

Systematic review of the links between human resource management practices and performance

M Patterson, J Rick, S Wood, C Carroll,
S Balain and A Booth



October 2010
10.3310/hta14510

Health Technology Assessment
NIHR HTA programme
www.hta.ac.uk





How to obtain copies of this and other HTA programme reports

An electronic version of this title, in Adobe Acrobat format, is available for downloading free of charge for personal use from the HTA website (www.hta.ac.uk). A fully searchable DVD is also available (see below).

Printed copies of HTA journal series issues cost £20 each (post and packing free in the UK) to both public **and** private sector purchasers from our despatch agents.

Non-UK purchasers will have to pay a small fee for post and packing. For European countries the cost is £2 per issue and for the rest of the world £3 per issue.

How to order:

- fax (with **credit card details**)
- post (with **credit card details** or **cheque**)
- phone during office hours (**credit card** only).

Additionally the HTA website allows you to either print out your order or download a blank order form.

Contact details are as follows:

Synergie UK (HTA Department)
Digital House, The Loddon Centre
Wade Road
Basingstoke
Hants RG24 8QW

Email: orders@hta.ac.uk

Tel: 0845 812 4000 – ask for ‘HTA Payment Services’
(out-of-hours answer-phone service)

Fax: 0845 812 4001 – put ‘HTA Order’ on the fax header

Payment methods

Paying by cheque

If you pay by cheque, the cheque must be in **pounds sterling**, made payable to *University of Southampton* and drawn on a bank with a UK address.

Paying by credit card

You can order using your credit card by phone, fax or post.

Subscriptions

NHS libraries can subscribe free of charge. Public libraries can subscribe at a reduced cost of £100 for each volume (normally comprising 40–50 titles). The commercial subscription rate is £400 per volume (addresses within the UK) and £600 per volume (addresses outside the UK). Please see our website for details. Subscriptions can be purchased only for the current or forthcoming volume.

How do I get a copy of HTA on DVD?

Please use the form on the HTA website (www.hta.ac.uk/htacd/index.shtml). *HTA on DVD* is currently free of charge worldwide.

The website also provides information about the HTA programme and lists the membership of the various committees.

Systematic review of the links between human resource management practices and performance

M Patterson,^{1*} J Rick,² S Wood,³ C Carroll,⁴
S Balain⁵ and A Booth⁴

¹Institute of Work Psychology, University of Sheffield, Sheffield, UK

²Health Services Research Group – Primary Care, University of Manchester, Manchester, UK

³School of Management, University of Leicester, Leicester, UK

⁴School of Health and Related Research (SchARR), University of Sheffield, Sheffield, UK

⁵Management School, University of Lancaster, Lancaster, UK

*Corresponding author

Declared competing interests of authors: none

Published October 2010

DOI: 10.3310/hta14510

This report should be referenced as follows:

Patterson M, Rick J, Wood S, Carroll C, Balain S, Booth A. Systematic review of the links between human resource management practices and performance. *Health Technol Assess* 2010;**14**(51).

Health Technology Assessment is indexed and abstracted in *Index Medicus/MEDLINE*, *Excerpta Medica/EMBASE*, *Science Citation Index Expanded (SciSearch®)* and *Current Contents®/Clinical Medicine*.

NIHR Health Technology Assessment programme

The Health Technology Assessment (HTA) programme, part of the National Institute for Health Research (NIHR), was set up in 1993. It produces high-quality research information on the effectiveness, costs and broader impact of health technologies for those who use, manage and provide care in the NHS. 'Health technologies' are broadly defined as all interventions used to promote health, prevent and treat disease, and improve rehabilitation and long-term care.

The research findings from the HTA programme directly influence decision-making bodies such as the National Institute for Health and Clinical Excellence (NICE) and the National Screening Committee (NSC). HTA findings also help to improve the quality of clinical practice in the NHS indirectly in that they form a key component of the 'National Knowledge Service'.

The HTA programme is needs led in that it fills gaps in the evidence needed by the NHS. There are three routes to the start of projects.

First is the commissioned route. Suggestions for research are actively sought from people working in the NHS, from the public and consumer groups and from professional bodies such as royal colleges and NHS trusts. These suggestions are carefully prioritised by panels of independent experts (including NHS service users). The HTA programme then commissions the research by competitive tender.

Second, the HTA programme provides grants for clinical trials for researchers who identify research questions. These are assessed for importance to patients and the NHS, and scientific rigour.

Third, through its Technology Assessment Report (TAR) call-off contract, the HTA programme commissions bespoke reports, principally for NICE, but also for other policy-makers. TARs bring together evidence on the value of specific technologies.

Some HTA research projects, including TARs, may take only months, others need several years. They can cost from as little as £40,000 to over £1 million, and may involve synthesising existing evidence, undertaking a trial, or other research collecting new data to answer a research problem.

The final reports from HTA projects are peer reviewed by a number of independent expert referees before publication in the widely read journal series *Health Technology Assessment*.

Criteria for inclusion in the HTA journal series

Reports are published in the HTA journal series if (1) they have resulted from work for the HTA programme, and (2) they are of a sufficiently high scientific quality as assessed by the referees and editors.

Reviews in *Health Technology Assessment* are termed 'systematic' when the account of the search, appraisal and synthesis methods (to minimise biases and random errors) would, in theory, permit the replication of the review by others.

The research reported in this issue of the journal was commissioned by the National Coordinating Centre for Research Methodology (NCCRM), and was formally transferred to the HTA programme in April 2007 under the newly established NIHR Methodology Panel. The HTA programme project number is 06/91/06. The contractual start date was in March 2005. The draft report began editorial review in April 2009 and was accepted for publication in June 2009. The commissioning brief was devised by the NCCRM who specified the research question and study design. The authors have been wholly responsible for all data collection, analysis and interpretation, and for writing up their work. The HTA editors and publisher have tried to ensure the accuracy of the authors' report and would like to thank the referees for their constructive comments on the draft document. However, they do not accept liability for damages or losses arising from material published in this report.

The views expressed in this publication are those of the authors and not necessarily those of the HTA programme or the Department of Health.

Editor-in-Chief: Professor Tom Walley CBE

Series Editors: Dr Martin Ashton-Key, Professor Aileen Clarke, Professor Chris Hyde, Dr Tom Marshall, Dr John Powell, Dr Rob Riemsma and Professor Ken Stein

Editorial Contact: edit@southampton.ac.uk

ISSN 1366-5278

© 2010 Queen's Printer and Controller of HMSO

This journal is a member of and subscribes to the principles of the Committee on Publication Ethics (COPE) (<http://www.publicationethics.org/>). This journal may be freely reproduced for the purposes of private research and study and may be included in professional journals provided that suitable acknowledgement is made and the reproduction is not associated with any form of advertising.

Applications for commercial reproduction should be addressed to: NETSCC, Health Technology Assessment, Alpha House, University of Southampton Science Park, Southampton SO16 7NS, UK.

Published by Prepress Projects Ltd, Perth, Scotland (www.prepress-projects.co.uk), on behalf of NETSCC, HTA.

Printed on acid-free paper in the UK by Henry Ling Ltd, The Dorset Press, Dorchester.

MR



Abstract

Systematic review of the links between human resource management practices and performance

M Patterson,^{1*} J Rick,² S Wood,³ C Carroll,⁴ S Balain⁵ and A Booth⁴

¹Institute of Work Psychology, University of Sheffield, Sheffield, UK

²Health Services Research Group – Primary Care, University of Manchester, Manchester, UK

³School of Management, University of Leicester, Leicester, UK

⁴School of Health and Related Research (ScHARR), University of Sheffield, Sheffield, UK

⁵Management School, Lancaster University, Lancaster, UK

*Corresponding author

Background: In recent years human resource management (HRM) has been seen as an important factor in the successful realisation of organisational change programmes. The UK NHS is undergoing substantial organisational change and there is a need to establish which human resource (HR) initiatives may be most effective.

Objectives: To assess the results from a wide-ranging series of systematic reviews of the evidence on HRM and performance. The first part assesses evidence on use of HRM in the UK and fidelity of practice implemented. The second part considers evidence for the impact of HRM practices on intermediate outcomes, which can impact on final outcomes, such as organisational performance or patient care.

Data sources: The following databases were searched: Applied Social Sciences Index and Abstracts (ASSIA), British Nursing Index (BNI), Business Source Premier, Campbell Collaboration, Cochrane Central Register of Controlled Trials (CENTRAL), Cochrane Database of Systematic Reviews (CDSR), Cumulative Index to Nursing and Allied Health Literature (CINAHL), Database of Abstracts of Reviews of Effectiveness (DARE), DH-Data, EMBASE, Health Management Information Consortium (HMIC), International Bibliography of the Social Sciences (IBSS), King's Fund database, MEDLINE, NHS Economic Evaluation Database (NHS EED), National Research Register (NRR), PREMEDLINE, PsycINFO, ReFeR, Social Sciences Citation Index (SSCI) and Science Citation Index (SCI). The searches were conducted in May/June 2006.

Review methods: Broad categories of HRM interventions and intermediate outcomes were generated: 10 HRM categories and 12 intermediate outcome categories. Seven patient final outcomes

were derived from the NHS Performance Indicators and the NHS Improvement Plan. The quality criteria used to select papers incorporated a longitudinal study design filter to provide evidence of the causal direction of relationships between HRM and relevant outcomes. Single HRM practices were considered. Within the health-specific literature, focus was on the impact of HRM on patient outcomes. Information is presented on the reliability of measures in each of the intermediate outcome areas.

Results: Work design practices that enhance employee autonomy and control influenced a number of outcomes and there was consistent evidence for the positive impact of increased job control on employee outcomes, such as job satisfaction, absence and health. For employee participation, the small number of studies reviewed supported the involvement of employees in design/implementation of changes that affect their work. In health literature in particular, employee involvement through quality improvement teams resulted in improved patient outcomes. Findings were positive for the impact of training on the intended outcomes of the initiatives. Support for the impact of performance management practices was apparent, in particular feedback on performance outcomes and the use of participative goal setting. Strong associations were found among all intermediate outcomes, and the relationship between most intermediate behaviours and outcomes were significant.

Limitations: Limited evidence was available on the use of HRM and on the implementation of policy. Also, the specific practices studied within each HRM category differ so there was little evidence to show whether similar practices have the same effects in health and non-health settings.

Conclusions: Some potentially effective practices for both health and non-health areas were identified, and HRM methods could be used to support change processes within the NHS; the findings relating to work organisation are particularly promising with regard to changes in methods of service delivery. Using training to support the implementation of change

is highlighted. However, future multilevel studies that embrace the individual, team and organisational level are needed. Studies should look into interventions aimed at improving HR outcomes and performance, and allow for pre- and post-intervention measurement of practices and outcomes.



Contents

List of abbreviations	vii	Definitions of selected intermediate outcomes	69
Executive summary	ix	Distinguishing final outcomes and intermediate outcomes	74
I Introduction	1	6 The impact of HRM practices on intermediate outcomes among health professionals	75
Context for the review: overview of the literature on HRM and organisational performance	1	Introduction	75
Review aim, scope and objectives	4	Review methodology	75
Report	4	Results	76
2 Methodology	7	Conclusions	82
Introduction	7	7 The impact of HRM practices on final outcomes in the health sector	85
Applying systematic review methodology within the HRM literature	7	Introduction	85
Overview of systematic review methodology	8	Patient outcomes	85
Applying the systematic review methodology	8	Review methodology	87
Summary of specific research questions and methodological approaches	14	Results	88
3 HRM practices and their reported use in the UK	17	Conclusions	124
Introduction	17	8 Impact of HRM practices in non-health settings	129
What HRM practices are described in the literature?	17	Introduction	129
How widespread is the use of these HRM practices in the UK?	19	Review methodology	129
Summary	21	Conclusions	207
Conclusion	49	9 Intermediate and final outcomes: correlations and effects	209
4 Implementation fidelity in HRM	51	Introduction	209
Introduction	51	Review methodology	209
Policy-practice link and implementation fidelity	51	Findings for Objective 3.1	211
Dimensions of fidelity	52	Findings for Objective 4.2	217
Overview of findings from fidelity studies in social policy	52	Findings for Objective 4.1	218
Fidelity of HR policy	59	Conclusions	222
A framework for implementation fidelity ..	64	10 Measuring the intermediate outcomes of HRM: the reliability of measures	223
Conclusion	65	Introduction	223
5 Identifying linkages between HRM practices and performance outcomes ..	67	What is measurement reliability?	223
Introduction	67	Which intermediate outcomes is it valid to measure in this context?	224
Intermediate outcomes linking HRM and performance	67	Reliability of intermediate outcome measures	225
Selecting intermediate outcomes	68	Conclusions	234
		11 Conclusions and recommendations	237
		Introduction	237
		Systematic review methodology	237

Identification of HRM practices	237	Appendix 4 Guidance on monitoring implementation fidelity	301
Range and fidelity of use of HRM practices in the UK	238	Appendix 5 Implementation fidelity checklist	303
Evidence for the link between HRM practices and intermediate outcomes in the health sector	239	Appendix 6 Patient outcomes search strategy	311
Impact of HRM practices on patient outcomes	239	Appendix 7 Typical HRM and longitudinal search filters	313
Impact of HRM on intermediate and final outcomes in the non-health literature	240	Appendix 8 Example Business Source Premier and PsycInfo search filters	315
Broad emergent themes from the health and non-health literature	241	Appendix 9 Discussion of bias in meta-analyses	317
Relationship between intermediate outcomes and final outcomes	242	Appendix 10 Checklist to assess bias in meta-analyses	319
Measures of intermediate outcomes	243	Appendix 11 Assessment of bias for included meta-analyses	321
Conclusions	244	Health Technology Assessment reports published to date	335
Future research	244	Health Technology Assessment programme	359
Concluding comments	246		
Acknowledgements	247		
References	249		
Appendix 1 Taken from original proposal to NCCSDO	281		
Appendix 2 HRM practice categories and definitions	295		
Appendix 3 HRM practice categories and associated terms from the literature ..	299		



List of abbreviations

BSI	bloodstream infection	NA	nursing aide
CCM	<i>Critical Care Medicine</i>	NP	nurse practitioner
CIPD	Chartered Institute of Personnel and Development	OCB	organisational citizenship behaviour
EPOC	Employee Direct Participation in Organisational Change	OCQ	Organisational Commitment Questionnaire
ESOP	employee stock option plan	OM	outcomes manager
ESWT	European Survey on Working Time and Work–Life Balance	OSQ	Occupational Stress Questionnaire
FFS	fee for service	PDP	personal development plan
FTE	full-time equivalent	PMS	performance management system
GHQ	General Health Questionnaire	PPM	participative productivity management
GP	general practitioner	QICC	quality indicator for client care
HCC	Healthcare Commission	R&D	research and development
HR	human resource	RBSE	role breadth self-efficacy
HRM	human resource management	RCT	randomised controlled trial
HPWP	high-performance work practice	RN	registered nurse
ICC	intraclass correlation	SDO	Service Delivery and Organisation
ICU	intensive care unit	SOC	sense of coherence
IPCC	Intensive Psychiatric Community Care	TQM	total quality management
JDI	job descriptive index	PNP	paediatric nurse practitioner
JDS	Job Diagnostic Survey	ProMES	Productivity Measurement and Enhancement System
JIT	just-in-time	UTI	urinary tract infection
LOC	locus of control	WAB	weighted application blank
LOS	length of stay	WAS	Ward Atmosphere Scale
MPS	motivating potential score	WERS	Workplace Employment Relations Survey
MSQ	Minnesota Satisfaction Questionnaire		

All abbreviations that have been used in this report are listed here unless the abbreviation is well known (e.g. NHS), or it has been used only once, or it is a non-standard abbreviation used only in figures/tables/appendices, in which case the abbreviation is defined in the figure legend or in the notes at the end of the table.



Executive summary

Context for this review

The UK NHS is the largest employer in Europe, involving complex and diverse services and work roles. The NHS continues to undergo substantial organisational change, as indicated by increased emphasis on performance targets representing drivers at local, national and clinical level.

Human resource management (HRM) is being seen as a vital element in the successful realisation of these change programmes and is being given a greater prominence than it has traditionally. It is therefore timely to assess the evidence we have on what human resource (HR) initiatives are most effective.

HRM in the UK

Over the past two decades, growing research attention has been given to exploring the links between organisational performance and HRM systems and processes, and especially the much-touted modern, high-involvement management approach. This has generated a large body of literature, largely cross-sectional in nature, i.e. measures of performance and systems are taken at the same time, so it is not possible to determine cause and effect. Reviews of this literature have given rise to the perception that the significance of HRM in determining organisational performance has largely been proven. Increasingly, however, a number of researchers are questioning whether the claims for evidence of a universal link between HRM and performance are overstated – while they endorse the importance of this line of research, they particularly draw attention to methodological limitations of the studies and the heterogeneity of the measures of HRM used across the studies.

This report presents the results from a wide-ranging series of systematic reviews of the evidence on HRM and performance. The searches included literature published up to June 2006 and covered the general HRM literature, not simply the health literature. It is distinctive in a number of ways:

- The quality criteria that were used to select papers for inclusion incorporated a

longitudinal study design filter, as this may provide evidence about the causal direction of relationships between HRM and relevant outcomes in a way that cross-sectional data cannot.

- The review considers single HRM practices and is not confined to collectivities of them, or 'bundles' as they are known in the high-performance management literature.
- The review covers issues around the implementation of HRM in practice and the measurement of relevant intermediate outcomes in the HRM performance chain.
- Within the health-specific literature, the review is focused, in particular, on the impact of HRM on patient outcomes.

How widespread is the use of HRM practices in the UK?

The first part of this review is concerned with evidence on the use of HRM in the UK and the fidelity or accuracy with which HRM practices are implemented. Limited evidence on the use of HRM is available. A review of national survey data identified some evidence on the use of specific HRM practices in 10 broad practice categories, although very little was disaggregated to the health sector level. The most commonly cited practices were family-friendly and work organisation ones, which were used in 70% of workplaces. The data do not always indicate the precise extent of the use practices within organisations, i.e. whether practices apply to all, or some, of the workforce.

Little is known, therefore, about what HRM practices are used within the NHS at the present time. A more detailed picture could be achieved through further analysis of the Workplace Employment Relations Survey (WERS) or through bespoke future surveys.

How well implemented are HRM practices?

A further important consideration in assessing the impact of HRM practices is *implementation fidelity*, i.e. the accuracy with which policies are implemented by organisations in practice. Research from social policy, where the concept

of implementation fidelity is more established, indicates that the fidelity with which a practice is implemented is related to its efficacy. Within HRM, this review found only a few studies that had collected data on the implementation of a policy and this appeared to be an area that was largely ignored in the HRM literature. The majority of research focuses on policy or intended HRM practices rather than actual or implemented practices. This finding has considerable implications for interpretation of the research and understanding why a study might find a weak, or no, relationship between a practice and its intended outcome. This review proposes a framework for understanding and explaining processes at work in evaluating and achieving implementation fidelity, within the context of HRM and policy. Appendices 3 and 4 present guidance and a checklist for evaluating fidelity, based on these findings.

For all new HRM practices, the process of implementation should be clearly stated and adherence to the implementation needs to be evaluated as well as any intended outcomes.

Impact of HRM

The remit for the second part of this review was to consider the evidence for the impact of HRM practices on intermediate outcomes (the intended outcomes of HRM) that may ultimately impact on final outcomes such as organisational performance or patient care. In other words, the focus was on HRM interventions and employee mental, emotional and attitudinal states (and their measurement), thought to influence employee behaviours that are salient to effective organisational performance.

HRM practices and outcomes considered in the review

Broad categories of HRM interventions and intermediate outcomes were generated through the literature. This list was refined over the course of the study to produce 10 HRM categories and 12 intermediate outcome categories. Seven patient (final) outcomes were derived from the NHS Performance Indicators (Healthcare Commission 2005) and the NHS Improvement Plan (NHS 2005). No final outcomes were specified in the non-health-care literature (i.e. any longitudinal studies of HRM practices were considered for inclusion):

- HRM practices:
 - work design

- staffing
- training and development
- compensation and rewards
- communication
- family friendly
- single status/status harmonisation
- employee representation and participation
- appraisal/performance management
- bundles of practices
- intermediate outcomes:
 - motivation
 - job satisfaction
 - organisational commitment
 - occupational commitment
 - engagement
 - burnout
 - job involvement
 - turnover intentions
 - psychological contract
 - organisational justice
 - organisational support
 - organisational climate
- final outcomes:
 - patient safety
 - patient-centred care
 - patient waiting times
 - patient satisfaction
 - health-related quality of life
 - patient mortality
 - patient stay
 - re-admissions.

Overall findings on impact

HRM in health and non-health settings

There is an imbalance in the practices covered, so in both health and non-health areas certain domains of HRM are covered disproportionately more than in others. This highlights areas of HRM that have yet to be researched, including in an NHS context. Additionally, very few replication studies were found, so many of the findings in this report are based on only a small number of studies that precludes the development of generalisable conclusions.

Some HRM practices have been the subject of research in both the health and the non-health sectors. However, the specific practices that have been studied within each HRM category do differ, so there is little evidence to show whether similar HRM practices have the same effects in health and non-health settings. An implication of this finding is that care needs to be taken when adopting HRM practices from outwith the NHS – it cannot be assumed that the same practices are appropriate in both settings or that the same effects will accrue.

No single HRM practices or bundle of practices were found to be a panacea. However, our review does enable us to identify some potentially effective practices for both health and non-health areas.

- In the area of work design, practices that enhance employee autonomy and control are influential in relation to a number of outcomes and there is consistent evidence for the positive impact of increased job control (in various forms) on employee outcomes such as job satisfaction, absence and health.
- In the parallel field of employee participation, the small number of studies reviewed here supports the widely advocated principle of involving employees in the design and implementation of changes (e.g. job redesign) that affect their work. Specifically in the health literature, employee involvement through quality improvement teams was found to be effective in terms of improved patient outcomes.
- In the area of training, findings are consistently positive for the impact of training on the specific intended outcomes of the training initiatives.
- Support for the impact of performance management practices is found and particularly the importance of feedback on performance outcomes and the use of participative goal setting.

Such evidence points to the HRM methods that can be used to support and enhance change processes within the NHS. The findings in the work organisation area are particularly promising in the light of considerable changes in methods of service delivery that are ongoing in the NHS. Opportunities for job and service redesign within the NHS offer great scope for future exploration. The use of training to support the implementation of change is also highlighted in the good practice around implementation fidelity identified by this review, and therefore is important evidence on the process of HRM policy development and practice.

Relationships between intermediate outcomes

The relationships amongst intermediate outcomes were also examined. Moderate to high correlations were found between all of the intermediate outcomes for which data were available. The associations, although strong, do not suggest construct redundancy and it is reasonable to

conclude that each of the intermediate outcomes identified in this review may contribute uniquely to efforts to understand and manage employee behaviours.

The review also explored the correlations between intermediate outcomes and productivity-enhancing behaviours (e.g. individual job performance, employee turnover). The relationships between most intermediate outcomes and behaviours were significant and of small to moderate strength. The premise here is that intermediate outcomes are determinants of salient employee behaviours, which, in turn, enhance organisational performance. These data do not prove a causal link but do demonstrate associations.

Impact of intermediate outcomes on final outcomes

This review was unable to identify any longitudinal evidence to assess whether intermediate outcomes, such as job satisfaction or burnout, impact on patient-care outcomes. In the non-health field, a small number of longitudinal studies were identified that examined the impact of intermediate outcomes (mostly average employee job satisfaction) on organisational performance. While the studies in this review show associations, the evidence on the casual direction of this relationship is mixed. This relationship is a crucial link for the premise that HRM influences final outcomes partially through its impact on employee outcomes such as job satisfaction, and we clearly need more substantial data sets for surer interpretation.

Measuring intermediate outcomes in the NHS

The report presents information on the reliability of measures in each of the intermediate outcome areas identified for review. Where possible, the specific measures used in the included studies were reported on. Where an intermediate outcome area was not covered by the studies included in this review, the subject experts on the research team identified an appropriate measure for inclusion. Details of the measures, their items and reliabilities are presented in Chapter 10.

These measures represent a basic toolkit that could be used or adapted for future NHS-based research of the HRM performance link.

Future research foci

Many of the problems of the studies taken collectively arise from the small-scale funding that characterises social science. Developing a 'big science' project that permits repeat surveys, a broad coverage of practices, independent audits of practices, and reliable and valid performance measures would be desirable. Smaller-scale projects would still be useful, for example, to delve into the fidelity of implementation issue, but they would have more value if set in the context of bigger studies. Existing data sets, for example, the WERS and Healthcare Commission (HCC) staff survey,

could be usefully revised to take account of some of the learning from this and other overviews. More attention needs to be given to the intermediate variables between HR practices and organisational performance. Thus, multilevel studies that embrace the individual, team and organisational level (and, in the case of the NHS, Trust level) are needed. Finally, studies of interventions aimed at improving HR outcomes and performance should be encouraged, together with a mechanism for bringing together researchers and organisations before the interventions take place. This would allow pre- and post-intervention measurement of relevant HRM practices and outcomes.

Chapter I

Introduction

Appropriate human resource management (HRM) policies and practices are vital if the UK NHS is to change the process of health care and improve outcomes for patients. The key issue is what 'appropriate' means in this context, and the evidence on which this can be based. This report presents findings from a series of systematic reviews of the literature linking HRM practices to performance outcomes in the NHS and wider organisational settings. It was commissioned by the National Coordinating Centre for Research Methodology (now part of the NIHR HTA programme under the NIHR Methodology Panel) and the NIHR Service Delivery and Organisation (SDO) Research and Development (R&D) Programme, and the reviews were undertaken between September 2005 and July 2007.

First, this chapter provides an overview of research in the field of HRM, exploring current debates and the rationale for the review. It then goes on to explain the research brief and detail the specific objectives for the review. Finally, the structure of the report and presentation of findings are described.

Context for the review: overview of the literature on HRM and organisational performance

Focus on high involvement and skill acquisition

The Department of Health (www.dh.gov.uk/en/index.htm) repeatedly singles out the crucial role of skill development, involvement, team working and morale to the modernisation of the NHS. In the words of the Department of Health's website, 'Successful human resources management improves efficiency through a culture that supports and develops its staff, allowing the workforce to share in the organisation's objectives' (www.dh.gov.uk/en/Policyandguidance/Humanresourcesandtraining/Buildingpeoplemanagementskills/index.htm).

The evidence offered to support the Department's view that HRM is vital to the NHS is the finding

that patient mortality rates improve in acute hospitals where an HRM director is a member of the Trust Board. In this, the Department of Health is mirroring a more general emphasis on employee development and involvement as key to maximising the human resource (HR) contribution to strategic objectives of organisations. This high-involvement management and human capital approach to HRM, sometimes referred to as 'the HRM approach', has been at the centre of the literature for the past two decades. For consistency, we refer to it as 'the high-involvement management approach', while acknowledging that not all of those who are referring to modern HRM necessarily place empowerment at its core, but rather emphasise the development of human skills and knowledge. The term 'HRM' is used whenever a potentially more all-embracing concept of personnel management is being considered.

The past 20 years have seen increasing attention given to both the general notion of HRM and the more specific high-involvement management approach as a major contributor to organisation performance, even in capital or technologically intensive industries. High-involvement management is assumed to contribute both in its own right and as a support for such other modern management practices as total quality management (TQM) and just-in-time (JIT). So, in the health context, high-involvement management adds to the human capital of the workforce and helps support new modes of organisation, technology and patient delivery. Its importance derives from an assumption that some forms of personnel management – and, particularly in the current context, approaches founded on involvement and development – have greater effects on the development, skills and motivation of employees than others.

Much of the attention given to the high-involvement or commitment HRM system has been advocacy. Contrasting it with a traditional control approach (sometimes known as Taylorist or Fordist), academics¹⁻³ have championed high-involvement management as a progressive form of management that can remove past restrictions to both economic efficiency and the achievement

of high-quality performance, thereby sharpening the competitive edge of Western organisations and improving public sector delivery. They contend that there is a unique set of practices or approaches to management that will, regardless of the context, outperform all others. Within the strategy literature, the resource-based theory of the firm⁴⁻⁶ highlights how human resources, and the knowledge embodied in them, may be decisive for long-term competitive advantage. In the operations management literature⁷⁻¹⁰ the emphasis is on how HRM practices and the knowledge and skills of workers are decisive in exploiting lean production¹¹ and other modern management methods (e.g. see Dean and Bowen¹² on TQM).

Research evidence

The last decade has witnessed a stream of research assessing high-involvement management and its associated concepts. The basic hypothesis underlying this work is that high-involvement HRM systems will have positive effects on organisational performance. As academics have sought to move beyond advocacy of high-involvement systems, they have focused on testing this hypothesis. A spate of research studies in the 1990s were motivated by this, with many surmising that high-involvement HRM systems do perform best.¹³⁻²⁰ Several overviews^{21,22} concluded that, on the basis of the first few studies, the universalistic hypothesis is supported. The increasing use of the term 'high-performance' model to describe the set of practices may imply that the matter is indeed settled, much as a drug might be named by the disease it is known to cure.

The initial overviews of these studies^{22,23} tended to present them in a homogeneous way, taking for granted that they are studying the same phenomenon and that the results are broadly the same, concluding they had successfully demonstrated the link between the human capital approach and key organisational outcomes. These reviews have led some to conclude that the main issue now is to explain the link between high-involvement management and performance, i.e. to assess the mechanisms between them or get inside the 'black box' between the HRM system and outcomes. A second issue might be the extent to which the link will be found in all contexts, and particularly in service industries such as health care. The majority of the early studies were in manufacturing, and it is significant that one of the few early studies in services²⁴ found evidence of a contingent relationship between the human capital

approach and performance, i.e. that the impact of human capital will vary between contexts. In the past few years, more studies have either been conducted singly in the service sector or included that sector within the scope of the study,^{15,25-27} and the results have been mixed. Studies specifically on health care are emerging, for example West *et al.*²⁸ have investigated the link between HRM and patient mortality.

Assessing the evidence

Notwithstanding the above, an increasing number of writers question whether the portrayal of the studies as providing conclusive evidence for a universal link between HRM and performance is premature, and that there is a clear need to delve more deeply – both into the studies and into the reality of high-involvement management and its links to other aspects and methods of management. There are a number of reasons for extending the debate.

First, the results of the various studies are neither as clear-cut nor as uniform as some have concluded (see Wood,²⁹ particularly table 1 for a summary of the main results; and Wall and Wood^{30,31}). Within studies, there is unevenness in the findings between performance measures; while some results point to universal effects, others do not. Moreover, in many studies only the universal hypothesis has been tested so one cannot rule out the contingency argument that the effects of high-involvement management on performance are contingent on a third factor, either a dimension of the context or the strategy of the organisation, even when a positive link between high-performance management and performance has been found.

Second, it is not always clear whether high involvement or performance management is being defined simply as the combined use of best practice in each domain of human resources, as a synergistic set of practices, or by a more fundamental managerial orientation.³² In fact, the discussion so far has begged the question of how we define and identify a system. Most studies have defined an HRM system a priori, often with little theoretical justification, as the emphasis has been on testing the high involvement–performance link, rather than first investigating the relationship between practices or the nature of any systems. Researchers have measured HRM on the basis of differentiating organisations by their usage of a set of practices, the precise means varying between studies. Then they correlate these differences with performance

measures. The problem of simply aggregating practices to provide an overall measure of HRM is that each practice is treated implicitly as if it were equally important. With only a few exceptions,^{33,34} studies have provided insufficient information about which individual or subset of practices has the strongest effects and which may be marginal or even irrelevant. In one case¹³ where this was done, and it was shown that only some of the practices affect performance, and, moreover, that their strength varied between industrial context, though the authors still framed their conclusions in terms of an overall (high-performance work) system yielding superior performance. Aggregating practices does not allow one to test whether the effects of one practice are enhanced by the use of another, i.e. whether they are synergistically related, and begs the question of whether they tend to be used together.^{32,35}

Third, there is considerable variability across studies in the practices included either in the model of high-involvement management or the set of practices used to test its link to performance. Some of the differences are terminological, perhaps reflecting disciplinary biases or a quest to differentiate one's wares. But a core difference within the literature can be identified. On the one hand are those authors who see the core of high-involvement management as changes in work organisation, job design and employee involvement methods (particularly idea capturing), with the other practices acting as supports to help motivate and equip people to work in a new, more flexible and proactive way. On the other hand are those who do not prioritise the task system. They may then concentrate more on skill acquisition, following an emphasis on the resource-based theory of the firm, according to which genuine competitive advantage reflects an organisation having a unique capability or set of resources. Therefore, primacy is placed on the competencies of individuals, rather than whether they are empowered. Alternatively, they may treat high-involvement management as entailing the use of the whole gamut of sophisticated personnel management methods, and conceive them as primarily operating through people's commitment or sense of whether they are being treated fairly and consistent with their psychological contract. The different approaches need not affect greatly the practices researchers include in their studies, but the inclusion of job design and work organisation practices is one major source of diversity between the studies, as Wood and Wall³¹ show. The other major difference is incentive

systems, with some studies treating them as part of high-involvement management or at least performance management, whereas others do not.

Fourth, there has been insufficient empirical exploration of the mechanisms or intervening variables that might explain any link between HRM and performance. Of course it must be acknowledged that there is little point in investing resources in exploring the reasons for a link until it has been established. Yet, labels such as 'high commitment' and 'involvement' imply certain mechanisms that are concerned with the extent of commitment or engagement on the part of the work force, which is mirrored in the importance given to morale in statements about the modernisation of health care, and these could be explored more than they have been. Much of the theoretical justification that precedes the empirical studies also implies that skills, knowledge and learning might have an independent effect on performance as important as employees' attitudes.

Some studies have included intervening variables, which have either centred on intermediate HR outcomes (e.g. labour turnover in Huselid¹⁸) or on commitment and satisfaction.^{36,37} Several authors hint at, but do not explore in depth, other mechanisms; for example, Guest and Conway³⁸ imply that procedural justice may be important. In addition to morale and staff development, an important emphasis in statements on the modernisation of health care is what might be termed the strategic integration of individuals into the organisation, so that they both understand and share the goals that achieving patient care entails and, consequently, orientate their behaviour towards common visions. Studies outside the narrow confines of the HRM studies, particularly building on the job redesign and lean production literature, point to the importance of the kinds of attitudes that advocates of total quality management and other modern management methods highlight, including quality consciousness,³⁹ continuous improvement orientation⁴⁰ or flexible work orientation.⁴¹

Finally, the majority of studies have concentrated on a narrow range of HRM practices in isolation, the exception being those that have included TQM in their analysis,^{20,31,34} but there is a general failure to assess the effectiveness of HRM and related practices relative to both key elements of management, such as leadership, and practices further afield, such as R&D expenditure.

In addition, despite the differences in focus and measures, most of the studies share a basic research design, which has a number of weaknesses. These include:

- The use of cross-sectional designs, which limits the ability to make causal inferences (e.g. to decide whether HRM practices promote performance, or rather better performance encourages greater investment in HRM).
- A reliance on a single data source (e.g. a chief executive or HRM director) for information on HRM practices and performance, which may result in measures of unknown reliability and common-method bias (see, for example, the debate between Huselid and Becker⁴² and Gerhart *et al.*⁴³ on the reliability of measures based on single respondents).
- Many have small samples, low response rates and concentrate on a limited range of sectors.

However, even the most searching reviews that have highlighted problems in the studies have concluded that there is nonetheless sufficient promise in the body of evidence to consider major investments in the area.³⁰ It is thus timely to invest in detailed assessment of what we know.

Review aim, scope and objectives

The overall aim of this series of related systematic reviews is to provide a picture of HRM practices in use in the UK, to identify evidence on the relationships between HRM practices and a variety of individual and organisational outcomes, and to

assess the reliability of measures of some outcomes of HRM.

The brief for the review was that its scope should be broad, covering, where feasible, evidence from non-health sectors, although evidence from the health sector should be emphasised.

The objectives of the review (source: NHS/SDO Invitation to Tender 2004) are to:

1. describe HRM practices and measure the fidelity with which they may be implemented
2. review the reliability of methods of measuring particular intermediate outcomes (intended outcomes of HRM that may affect patient care, e.g. morale)
3. review the literature on the correlation of intermediate outcomes to each other
4. investigate the correlation of intermediate outcomes with final outcomes
5. investigate the sensitivity of intermediate outcomes to individual HRM practices.

A pictorial summary of the project and its objectives (adapted from that provided in the original brief) is shown in *Figure 1* (for details of the full proposal see Appendix 1).

Report

This report presents findings from a series of systematic reviews of the relationship between HRM practices and performance. The reviews presented two principal challenges to the research team. First, the literature on HRM and

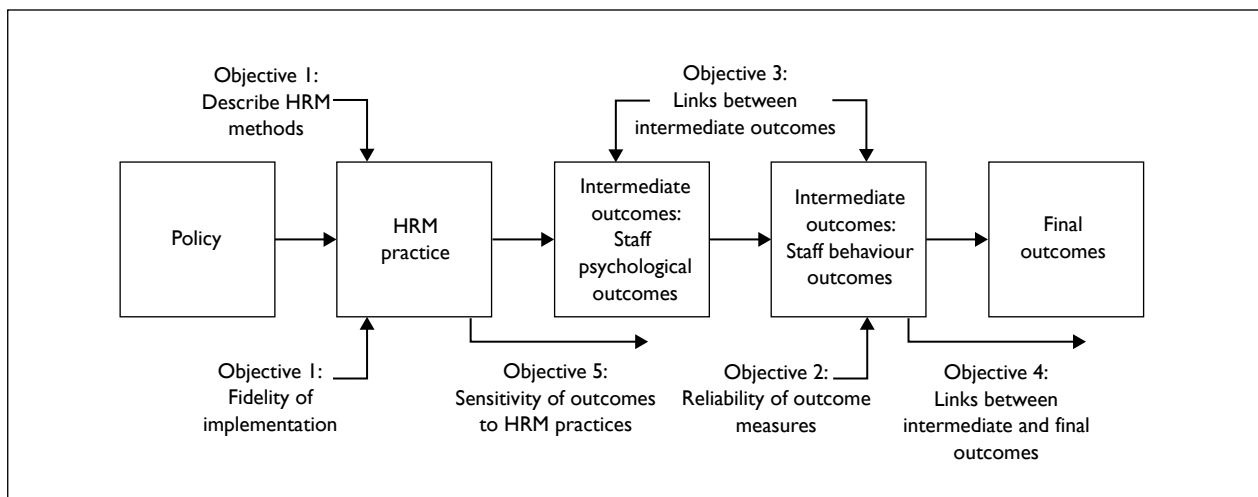


FIGURE 1 Human resource management policy, performance model and project objectives.

performance, and possible intervening variables linking the two, is diffuse, considerable and complex. For example, the research literature contains contributions from several disciplines, using different types of research designs, and what constitutes HRM and performance can vary considerably from study to study. Second, systematic review methodology has not been used much in the HRM field. As the literature is heterogeneous on a number of dimensions, we use a reflective approach, adapting and developing the review methodology to meet the particular demands of each research objective rather than using an identical methodology throughout the project.

Chapter 2 of the report describes the methodological context for the review, detailing recent developments in thinking and methodology that we have drawn upon. It then provides a methodological summary, including a description of the systematic review methodologies used in this research, the process by which research objectives were translated into specific research questions and an overview of the range of methods used in relation to each research question.

Chapter 3 addresses some of the research questions relating to Objective 1 of the review, specifically detailing:

- the range of HRM practices described in the literature
- evidence on the extent to which these practices are used in UK organisations.

Chapter 4 considers implementation fidelity (Objective 1), i.e. the extent to which HRM practices are actually put into practice, and the extent to which this is measured and how it could be measured, based on a critical review of the literature.

Chapter 5 explores current understanding of the linkages between HRM practices and performance

outcomes. It outlines the identification of intermediate and final outcomes, and provides a context for interpreting the review findings.

Chapters 6–8 investigate the sensitivity of intermediate outcomes to individual HRM policies (Objective 5) and present findings from a series of systematic reviews of the evidence on the impact of HRM practices on intermediate and final outcomes in the general and health literature:

Chapters 6 and 7 focus on evidence from the health sector:

- Chapter 6 presents a synthesis of evidence on the extent to which HRM practices affect intermediate outcomes in the health sector.
- Chapter 7 outlines the findings of a systematic review of the impact of HRM practices on health sector outcomes.

Chapter 8 reports on findings from a systematic review in the general HRM literature to identify and synthesise evidence on the links between HRM practices and both intermediate and final outcomes. It details specific search strategies and presents a narrative synthesis of results.

Chapter 9 describes the pattern of intercorrelations found in the literature both between intermediate outcomes (Objective 3) and between intermediate and final outcomes (Objective 4).

Chapter 10 presents evidence on the reliability and validity of measures of intermediate outcomes (Objective 2). Generic and health sector-specific measures of intermediate outcomes are identified, and the best available evidence on their reliability is presented.

Chapter 11 comprises the conclusions and recommendations, based on the evidence in this report.

Chapter 2

Methodology

Introduction

Chapter 2 provides a broad description of the methodological approaches used at different stages in the review. First, the research context is considered and the challenges of applying systematic review methodology to the HRM literature are discussed. Next, the systematic review approaches used are explained and the specific questions for the review established. The combinations of search terms and databases used are detailed and a summary of the methodological approaches used in addressing each of the specific research questions is presented.

Applying systematic review methodology within the HRM literature

Systematic review methodology has a very limited pedigree within HRM, which has only comparatively recently begun to adopt some of the tools of evidence-based practice.⁴⁴ Nevertheless, some key studies do exist. For example, Levy and Williams⁴⁵ conducted a systematic review of 300 studies examining the social context of performance appraisal and Taris⁴⁶ examined 16 studies dealing with the burnout–performance relationship. The lack of a significant body of exemplars within HRM has limited the capacity of this particular field to develop tailored methods of systematic review and to stimulate methodological innovation in the identification, assessment and synthesis of this type of data. As a consequence, there are very few instances of methodological papers on conducting systematic reviews within HRM. The review team, therefore, faced a number of challenges in conducting this series of systematic reviews and in leading the adaptation and development of methods to tackle practical problems generated by these review questions. The challenges were compounded by a corpus of literature that conceives the concepts of both HRM and performance (and indeed their intersection) in different ways, asking comparable but not identical questions, and using different types of research design. Furthermore, the literature that

is examined in this review is multidisciplinary and heterogeneous. Finally, the review is composed of five (subsequently six) distinct and yet related objectives – not a single well-focused research question but rather a series of separate and equally elusive questions.

Systematic review was the method of choice because the methodology offers a number of models to be applied or modified depending on the questions being asked. Systematic review is an evolving methodology, primarily designed to answer questions regarding the effectiveness of interventions by synthesising findings from large numbers of studies. As such systematic reviews are ‘a scientific tool which can be used to summarise, appraise and communicate the results and implications of otherwise unmanageable quantities of research. They differ from traditional reviews and commentaries produced by “content experts” in that they use a replicable, scientific and transparent approach that seeks to minimise bias.’⁴⁷ Systematic reviews follow a process of constructing a clearly defined research question with inclusion and exclusion criteria, comprehensive searching to identify all relevant literature, quality assessment of selected studies, extraction of relevant data from these studies, and synthesis of the study results. In cases where there is sufficient similarity in the focus of studies, in terms of interventions and outcomes researched, a meta-analysis may be performed: a quantitative synthesis. The final result of the review is thus a conclusion based on a critical synthesis of the comprehensive, unbiased selection and appraisal of the best available research examining the topic under consideration, which typically, in the health area, is an intervention.

This methodology was originally developed for analysing the effectiveness of pharmaceutical interventions in medicine, based on quantitative data from randomised controlled trials (RCTs). Systematic reviews in the medical field now have an accepted, standardised methodology.^{47,48} In recent years, the advantages of systematic review over more conventional forms of literature review have been recognised and examples have appeared in other fields.^{49,50} This has led to the piloting and

development of methodologies for the review of qualitative research and the review of literature in disciplines, such as the social sciences,⁵¹ where there is no accepted hierarchy of study design or accepted criteria for quality assessment.⁵²⁻⁵⁷

Despite the challenges presented by heterogeneous types of research, systematic review methods are characterised by transparency of approach, along with comprehensiveness, reliability and reproducibility of methods and techniques.

Recent commentators on systematic review methods endorse the adoption of flexible, exploratory and reflective approaches, especially (as is the case here) when the fields of evidence being considered are both complex and multidisciplinary.^{56,58,59} The team therefore decided that rather than adhere strictly to any one systematic review methodology in answering the different questions posed by this review a more reflective approach should be taken, which would allow the development of the methodology as new challenges within the literature were encountered.

Overview of systematic review methodology

Each systematic review attempts to follow the standard model:

- consultation exercise to define research question(s)
- scoping exercise to define elements of research question (population, intervention, outcomes) and establish inclusion criteria
- production of protocol document specifying population, intervention, outcomes, and inclusion/exclusion criteria (study design, quality assessment, language, date)
- identification of potentially relevant literature (literature search)
- study selection and quality assessment
- data extraction
- data synthesis.

This chapter goes on to describe the broad systematic review approach adopted by this research. It outlines how each stage of the review was conducted for the series of reviews that were undertaken, and ultimately presents a summary of the review questions and methodologies.

Applying the systematic review methodology

As described in Chapter 1, the five primary research objectives are concerned with the evidence at each stage in a model of HRM and performance. The model identifies final outcomes (such as patient care and performance) as well as intermediate outcomes – conceptualised as the factors that link HRM practices to final outcomes. Hence, the review aims to identify evidence on the nature of the causal links between, on the one hand, HRM practices and intermediate outcomes and, on the other, intermediate and final outcomes. However, this clear-cut distinction between final and intermediate outcomes is not reflected in the literature. The team identified that evidence generated from studies falling outside the five stated objectives would also be informative, namely:

- studies that attempt to examine the whole HRM to performance chain, and
- studies that examine the impact of HRM on final outcomes.

As a result, a sixth objective was added to the list:

- to review the literature investigating the impact of HRM on final outcomes.

Developing research questions

Getting the question right is ‘the most important step in doing a review ... [because] poorly focused questions lead to unclear decisions about what research to include and how to summarise it’.⁴⁸ The first stage is to develop specific research questions for the review.

The initial steps for this project involved breaking down the research objectives into their specific component questions. The aim was to provide questions that would form the basis of the series of systematic reviews that followed. The process of formulating precise, answerable questions from the research objectives was achieved through consultation within the team and with the expert advisers.

The six research objectives (that is, the five that were originally commissioned and the sixth added following consultation with experts) were broken down into 10 specific questions, as shown in *Table 1*.

TABLE 1 Research objectives and specific research questions

Research objectives	Research questions
Describe HRM methods and measure the fidelity with which they may be implemented	What HRM practices are described in the literature? How widespread is the use of HRM practices in UK organisations? How can the fidelity with which an HRM practice is implemented be measured?
Review the reliability of measures of particular intermediate outcomes (intended outcomes of HRM)	What is the evidence on the reliability of measures of intermediate outcomes covered by this review?
Review the literature on the correlation of intermediate outcomes to each other	What is the evidence on the intercorrelation of intermediate outcomes with each other?
Review the literature investigating intermediate outcomes with final outcomes (be these business or patient centred)	What is the evidence for the impact of intermediate outcomes on non-health final outcomes? What is the evidence for the impact of intermediate outcomes on patient care outcomes?
Investigate the sensitivity of intermediate outcomes to individual HRM methods alone or in conjunction with each other	What is the evidence for the impact of HRM practices on the intermediate outcomes identified for this review?
Review the literature investigating the impact of HR methods on final outcomes	Which HRM practices have an impact on performance outcomes? Which HRM practices have an impact on patient outcomes?

Once this had been done, each research question was then typically broken down into the components of ‘population’, ‘intervention’, ‘comparators’ and ‘outcome’; this ‘PICO model’ provides a structure for devising research questions, constructing search strategies and defining the inclusion and exclusion criteria for the review.⁴⁷ It is not necessary for all of the elements of the PICO model to be present in every question. Where a PICO model has been used in these reviews, it is detailed in the specific methodology for that chapter.

Scoping exercise

The scoping exercise defines key issues for a review as clearly as possible in terms of the population, interventions and outcomes to be studied, and the inclusion and exclusion criteria to be applied. Together with the definition of the research question, this constitutes the ‘problem formulation stage, which involves the development of key research questions, construction of the definitions of the key concepts ... and the establishment of inclusion and exclusion criteria for the review’.⁶⁰

For each review, a series of scoping exercises was undertaken to identify the best search terms with regard to the balance of specificity (relevance) and sensitivity (inclusivity). The nature of the HRM literature made the identification of specific intervention and outcome terms particularly

challenging. Chapter 3 details the process of identifying HRM practice terms, and the specific intervention and outcome terms used by the respective reviews are given in Chapters 6–8.

Developing the protocol

The protocol provides an explicit outline and plan to be followed by the review. Conventional systematic review methods require that a protocol describe clearly defined populations, interventions and outcomes for the review, and provide details of the literature-searching procedure, quality assessment, and data extraction and synthesis to be conducted.⁴⁷ As the outcome of the scoping process, the protocol specifies the exact content and processes of the review, from which there should be no deviations. It facilitates the performance of the review by itemising exactly what the review does and does not include, and specifying the methods of quality assessment and synthesis. It should also state any language or geographical restrictions that might lead to bias in the review.^{61,62}

It is increasingly recognised that protocols for reviews in disciplines where the literature is a less known quantity, i.e. potentially heterogeneous, qualitative, and lacking the tradition of a recognised hierarchy of study design and quality assessment criteria,^{54,55,60,63} may be required to be broad, flexible and open to change. In short, as Eakin and Mykhalovskiy⁶⁴ suggest, the question is

to be viewed as a compass rather than an anchor, continually being enhanced and refined until completion of the review. Management is typical of such a discipline.⁵⁶ In such cases, it may be necessary to revisit and redefine interventions and outcomes in response to findings, and conduct iterative and purposive searching of the literature to address questions that arise or gaps identified in the literature.^{52,58,60,63} This is often the case where the overall intent of the review is interpretive, not aggregative, and where the terminology and concepts are neither secure nor predefined.⁶⁵ The starting point, defined by the protocol, can therefore be broad and inclusive, rather than narrow and exclusive, in contrast with that required by more traditional systematic reviews.

In order to manage the diffuse HRM literature, simple, broad protocols were developed for each search. Protocols were reviewed regularly during the search process to help shape the eventual body of literature included in the data synthesis.

Identifying literature

After the scoping exercise, which is naturally exploratory, imaginative and purposive, the approach adopted is required to become more systematic, transparent and reproducible. A literature search for a review aims 'to provide as comprehensive a list as possible of primary studies, both published and unpublished, which may be suitable for answering the question posed by the review'.⁴⁷ Systematic review methods almost unequivocally advocate an extensive and multimethod approach to identifying relevant literature. The intention is to identify all published and unpublished literature of relevance to the review that satisfies the review's inclusion criteria. The principal means for achieving this is the searching of electronic databases. Search strategies follow the PICO model, which, as mentioned previously, breaks a search query down into four separate elements: population, intervention, comparator and outcome, a now-standard approach within health care.⁶⁶ Critical in this, was a time-consuming process designed to identify both the interventions (HRM practices) and the outcomes (whether intermediate outcomes, such as job satisfaction or final outcomes, such as reduction in mortality). The resulting lists and classifications inform most of the subsequent questions. This process is described in more detail in Chapter 3 (HRM practices) and Chapters 5 and 7 (intermediate and final outcomes).

Identifying longitudinal studies

A further component of the review was restriction by study design. This was used for sections of the review that sought to establish a causal link between interventions, in this case HRM practices, and either intermediate or final outcomes. While longitudinal studies in themselves do not prove causality, it is widely recognised that longitudinal analyses do provide better evidence for causation than cross-sectional analyses that use the same variables.^{67,68} Indeed, contemporaneous systematic reviews of HRM have reported that they are limited in their ability to draw conclusions by their dependence on cross-sectional data.⁶⁹ The project team decided to limit the searches to longitudinal study designs only, as the intention was to identify those studies that could demonstrate causal links between HRM practices and outcomes, rather than simple associations. It is believed that this literature would offer evidence with greater capacity for answering the questions set by this review. No limitations of language were applied in order to avoid known biases produced by language and location.^{61,62} There were no limitations by date other than those of the databases themselves.

Operationalising the search

For much of this particular review, only terms pre-specifying an intervention and an outcome were required. Searches aimed to optimise use of free-text searching and keyword terms, along with synonyms and variant spellings. This improves the chances of identifying all literature relevant to a topic, and is particularly necessary within social sciences where indexing and abstracting quality falls short of standards encountered within health care.⁷⁰

Literature searching requires more than interrogation of electronic databases with search strategies based on the protocol. It should use other formal methods, such as citation tracking and scanning the reference lists of selected papers, and hand searching of relevant journals. Informal methods of study identification can also be utilised, such as personal communications from peer reviewers or expert advisors and serendipity. Supplementary formal and informal methods may account for many, or even a majority, of studies included in non-quantitative reviews.^{52,53,60,63} Such additional approaches are especially valuable if concepts are imprecise or if the literature is widely dispersed and inconsistently indexed.

In conventional review methodology, literature searching is refined by the scoping process and then carried out once.⁴⁷ However, where concepts or interventions are evolving or cannot be easily defined, supplementary, purposive literature searches may be performed. This may reflect an increasing understanding of the topic or the subsequent identification of specific questions raised by the findings of the review.^{52,63} Searching becomes an iterative rather than one-off process, the so-called 'spiral approach' as described by Grant *et al.*⁷¹ This was often how we had to proceed in this review, where pre-defining outcomes could have limited the findings. However, such a process is still systematic and consistent with the principles of systematic review methods. All search strategies and sources for all included papers are documented to make the process transparent, auditable and reproducible.

Developing the search terms

Scoping searches were performed using two of the less ambiguous categories from the list of HRM practices generated for the review: pay and training. Even relatively non-sensitive scoping searches of the principal health and psychology databases (MEDLINE and CINAHL) produced large numbers of research studies, which, although they used these terms, were not the focus of the review and would provide no data on HR performance linkages. Additionally, the scoping searches indicated that even larger numbers of citations would be retrieved by the more sensitive searches planned for the full review. *Table 2* provides an illustration of the number of hits

from three databases using standard and more sensitive versions of the pay and training filters. The number of potential HRM categories and practices was very large. A complete and formal process of reciprocal translation to produce a more clearly defined list would have been an extremely resource-intensive task and would have produced an unmanageable number of results from any searches performed. On account of the multifaceted nature of our study, with its multiple questions, it was decided that the approach of leading the review by specific HRM interventions was not viable. The original idea of structuring this review by HR intervention was therefore rejected.

Problems encountered using particular HRM terms required an alternative approach to the intervention terminology. The team tested the viability of constructing an intervention search filter using only generic HRM terms, such as human resource, HRM, HR and high-performance work practices or management, and database keywords, such as 'personnel management'. This removed the problem posed by constructing strategies using potentially non-HRM-related terms, such as 'training', 'communication' or 'pay', which retrieved large numbers of studies and were, arguably, as generic and non-specific as this overarching terminology. Scoping searches using this approach produced manageable numbers of potentially more relevant studies and, therefore, this method was adopted. The resulting HRM search strategy is discussed more fully in Chapters 5–7, and example searches are provided in Appendices 6 and 7.

TABLE 2 Results of scoping searches for two HR practices with patient outcomes

HR practice	Database	Hits	+ Patient outcomes	- Comments, editorials, letters, reviews	English only	+ Longitudinal
Pay systems ^a	MEDLINE	1350	417	379	367	55
Pay	MEDLINE	58,126	7443	6387	5572	1385
	EMBASE	40,179	5882	4873	4213	914
	CINAHL	13,909	1344	1283	1247	209
Training ^a	MEDLINE	11,607	939	823	793	163
Training	MEDLINE	178,806	10,028	8804	8269	1341
	EMBASE	209,317	28,908	21,084	19,283	4001
	CINAHL	9968	1274	1219	1198	160

a Denotes the less sensitive, more specific version of the filter.

Search process

Literature search strategies were developed and performed by a systematic review information specialist on the following databases: Applied Social Sciences Index and Abstracts (ASSIA), British Nursing Index (BNI), Business Source Premier, Campbell Collaboration, Cochrane Central Register of Controlled Trials (CENTRAL), Cochrane Database of Systematic Reviews (CDSR), Cumulative Index to Nursing and Allied Health Literature (CINAHL), Database of Abstracts of Reviews of Effectiveness (DARE), DH-Data, EMBASE, Health Management Information Consortium (HMIC), International Bibliography of the Social Sciences (IBSS), King's Fund database, MEDLINE, NHS Economic Evaluation Database (NHS EED), National Research Register (NRR), PREMEDLINE, PsycINFO, ReFeR, Social Sciences Citation Index (SSCI) and Science Citation Index (SCI). Search strings were modified for the different databases to take account of the different keywords and thesauri they use. Searching of electronic databases using pre-designed search filters was supplemented by reference tracking of selected studies. Searches were conducted in May/June 2006. *Table 3* provides details of the search filters and databases used for different areas of the review.

Use of generic HRM terms is not ideal in identifying relevant studies. Papers that examined an HRM practice, such as employee feedback, could be missed if no mention of human resources, personnel or a synonym is made in the title, abstract or database designated keywords. However, this was the only way to operationalise HRM as a search strategy, given the extensive problems of using single practice terms. This search string was modified for different databases recognising the different keywords and thesauri they utilise. Additionally, the 'HRM' searches were supplemented by reference tracking and citation searching.

Study selection

This stage aims to identify articles that 'help to answer the questions being addressed by the review'.⁴⁷ Study selection should be systematic, replicable and free from bias. Sifting is informed by criteria reflecting the population, intervention, outcome, study design, language and other criteria defined in the protocol. Titles and abstracts of retrieved articles are sifted by two reviewers or by one reviewer after an acceptable inter-rater

reliability score is achieved.⁴⁷ Where a question remains over whether or not to include a study it is referred to a third reviewer (or a consensus is reached by two reviewers).

Conventional systematic review methods advocate the application of a quality threshold in determining study inclusion.⁴⁷ The aim is to evaluate the internal validity of studies by assessing selection, performance, measurement and attrition bias. The intention is to include only those studies that achieve the highest standards of methodology and reporting. Many tools or checklists have been developed for the critical appraisal of study quality based on study design, but each has limitations and there is no accepted standard set of tools.⁷² Nevertheless, such tools are principally designed for specific types of medical research; surveys and case studies, for example, are less easily assessed, although quality assessment checklists have been developed.⁵⁸

However, there is a case for not excluding studies on the basis of quality, but simply to use assessment criteria to weight the findings of the studies in the review.^{52,54,55,63,73} Quality assessment may act as a guide to interpreting findings and determining the strength of inferences, as well as enabling weighting of study results. It has been argued that qualitative studies cannot and should not be appraised formally,^{54,57} and that quality assessments may be evaluating limitations of reporting rather than methodology.⁷⁴ Quality assessment thus depends on the type of studies being reviewed. Controversy remains on whether or not to exclude 'weak papers'.⁷⁵ In this review assessment of quality is used to moderate the messages from included research, and not as a quality threshold.

This review had already imposed a longitudinal criterion on the studies selected for review – a fairly high threshold for studies in the HRM field (in which cross-sectional, self-report design is common). Further weighting of studies by study design was applied and this is reflected in the relative weight given to the various studies in the data synthesis.

Data extraction

This is the process 'by which reviewers obtain the information they need from what is reported by primary investigators'.⁴⁷ The aim is to collect from the selected studies the most important data for answering the research question. A data extraction

TABLE 3 Search filters and databases used by report chapter

Report chapter	Search filter										Database					
	HRM	IOs	POs	Longitudinal	Meta-analysis/review	IO measures	MEDLINE, CINAHL	PSYINFO	Business Source Premier	SSCI	ASSIA, SCI, EMBASE, Cochrane library	HMIC, King's Fund ^a	IBSS, ^a BNI	DH-Data, NRR, RefEr	PREMEDLINE	
Linking HRM practices to outcomes (Chs 7 and 8)	✓			✓				✓	✓							
HRM practices to patient outcomes (POs) (Ch. 6)	✓		✓				✓	✓	✓					✓	✓	
Linking IOs to IOs (Ch. 8)		✓			✓		✓	✓	✓					✓	✓	
Linking IOs to FOs (Ch. 8)		✓			✓		✓	✓	✓							
Linking IOs to POs (Ch. 8)		✓	✓				✓	✓	✓					✓	✓	
Reliability of IO measures (Ch. 9)					✓		✓	✓	✓				✓ ^a		✓ ^a	

FO, final outcome; IO, intermediate outcome; PO, patient outcome; RefEr, Research Findings Register.
 a Of the two databases listed, only this database was searched.

form is piloted on several studies to ensure that reviewers are recording the same data and to develop forms of optimal length so that all key data are recorded.⁴⁷ In this review, data are primarily extracted and presented in the form of evidence tables.

Data synthesis

Synthesis aims to ‘draw together, contextualise and interpret the findings from the separate [studies]’.⁵³ Methods of synthesis are determined by whether data are qualitative or quantitative, and by the questions being asked of the data.⁷⁵ Meta-analysis is ‘the quantitative synthesis of data, in which evidence is pooled using statistical techniques’.⁷⁵ A narrative review seeks to ‘capture and describe, rather than “average out” the heterogeneity between studies’, and its choice as a method of synthesis may be ‘predicated on the diversity and complexity of the field’.⁵³ Several methods of synthesising qualitative data are being developed, such as thematic analysis, grounded theory, meta-ethnography and realist synthesis.⁷⁵ The method applied to each review is determined by the heterogeneity of the included studies and their data. In this review, synthesis is primarily descriptive and quantitative in recording the studies that meet specific characteristics, and is accompanied by a narrative synthesis.⁷⁶ There were very few studies in this review that addressed the same basic research question (i.e. examining the same relationship or set of relationships) precluding the use of meta-analysis for most intervention groups. Narrative synthesis was retained to ensure consistent synthesis across all interventions and enabling comparisons to be made.

Summary of specific research questions and methodological approaches

The review team drew on the most recent developments in systematic review methodology in identifying and then resolving the challenges of this evidence base.

A number of different research methods were used to identify evidence in relation to each of the specific research questions. This section provides a summary of the methodological approaches used in relation to each of the objectives and specific research questions.

Objective 1

Objective 1 is a mapping exercise involving both the identification of the range of HRM practices documented in the literature and the HRM practices actively reported in use reported by management practitioners. It is necessary to triangulate findings from these two sources in order to identify any gaps between research and practice.

- *Question 1.1* What HRM practices are described in the literature?

Method Content analysis was performed on six, recent major reviews of HRM practices, supplemented by additional literature identified for Objective 6. Practices were then categorised under broad headings of HRM, using accepted definitions of these categories, for example work design, performance management.

- *Question 1.2* How widespread is the use of HRM practices in UK organisations?

Method Evidence was drawn from the best available surveys of HRM practices in the UK. These surveys were identified from the expert knowledge of members of the project team, personal communications from colleagues, and systematic searching of electronic databases and relevant websites. Surveys were included if they contained UK data. They were then weighted according to specific criteria. Results were tabulated.

- *Question 1.3* How can the fidelity with which an HRM practice is implemented be measured?

Method A critical review was undertaken of research on implementation fidelity and relevant studies from the field of HRM. Studies were identified by systematic searching of electronic databases and informal methods, such as serendipity. A model, a measure and a guidance document were developed, based on this literature review.

Objective 2

- *Question 2.1* What are the most reliable measures of the intermediate outcomes identified for this review?

Method The intermediate outcomes to be assessed by this review were identified by content analysis of the relevant literature and a Delphi process involving HRM experts. The existing review and theory literature on the measures of these

intermediate outcomes was examined to identify candidate measures. This literature was identified from a combination of systematic searching of electronic databases and informal methods, such as expert knowledge.

Objective 3

- *Question 3.1* What is the evidence on the intercorrelation of intermediate outcomes with each other?

Method Intermediate outcomes covered by this question were identified as described under Objective 2. The existing review and meta-analysis literature was reviewed to identify correlations between individual intermediate outcomes. This literature was identified by a combination of systematic searching of electronic databases and reference tracking.

Objective 4

- *Question 4.1* What is the evidence for the impact of intermediate outcomes on non-health final outcomes?

Method Once again, the intermediate outcomes covered by this question were devised as for Objective 2. The existing review and meta-analysis literature was identified and reviewed to evaluate correlations between individual intermediate outcomes and final outcomes, such as performance, turnover and absenteeism. This literature was identified by a combination of systematic searching of electronic databases and reference tracking.

- *Question 4.2* What is the evidence for the impact of intermediate outcomes on patient care outcomes?

Method Intermediate outcomes were again identified as for Objective 2. The aim was to produce a synthesis of the longitudinal literature for each intermediate outcome as it relates to the patient care outcomes identified for this review. This literature was identified by a combination of formal methods, such as systematic searching of electronic databases and reference tracking.

Objective 5

- *Question 5.1* Do any HRM practices have a significant impact on the intermediate outcomes identified for this review?

Method Again, each intermediate outcome identified under Objective 2 was examined in a systematic review of the longitudinal HRM literature. This literature was identified from Objective 6, Questions 6.1 and 6.2, which included longitudinal research examining the impact of HRM practices on various intermediate outcomes. A qualitative, narrative synthesis of the literature was produced.

Objective 6

- *Question 6.1* Which HRM practices have an impact on performance outcomes?

Method A systematic review was undertaken of longitudinal research examining HRM practices and both intermediate and final outcomes. Studies were identified by the systematic searching of electronic databases and reference tracking, and by informal methods such as expert advice. The literature was mapped to the category framework developed in response to Question 1.1 and a qualitative, narrative synthesis of the literature was produced.

- *Question 6.2* Which HRM practices have an impact on patient care outcomes?

Method A systematic review was undertaken of longitudinal research examining HRM practices and their impact on patient-care outcomes. Studies were identified by the systematic searching of electronic databases and reference tracking, and by informal methods, such as serendipity. The literature was mapped to the category framework developed in response to Question 1.1 and a qualitative, narrative synthesis of the literature was produced.

Against this methodological backdrop, the specific details of each review are described in the corresponding section of the report and justification is given for methods used.

Chapter 3

HRM practices and their reported use in the UK

Introduction

This chapter of the report presents findings in relation to Objective 1. Specifically, it addresses the first two research questions identified under Objective 1 (Question 1.3, on implementation fidelity, is dealt with in Chapter 11):

- *Objective 1: 1.1* What HRM practices are described in the literature?
- *Objective 1: 1.2* How widespread is the use of HRM practices in UK organisations?

The chapter first describes the process by which HRM practices were identified, and then goes on to report findings on the extent of use of these practices in the UK.

What HRM practices are described in the literature?

This phase of the research sought to audit the main HRM practices described in the literature. The aim was to identify a complete list of HRM practices to be developed into a search strategy. Data from three sources were used to develop the list.

Step 1

The research team and expert advisers generated a list of 13 headings. Eleven of these were broad HRM categories under which it was anticipated that the majority of individual HRM practices could be grouped, which could then be used as a framework to shape the reviews. Initial HRM practice terms are presented in *Table 4*.

It was recognised from the outset that HRM practices were unlikely to all fall into neat categories. In addition to the 11 broad categories of HRM practice identified, two further categories were used to group individual practices:

- The 'Miscellaneous' category was used to group practices that were not subject to direct manipulation by the HR department, or were

too broad to be influenced by HR policies/practices alone, but were of potential interest to the review for their impact on organisational or individual performance. Examples include bullying/harassment, socialisation, etc.

- A sizeable number of HR policies/practices, 29 in total, were considered to be part of HR maintenance functions (i.e. administration) rather than proactive HR practices aimed at enhancing performance. Examples include equal opportunity, dispute resolution policies, and health and safety policies.

The classification of HRM practices into broad categories was reviewed by the expert advisers. As a result, the terms were refined according to the most appropriate HR category as defined and used in the literature and additional HRM practice terms were suggested, which had not been identified in the review of reviews:

- The higher level concepts category was renamed 'bundles' of practices. Over the last 10–15 years there has been a growing body of research on 'bundles' of practices. This

TABLE 4 Initial categorisation of HRM

1	Work design
2	Training and development
3	Communication
4	Single status/harmonisation/status differentials
5	Appraisal/performance management
6	Higher-level concepts (HPWPs, HI, HC, etc.)
7	Administration
8	Recruitment and selection (including placements)
9	Compensation and reward systems
10	Family friendly
11	Employee representation/involvement/participation
12	Total quality management
13	Miscellaneous

HC, high commitment; HI, high involvement; HPWP, high-performance work practice.

category was therefore intended to capture research that focused on combinations of HRM practices that were intentionally designed to be used in concert as well as for multiple practices opportunistically used together.

- Articles in the ‘Miscellaneous’ category were reappraised and either recategorised under one of the main headings or excluded from this assessment of the main HRM practices described in the literature.

Step 2

In a parallel process, a list of HRM practices was compiled from six major recent reviews of the HRM literature.^{30,35,77–80} This process identified 245 practices.

A process of reciprocal translation⁸¹ was applied to the 245 practices identified by the review of reviews, with the intention of building a consensus about the main HRM practices covered in the literature. Reciprocal translation involves the comparison of themes across papers and an attempt to establish whether there is equivalence in the themes of one paper with those from another. The aim is to ensure that a key theme captures similar policies or practices from different papers. In this exercise, the reciprocal translation was approached by two of the researchers independently attempting to compare HRM practice terms across review papers and group them under one of the broad HRM categories listed in *Table 4*.

Initially, a substantial number of practices did not appear in any of the categories or could be allocated to more than one. For example, appraisal-based pay can be seen as a part of the broad HRM category of appraisal/performance management and of compensation and reward systems. Likewise, introducing autonomous work teams can be seen as both an employee involvement strategy and a work design approach.

The process of reciprocal translation made it apparent that the same term could be used to describe different practices in different papers (e.g. ‘goal setting’ to mean performance management in one context and employee involvement in another).

At this stage in the research, it became apparent that the diffuse nature of the HRM literature, in

particular the inconsistency of terminology and the blurred boundaries of some of the concepts, meant that the broad categories identified through this process would not be a suitable as the sole basis for the subsequent review of evidence. Ultimately, a combination of broader search terms and study design criteria were used (which are described in Chapters 2, 5 and 6).

Step 3

The systematic reviews undertaken to meet Objectives 3–5 generated over 450 papers (see Chapter 5 for a description of these searches). The individual HR practices, policies or interventions that had been the focus of these studies were mapped on to the list of HR practices generated by Steps 1 and 2. This was done in order to identify any gaps in the list of HR practice terms and further refine the categories. The exercise revealed that:

- A large body of literature in the health sector focused on specific HR practices not commanding much attention in the non-health sector – specifically ‘working hours’, ‘staff levels’ and ‘skill mix’. These practices were included under the ‘staffing’ practice category along with selection and recruitment.
- All TQM practices identified (a separate category on the original list) were, in fact, training interventions, so were included under the broad ‘training’ heading.

The final list of 10 broad HRM categories is as follows:

1. work design
2. staffing
3. training and development
4. compensation and rewards
5. communication
6. family friendly
7. single status/status harmonisation
8. employee representation, involvement and participation
9. appraisal/performance management
10. bundles.

Appendix 2 contains a list of these broad HRM categories with definitions. Appendix 3 presents the specific HRM practices identified in the literature grouped under these 10 broad categories.

How widespread is the use of these HRM practices in the UK?

Aim

As part of Objective 1, the review sought to document evidence on the extent of use of HRM practices within UK organisations or workplaces. The intention is to:

- provide a comprehensive report of the percentage of organisations using the HRM practices identified for this review and to identify gaps in the survey literature
- relate findings of the review of the research literature to actual practices used within UK organisations. For example, research may demonstrate that a practice has a significant beneficial impact on job satisfaction or patient outcomes, while survey data may indicate that this practice is not actually widespread.

The first aim is addressed in this chapter and the implications for the overall conclusions of the review are considered in Chapter 11.

Methods

Findings from the highest-quality and most up-to-date HR surveys were used to generate these data. Surveys were identified using several strategies. The Workplace Employment Relations Survey (WERS) and other survey organisations were identified by members of the project team. Searches were conducted to identify appropriate publications on the websites of relevant organisations, including: Community Innovation Survey (CIS), Continuing Vocational Training Survey (CVTS), European Survey on Working Time and Work–Life Balance (ESWT), PASO (Panel Survey of Organisations), Employee Direct Participation in Organisational Change (EPOC Project), and Workplace and Employee Survey (WES) Canada. Searches of the SSCI and King's Fund electronic databases were used to identify additional surveys, particularly for the UK health sector. Search strategies used combinations of the following terms and their variants: survey(s) and practice(s) and either human resource(s), staffing, work or personnel. To be included, the survey data had to relate to UK workplaces.

Surveys were ordered in a hierarchy, based on the following quality assessment criteria. The survey reported data that:

1. were weighted and representative of UK workplaces (i.e. data were collected or adjusted so that the resulting figures do not simply represent large organisations or organisations from particular sectors or industries)
2. were based on the unit of the workplace (this can be a self-contained entity or a unit of a larger organisation) rather than an individual employee
3. included the UK public sector and/or health sector.

Data from surveys that were weighted were preferred to data from surveys that were not representative of UK workplaces but simply reported data based on the unit of the workplace. Data from such surveys were, in turn, preferred to those that simply reported UK private or public sector data. If data on a practice were available in a survey that was weighted and representative of UK workplaces then these data were used in preference to data on that practice from a more limited survey.

Results

Surveys: a comparison

Searches identified 18 surveys from 1996 to 2006 that satisfied the criteria. A comparison of included surveys is seen in *Table 5*. The best available survey is the 2004 WERS.⁸² WERS data were 'weighted and are representative of [workplaces with 10 or more employees], which accounts for 18% of all workplaces and 80% of all employees in Britain'. With the exception of the Chartered Institute of Personnel and Development (CIPD) surveys on performance pay or rewards, this was also the only major survey to record data from the public sector, and the only survey to compile specific health sector data. Therefore, if WERS covered a practice, then only WERS data were used, even if other surveys provided data on the same practice; WERS was considered the best evidence. Where duplicate data existed, those from only the best survey were reported.

Three further surveys also claimed to be representative, although they did not acknowledge weighting of these data. For example, the ESWT survey stated that 'the survey data in the ESWT are representative of establishments with 10 or more employees from all sectors of activity'⁸⁶ and the EPOC survey⁸⁸ claimed to be 'representative of workplaces in ten countries of the European Union'. The remaining surveys were not representative, although several did offer public sector or health sector data, which were absent from the representative surveys.

TABLE 5 Comparison of included surveys

Survey	UK data	Representative of UK workplaces	Unit=workplace or equivalent	Public sector data	Health sector data
WERS (1998, 2004, 2006) ⁸²⁻⁸⁵	✓	✓	✓	✓	✓
ESWT (2006) ⁸⁶	✓	✓	✓		
CVTS (2001) ⁸⁷	✓	✓	✓		
EPOC (1996) ⁸⁸	✓	✓	✓		
Newton <i>et al.</i> (1996) ¹⁰²	✓		✓	✓	✓
CIPD (2006) ⁸⁹	✓		✓	✓	
IPD (1999) ⁹⁰	✓		✓	✓	
NESS (2005) ⁹¹	✓		✓		
CIPD surveys (2002-6) ⁹²⁻⁹⁸	✓			✓ ^a	
Wood <i>et al.</i> (2004) ⁹⁹	✓				✓
CRANET (2003) ¹⁰⁰	✓			✓	
IPD (1999) ¹⁰¹	✓				

CRANET, Cranfield Network on International Human Resource Management; IPD, Institute of Personnel and Development; NESS, National Employers Skills Survey.
a Some of the CIPD surveys contain these data, but others do not.

Seven surveys sampled the workplace, all of which reported UK data (although three surveys were Europe wide). In the remaining surveys, CIPD members were being surveyed rather than actual workplaces, limiting the potential value of these sources. Only one specific health sector survey of HRM practices was identified by this review.¹⁰² The study reported on a non-representative sample of general practices in the UK. Some HRM practices, which duplicate those covered by other surveys, are included because this was the only specific health service survey.

This section examines evidence on the extent of use of HRM practices among UK employers. As a result, the focus is on the most recent data for any practice rather than on all available data. For example, only the most recent WERS⁸² data were recorded here. Data from an earlier WERS⁸³ survey were recorded only if the information was not collected for the subsequent survey. Also, it was outwith the remit of this review to examine developments in coverage of practices over time.

Health sector-specific surveys

The most comprehensive surveys within the health sector are those conducted by the Healthcare Commission (HCC). Whilst providing extensive

information about staff experiences of working within the NHS, the annual staff survey differs considerably from the HR surveys reviewed here in that:

- It is targeted at the individual employee, rather than the HR function.
- It asks questions about individual staff perceptions or experiences rather than the absence or presence of specific HR practices.
- The nature of the data means that findings are reported at the individual level (i.e. percentage of all staff responses to a particular item) for the NHS as a whole, or by type of Trust [e.g. all Primary Care Trusts; all Ambulance Trusts, etc.], or by Strategic Health Authority, or by individual Trust, rather than at the organisational level (i.e. percentage of Trusts/organisations reporting the presence of an HR practice).

Comparing such data with HR practice measures is extremely problematic. For example, the proportion of employees reporting that they have had an appraisal in the last 12 months may not bear a strong relation to the proportion of NHS organisations with appraisal policies in place, or to the existence of an appraisal policy in any specific organisation. Accepting these limitations, it is

possible to interpret some of the NHS Staff Survey findings as a proxy indicator for staff experience of particular HR practices in the NHS.

Analysis of data from the NHS Staff Survey focuses on 26 key areas (key scores). These are a mixture of attitudinal and experiential measures, the latter providing an indication of the percentage of NHS staff who have experienced a particular HR practice (i.e. a proxy indicator).

Where a proxy indicator for staff experience of an HR policy is available from the National NHS Survey 2007,¹⁰³ this has been indicated in the right-hand column of *Table 6*. Findings from the survey are summarised later (see *Table 17*) and discussed below (see Data from the NHS Staff Survey 2007, below).

Categorisation of practices

Practices recorded by HR practice surveys are reported using our categories of HRM practices (as presented above: see What HRM practices are described in the literature?). These groupings are used to structure the following tables reporting the survey data (*Tables 7–16*). Figures in these tables represent the percentage of workplaces that report using a particular practice. Data are from the National NHS Staff Survey 2007¹⁰³ as presented later in the chapter (*Table 17*).

Index of tables

- Table 6 Survey coverage of HRM practice use.
- Table 7 Work design.
- Table 8 Staffing: recruitment and selection.
- Table 9 Training and development.
- Table 10 Compensation and rewards.
- Table 11 Communication.
- Table 12 Family friendly/work–life balance.
- Table 13 Single status/status harmonisation.
- Table 14 Employee involvement.
- Table 15 Performance management.
- Table 16 ‘Bundles’ of practices/HPWPs.
- Table 17 Summary of proxy indicators from National NHS Staff Survey 2007.¹⁰³

Summary

These surveys provide information on the extent to which different HRM practices are used. The results for work organisation practices (team working, job rotation, role empowerment and the formality of job descriptions) show that for all of these practices over 70% of the units surveyed, the workplace or company had the practice for

at least some of the workforce. However, the figures for companies where the entire workforce is covered by the practice would be considerably lower. For example, in the Wood *et al.*⁹⁹ study of UK manufacturing firms, 70% of responding organisations had team working but only 38% used it for the majority of the workforce.

The information on staffing is mainly confined to whether selection tests are used and whether specific recruitment procedures are used to attract minority or discriminated groups, for example disabled or elder workers or whether exit interviews are used. None of these practices shows particularly widespread coverage, with none of the practices being used in more than 50% of the units. Competence tests are used in 46% of the workplaces.

There is more information on training where a variety of practices are measured. Most units use the practices that are studied, if only partially. The provision of general training for at least some of the workforce is, as expected, nearly ubiquitous, whereas specific forms of training are used somewhat less.

In the case of compensation and rewards, we have information on types of pay systems and types of employee benefits. The pay systems measures concentrate on types of incentive or performance-related pay, ranging from a general performance pay measure to specific ones, such as team-based or profit-related pay. Some form of performance-related pay is used in 40% of workplaces, whereas team-based pay is the least used. Employee benefits, such as pension schemes and sick pay, are more widely used, although health insurance is not so frequently used.

Communication practices concentrate on forms of direct communication, the mechanisms for this, and the type of economic information disseminated to employees. A large majority of workplaces used some form of team briefing, and just over 50% disclose key information about the financial position of the organisation or investments.

Family-friendly practices are covered well in WERS and their use varies considerably between practices. In the cases of practices where there is a statutory right to provide leave, for example maternity and paternity leave, the study focused on the provisions beyond the statutory minimum, for example paid leave. Aside from these practices, the ability to

TABLE 6 Coverage of categories of work practices by surveys

	WERS 2006 ⁸²	ESWT 2006 ⁸⁶	CVTS 2001 ⁸⁷	EPOC 1996 ⁸⁸	CIPD 2006 ⁸⁹	IPD 1999 ⁹⁰	NESS 2005 ⁹¹	CIPD 2002 ⁹²	CIPD 2003 ⁹³	CIPD 2005 ⁹⁴	CIPD 2005 ⁹⁵	CIPD 2006 ⁹⁶	CIPD 2006 ⁹⁷	CIPD 2006 ⁹⁸	NHS ¹⁰³ Staff Survey 2007 proxy indicator
Work design	✓						✓						✓		✓
Staffing: recruitment and selection	✓							✓						✓	
Training and development	✓		✓				✓	✓			✓				✓
Compensation and rewards	✓				✓	✓					✓				
Communication	✓										✓				✓
Family friendly/ work-life balance	✓	✓								✓					✓
Single status/ harmonisation	✓				✓									✓	✓
Employee involvement	✓			✓											✓
Performance management	✓						✓				✓				✓
Bundles of practices/HPWPs	✓														

TABLE 7 Reported use of HRM practices: work design

Category	Practice: interview or survey question/report definition, where available	Percentage of workplaces with practice [overall (public/private/health)]	Data collection method	Sample size; workplace size	Source
Job characteristics	Formal job description	72 (na/na/na)	Manager telephone survey	27,172 managers/establishments	NESS (2005: 84) ⁹¹
Job rotation	Percentage of workplaces answering 'yes' to the question, 'What percentage of your staff has a formal written job description?' Job rotation (used frequently, occasionally or rarely)	77 (na/na/na)	Postal survey	635 CIPD members in UK organisations; no limit	CIPD (2006: 6) ⁹⁷
Team working	Some use of team-based working	na (80/na/79)	Manager telephone survey	1115 UK organisations; more than 150 employees	Wood et al. (2004: 426) ⁹⁹
Team working	Any employees working in teams Percentage of workplaces with some or all staff in teams answering the question, 'What proportion, if any, of the [largest occupational group] in this workplace work in formally designated teams?'	72 (88/68/na)	Manager interviews	2050 managers; 10 or more employees	WVERS (2006: 90) ⁸²
Empowerment	Empowerment	na (70/na/73)	Manager telephone survey	1115 UK organisations; more than 150 employees	Wood et al. (2004: 426) ⁹⁹
na, data not available.					

TABLE 8 Reported use of HRM practices: recruitment and selection

Category	Practice: interview or survey question/report definition, where available	Percentage of workplaces with practice [overall (public/private/health)]	Data collection method	Sample size; workplaces size	Source
Selection	Personality tests used routinely for some occupations	19 (18/20/17)	Manager interviews	2024 managers; 10 or more employees	WERS (2006: 77) ⁸²
	Percentage of workplaces answering 'yes' to the question, 'When filling vacancies at this workplace do you ever conduct any type of personality or attitude test?'				
	Performance tests used routinely for some occupations				
	Percentage of workplaces answering 'yes' to the question, 'When filling vacancies at this workplace do you ever conduct any type of performance or competency test?'				
Recruitment	Preference for internal applicants	46 (63/42/50)	Manager interviews	2024 managers; 10 or more employees	WERS (2006: 77) ⁸²
	Percentage of workplaces specifying the answer to the question, 'Which of these statements best describes your approach to filling vacancies as internal applicants are given preference, other things being equal, over external applicants?'				
	Open internal job market				
	Formal promotion policies				
Recruitment	Special recruitment procedures to attract women returning to work after having a child	22 (12/25/na)	Manager interviews	2024 managers; 10 or more employees	WERS (2004) p. 9 ⁸⁴
	Percentage of workplaces answering 'yes' to this choice in the question, 'When filling vacancies do you have any special procedures to encourage applications from the following groups?'				
	Special recruitment procedures to attract women in general				
	Percentage of workplaces answering 'yes' to this choice in the question, 'When filling vacancies do you have any special procedures to encourage applications from the following groups?'				
Recruitment	Special recruitment procedures to attract members from minority ethnic groups	93 (na/na/na)	Postal survey	732 HR and career management practitioners; no limit	CIPD (2003: 19) ⁹⁵
	Percentage of workplaces answering 'yes' to this choice in the question, 'When filling vacancies do you have any special procedures to encourage applications from the following groups?'				
	Special recruitment procedures to attract women returning to work after having a child				
	Percentage of workplaces answering 'yes' to this choice in the question, 'When filling vacancies do you have any special procedures to encourage applications from the following groups?'				
Recruitment	Special recruitment procedures to attract members from minority ethnic groups	18 (na/na/na)	Postal survey to practice manager	477 general practices	Newton et al. (1996: 83) ¹⁰²
	Percentage of workplaces answering 'yes' to this choice in the question, 'When filling vacancies do you have any special procedures to encourage applications from the following groups?'				
	Special recruitment procedures to attract women returning to work after having a child				
	Percentage of workplaces answering 'yes' to this choice in the question, 'When filling vacancies do you have any special procedures to encourage applications from the following groups?'				
Recruitment	Special recruitment procedures to attract members from minority ethnic groups	8 (12/8/na)	Manager interviews	2056 managers; 10 or more employees	WERS (2006: 243) ⁸²
	Percentage of workplaces answering 'yes' to this choice in the question, 'When filling vacancies do you have any special procedures to encourage applications from the following groups?'				
	Special recruitment procedures to attract members from minority ethnic groups				
	Percentage of workplaces answering 'yes' to this choice in the question, 'When filling vacancies do you have any special procedures to encourage applications from the following groups?'				
Recruitment	Special recruitment procedures to attract members from minority ethnic groups	6 (10/5/na)	Manager interviews	2056 managers; 10 or more employees	WERS (2006: 243) ⁸²
	Percentage of workplaces answering 'yes' to this choice in the question, 'When filling vacancies do you have any special procedures to encourage applications from the following groups?'				
	Special recruitment procedures to attract members from minority ethnic groups				
	Percentage of workplaces answering 'yes' to this choice in the question, 'When filling vacancies do you have any special procedures to encourage applications from the following groups?'				
Recruitment	Special recruitment procedures to attract members from minority ethnic groups	9 (21/6/na)	Manager interviews	2056 managers; 10 or more employees	WERS (2006: 243) ⁸²
	Percentage of workplaces answering 'yes' to this choice in the question, 'When filling vacancies do you have any special procedures to encourage applications from the following groups?'				
	Special recruitment procedures to attract members from minority ethnic groups				
	Percentage of workplaces answering 'yes' to this choice in the question, 'When filling vacancies do you have any special procedures to encourage applications from the following groups?'				

Category	Practice: interview or survey question/report definition, where available	Percentage of workplaces with practice [overall (public/private/health)]	Data collection method	Sample size; workplaces size	Source
	Special recruitment procedures to attract older workers	5 (6/5/na)	Manager interviews	2056 managers	WERS (2006: 243) ⁸²
	Percentage of workplaces answering 'yes' to this choice in the question, 'When filling vacancies do you have any special procedures to encourage applications from the following groups?'				
	Special recruitment procedures to attract disabled workers	10 (29/5/na)	Manager interviews	2056 managers; 10 or more employees	WERS (2006: 243) ⁸²
	Percentage of workplaces answering 'yes' to this choice in the question, 'When filling vacancies do you have any special procedures to encourage applications from the following groups?'				
	Special recruitment procedures to attract people who have been unemployed for 12 months or more	5 (8/5/na)	Manager interviews	2056 managers; 10 or more employees	WERS (2006: 243) ⁸²
	Percentage of workplaces answering 'yes' to this choice in the question, 'When filling vacancies do you have any special procedures to encourage applications from the following groups?'				
	Advertising in different sources to widen interest from under-represented groups	41 (65/33/na)	Postal survey	659 HR professionals; no limit	CIPD (2006: 15) ⁹⁸
	Using images and words that appeal to a wider audience	39 (45/37/na)	Postal survey	659 HR professionals; no limit	CIPD (2006: 15) ⁹⁸
	Checking tests used are culture free and tested on diverse norm groups	37 (44/33/na)	Postal survey	659 HR professionals; no limit	CIPD (2006: 15) ⁹⁸
	Recruitment documents in other formats (e.g. large print)	23 (53/9/na)	Postal survey	659 HR professionals; no limit	CIPD (2006: 15) ⁹⁸
	Formal recruitment policies	40 (na/na/na)	Postal survey to practice manager	477 general practices	Newton et al. (1996: 83) ¹⁰²
	Formal resourcing strategies	53 (na/na/na)	Postal survey	804 HR professionals; no limit	CIPD (2006: 3) ⁹⁸
	Exit interviews	91 (na/na/na)	Postal survey	750 HR professionals; no limit	CIPD (2006: 29) ⁹⁸
	Exit postal surveys	32 (na/na/na)	Postal survey	750 HR professionals; no limit	CIPD (2006: 29) ⁹⁸

na, data not available.

TABLE 9 Reported use of HRM practices: training and development

Category	Practice: interview or survey question/report definition, where available	Percentage workplaces with practice [overall (public/private/health)]	Data collection method	Sample size; workplaces	Source
General training	Off-the-job training for experienced core employees	84 (98/82/94)	Manager interviews	2024 managers; 10 or more employees	WERS (2006: 83) ⁸²
	Percentage of workplaces answering 'some', 'a lot' or 'all' of time to the question, 'What proportion of experienced [largest occupational group of staff] have been given time off from their normal daily work duties to undertake training over the past 12 months?'	64 (na/na/na)	Manager telephone survey	27,172 managers/establishments	NESS (2005: 65) ⁹¹
	Training	19 (na/na/na)	Postal survey to practice manager	477 general practices	Newton et al. (1996: 83) ¹⁰²
Skills training	Percentage of workplaces answering 'yes' to the question, 'Have you funded or arranged any training over the last 12 months?'	66 (64/67/na)	Manager interviews	2012 managers; 10 or more employees	WERS (2006: 92) ⁸²
	Staff development	48 (65/45/na)	Manager interviews	2012 managers; 10 or more employees	WERS (2004: 11) ⁸⁴
	Some core employees trained to be functionally flexible	81 (percentage of the 64% of employers who offer training) (na/na/na)	Manager telephone survey	27,172 managers/establishments	NESS (2005: 73) ⁹¹
	Percentage of workplaces answering 'some', 'a lot' or 'all' of time to the question, 'What proportion of [the largest occupational group of staff] is formally trained to be able to do jobs other than their own?'	80 (percentage of the 64% of employers who offer training) (na/na/na)	Manager telephone survey	27,172 managers/establishments	NESS (2005: 73) ⁹¹
	Some core employees trained in team working, communication or problem-solving	59 (percentage of the 64% of employers who offer training) (na/na/na)	Manager telephone survey	27,172 managers/establishments	NESS (2005: 73) ⁹¹
Percentage of workplaces answering 'yes' to this choice in the question, 'Does the training cover any of the matters listed [here]?'					
Job-specific training	Percentage of workplaces answering 'yes' to this choice in the question, 'Over the past 12 months which, if any, of the following types of training and development has this establishment funded or arranged for staff employed at this location?'				
Health and safety training	Percentage of workplaces answering 'yes' to this choice in the question, 'Over the past 12 months which, if any, of the following types of training and development has this establishment funded or arranged for staff employed at this location?'				
Training in new technology	Percentage of workplaces answering 'yes' to this choice in the question, 'Over the past 12 months which, if any, of the following types of training and development has this establishment funded or arranged for staff employed at this location?'				

Category	Practice: interview or survey question/report definition, where available	Percentage workplaces with practice [overall (public/private/health)]	Data collection method	Sample size; workplaces size	Source
	Supervisory Percentage of workplaces answering 'yes' to this choice in the question, 'Over the past 12 months which, if any, of the following types of training and development has this establishment funded or arranged for staff employed at this location?'	42 (percentage of the 64% of employers who offer training) (na/na/na)	Manager telephone survey	27,172 managers/establishments	NESS (2005: 73) ⁹¹
	Management training Percentage of workplaces answering 'yes' to this choice in the question, 'Over the past 12 months which, if any, of the following types of training and development has this establishment funded or arranged for staff employed at this location?'	41 (percentage of the 64% of employers who offer training) (na/na/na)	Manager telephone survey	27,172 managers/establishments	NESS (2005: 73) ⁹¹
	Personal development plans	62 (na/na/na)	Postal survey	506 HR practitioners; no limit	CIPD (2005: 3) ⁹⁵
	In-house development programmes (used frequently, occasionally or rarely)	96 (na/na/na)	Postal survey	635 CIPD members in UK organisations; no limit	CIPD (2006: 6) ⁹⁷
	Coaching (used frequently, occasionally or rarely)	94 (na/na/na)	Postal survey	635 CIPD members in UK organisations; no limit	CIPD (2006: 6) ⁹⁷
	Succession planning Percentage of workplaces reporting that they use this practice frequently, occasionally or rarely 'Planning and shaping the progression or movement of individuals within an organisation by aligning employee preferences and potential with organisational resourcing needs' p. ii (CIPD 2005, p. 3)	92 (na/na/na)	Postal survey	635 CIPD members in UK organisations; no limit	CIPD (2006: 6) ⁹⁷
	Career coaching 'A process which enables an employee to have focused attention on their individual career concerns, leading to increased clarity, personal change and forward action' (p. 26)	52 (na/na/na)	Postal survey	732 HR and career management practitioners; no limit	CIPD (2003: 26) ⁹³
	Career planning advice	34 (na/na/na)	Postal survey	2029 IPD members; no limit	IPD (1999: 2) ¹⁰¹
	Mentoring and buddying Percentage of workplaces reporting they use this practice frequently, occasionally or rarely	87 (na/na/na)	Postal survey	635 CIPD members in UK organisations; no limit	CIPD (2006: 6) ⁹⁷

continued

TABLE 9 Reported use of HRM practices: training and development (continued)

Category	Practice: interview or survey question/report definition, where available	Percentage workplaces with practice [overall (public/private/health)]	Data collection method	Sample size; workplaces size	Source
	Cross-functional project assignments	78 (na/na/na)	Postal survey	635 CIPD members in UK organisations; no limit	CIPD (2006: 6) ⁹⁷
	Percentage of workplaces reporting they use this practice frequently, occasionally or rarely				
	High-potential development schemes	76 (na/na/na)	Postal survey	635 CIPD members in UK organisations; no limit	CIPD (2006: 6) ⁹⁷
	Percentage of workplaces reporting that they use this practice frequently, occasionally or rarely				
	Graduate development programmes	55 (na/na/na)	Postal survey	635 CIPD members in UK organisations; no limit	CIPD (2006: 6) ⁹⁷
	Percentage of workplaces reporting that they use this practice frequently, occasionally or rarely				
	Assessment centres	59 (na/na/na)	Postal survey	635 CIPD members in UK organisations; no limit	CIPD (2006: 6) ⁹⁷
	Percentage of workplaces reporting that they use this practice frequently, occasionally or rarely				
	Development centres	56 (na/na/na)	Postal survey	635 CIPD members in UK organisations; no limit	CIPD (2006: 6) ⁹⁷
	Percentage of workplaces reporting that they use this practice frequently, occasionally or rarely				
	MBA's	86 (na/na/na)	Postal survey	635 CIPD members in UK organisations; no limit	CIPD (2006: 6) ⁹⁷
	Percentage of workplaces reporting that they use this practice frequently, occasionally or rarely				
	Action learning sets	56 (na/na/na)	Postal survey	635 CIPD members in UK organisations; no limit	CIPD (2006: 6) ⁹⁷
	Percentage of workplaces reporting that they use this practice frequently, occasionally or rarely				

Category	Practice: interview or survey question/report definition, where available	Percentage workplaces with practice [overall (public/private/health)]	Data collection method	Sample size; workplaces size	Source
Induction	Induction Percentage of workplaces answering 'yes' to this choice in the question, 'Over the past 12 months which, if any, of the following types of training and development has this establishment funded or arranged for staff employed at this location?'	66 (percentage of the 64% of employers who offer training) (na/na/na)	Manager telephone survey	27,172 managers/establishments	NESS (2005: 73) ⁹¹
Needs assessment	Skill gap assessment Percentage of workplaces answering more than zero to the question, 'What percentage of your staff has a skill gap assessment?'	54 (na/na/na)	Manager telephone survey	27,172 managers/establishments	NESS (2005: 84) ⁹¹
Secondment	Internal secondments Percentage of workplaces reporting that they use this practice frequently, occasionally or rarely External secondments Percentage of workplaces reporting that they use this practice frequently, occasionally or rarely	88 (na/na/na) 57 (na/na/na)	Postal survey Postal survey	635 CIPD members in UK organisations; no limit 635 CIPD members in UK organisations; no limit	CIPD (2006: 6) ⁹⁷ CIPD (2006: 6) ⁹⁷
na, data not available.					

TABLE 10 Reported use of HRM practices: compensation and reward

Category	Practice: interview or survey question/report definition, where available	Percentage workplaces with practice [overall (public/private/health)]	Data collection method	Sample size: workplaces	Source
Payment system	Performance-related pay	40 (19/44/na)	Manager interviews	194 managers; 10 or more employees	WERS (2006: 190) ⁸²
	Percentage of workplaces answering 'yes' to this choice in the question, 'Are ... employees paid in this way?'				
	Profit-related payments or bonuses	30 (15/37/na)	Manager interviews	194 managers; 10 or more employees	WERS (2006: 192) ⁸²
	Percentage of workplaces answering 'yes' to the question, 'Do any employees at this workplace receive profit-related payments or profit-related bonuses?'				
	Employee share scheme	na (na/21/na)	Manager interviews	194 managers; 10 or more employees	WERS (2006: 191) ⁸²
	Percentage of workplaces answering 'yes' to the question, 'Does this company operate any of the employee share schemes listed on this card for any employees at this workplace?'				
	Cash bonus or incentive plans	66 (32/88/na)	Postal survey	535 organisations; no limit	CIPD (2006: 22) ⁸⁹
	Team performance-related pay for managers	8 (4/11/na)	Postal survey	1158 organisations; na	IPD (1999: 3) ⁹⁰
	Team performance-related pay for non-managers	8 (2/12/na)	Postal survey	1158 organisations; na	IPD (1999: 3) ⁹⁰
	Skill- or competency-related pay for managers	6 (4/7/na)	Postal survey	1158 organisations; na	IPD (1999: 3) ⁹⁰
	Skill- or competency-related pay for non-managers	11 (9/14/na)	Postal survey	1158 organisations; na	IPD (1999: 3) ⁹⁰
Job evaluation scheme	Job evaluation scheme	20 (42/16/28)	Manager interviews	2059 managers; 10 or more employees	WERS (2006: 244) ⁸²
	Percentage of workplaces answering 'yes' to the question, 'Are there any formal job evaluation schemes here? These are schemes for comparing systematically the relative value of different jobs in order to settle their relative rates of pay'				

Category	Practice: interview or survey question/report definition, where available	Percentage workplaces with practice [overall (public/private/health)]	Data collection method	Sample size; workplaces size	Source
Employee benefits	Employer provision of child-care assistance	8 (18/5/na)	Manager interviews	2054 managers; 10 or more employees	WERS (2006: 255) ⁸²
	Percentage of workplaces answering 'yes' to the question whether they offer nursery or financial assistance to aid child care				
	Access to company car for managerial employees	45 (na/na/na)	Manager interviews	1994 managers; 10 or more employees	WERS (2004: 21) ⁸⁴
	Percentage of workplaces answering 'yes' to this choice in the question, 'What about managers at this workplace, are they entitled to any of these non-pay terms and conditions?'				
	Access to company car for non-managerial employees	15 (na/na/na)	Manager interviews	1994 managers; 10 or more employees	WERS (2004: 21) ⁸⁴
	Percentage of workplaces answering 'yes' to this choice in the question, 'Is the largest occupational group at this workplace entitled to any of these non-pay terms and conditions?'				
	Access to private health insurance for managerial employees	38 (na/na/na)	Manager interviews	1994 managers; 10 or more employees	WERS (2004: 21) ⁸⁴
	Percentage of workplaces answering 'yes' to this choice in the question, 'What about managers at this workplace, are they entitled to any of these non-pay terms and conditions?'				
Employee benefits	Access to private health insurance for non-managerial employees	16 (na/na/na)	Manager interviews	1994 managers; 10 or more employees	WERS (2004: 21) ⁸⁴
	Percentage of workplaces answering 'yes' to this choice in the question, 'Is the largest occupational group at this workplace entitled to any of these non-pay terms and conditions?'				
	Entitlement to an employee pension scheme for managerial employees	71 (na/na/na)	Manager interviews	1994 managers; 10 or more employees	WERS (2004: 21) ⁸⁴
	Percentage of workplaces answering 'yes' to this choice in the question, 'What about managers at this workplace, are they entitled to any of these non-pay terms and conditions?'				

continued

TABLE 10 Reported use of HRM practices: compensation and reward (continued)

Category	Practice: interview or survey question/report definition, where available	Percentage workplaces with practice [overall (public/private/health)]	Data collection method	Sample size; workplaces size	Source
	Entitlement to an employee pension scheme for non-managerial employees	64 (na/na/na)	Manager interviews	1994 managers; 10 or more employees	WERS (2004: 21) ⁸⁴
	Percentage of workplaces answering 'yes' to this choice in the question, 'Is the largest occupational group at this workplace entitled to any of these non-pay terms and conditions?'				
	Entitlement to more than 4 weeks' annual leave for managerial employees	67 (na/na/na)	Manager interviews	1994 managers; 10 or more employees	WERS (2004: 21) ⁸⁴
	Percentage of workplaces answering 'yes' to this choice in the question, 'What about managers at this workplace, are they entitled to any of these non-pay terms and conditions?'				
	Entitlement to more than 4 weeks' annual leave for non-managerial employees	59 (na/na/na)	Manager interviews	1994 managers; 10 or more employees	WERS (2004: 21) ⁸⁴
	Percentage of workplaces answering 'yes' to this choice in the question, 'Is the largest occupational group at this workplace entitled to any of these non-pay terms and conditions?'				
	Entitlement to sick pay in excess of statutory requirements for managerial employees	62 (na/na/na)	Manager interviews	1994 managers; 10 or more employees	WERS (2004: 21) ⁸⁴
	Percentage of workplaces answering 'yes' to this choice in the question, 'What about managers at this workplace, are they entitled to any of these non-pay terms and conditions?'				
	Entitlement to sick pay in excess of statutory requirements for non-managerial employees	54 (na/na/na)	Manager interviews	1994 managers; 10 or more employees	WERS (2004: 21) ⁸⁴
	Percentage of workplaces answering 'yes' to this choice in the question, 'Is the largest occupational group at this workplace entitled to any of these non-pay terms and conditions?'				
	Occupational sick pay	83 (95/83/na)	Postal survey	535 organisations; no limit	CIPD (2006: 29) ⁸⁹
	na, data not available				

TABLE 11 Reported use of HRM practices: communication

Category	Practice: interview or survey question/report definition, where available	Percentage workplaces with practice [overall (public/private/health)]	Data collection method	Sample size: workplaces size	Source
Face to face	Meetings between senior management and the entire workforce	79 (89/77/na)	Manager interviews	2057 managers; 10 or more employees	WERS (2006: 135) ⁸²
	Team briefings or meetings with entire workforce	71 (81/68/na)	Manager interviews	2057 managers; 10 or more employees	WERS (2006: 135) ⁸²
	Percentage of workplaces answering 'yes' to the question, 'Do you have meetings between line managers or supervisors and all the people for whom they are responsible? ... these are sometimes known as "briefing groups" or "team briefings".'	63 (81/59/na)	Manager interviews	2017 managers (overall) — 554 managers (public), 1463 managers (private); 10 or more employees	WERS (2006: 139) ⁸²
	Regular meetings with feedback				
	Percentage of workplaces answering 'some' or 'a lot' of time to the question, 'What proportion of the time at meetings is usually available for questions from employees or for employees to offer their views?'	30 (17/33/na)	Manager interviews	2017 managers (overall) — 554 managers (public), 1463 managers (private); 10 or more employees	WERS (2006: 139) ⁸²
	Other meetings or written or 2-way communication				
	Percentage of workplaces answering 'some' or 'a lot' of time to the question, 'Other meetings ... What proportion of the time at meetings is usually available for questions from employees or for employees to offer their views?'	64 (91/60/na)	Manager interviews	2057 managers; 10 or more employees	WERS (2006: 135) ⁸²
	Systematic use of management chain/cascading of information				
	Percentage of workplaces answering 'yes' to this choice in the question, 'Are there other ways in which management communicates or consults with employees at this establishment?'	81 (89/78/na)	HR postal and online survey	1083 HR professionals; na	CIPD (2006: 29) ⁹⁶
	Return-to-work interviews/short-term absence management	73 (83/70/na)	HR postal survey	1083 HR professionals in organisations; na	CIPD (2006: 32) ⁹⁶
	Return-to-work interviews/long-term absence management				

continued

TABLE II Reported use of HRM practices: communication (continued)

Category	Practice: interview or survey question/report definition, where available	Percentage workplaces with practice [overall (public/private/health)]	Data collection method	Sample size; workplaces size	Source
Impersonal communication	Direct communication only	4 (1/5/na)	Manager interviews	2017 managers (overall) – 554 managers (public), 1463 managers (private); 10 or more employees	WERS (2006: 139) ⁸²
	Percentage of workplaces answering 'yes' to this choice in the question, 'Are there other ways in which management communicates or consults with employees at this establishment?'				
	Regular newsletters	45 (63/41/na)	Manager interviews	2057 managers; 10 or more employees	WERS (2006: 135) ⁸²
	Percentage of workplaces answering 'yes' to this choice in the question, 'Are there other ways in which management communicates or consults with employees at this establishment?'				
	Notice boards	74 (86/72/na)	Manager interviews	2057 managers; 10 or more employees	WERS (2006: 135) ⁸²
	Percentage of workplaces answering 'yes' to this choice in the question, 'Are there other ways in which management communicates or consults with employees at this establishment?'				
	E-mail	38 (48/36/na)	Manager interviews	2057 managers; 10 or more employees	WERS (2006: 135) ⁸²
	Percentage of workplaces answering 'yes' to this choice in the question, 'Are there other ways in which management communicates or consults with employees at this establishment?'				
	Intranet	34 (48/31/na)	Manager interviews	2057 managers; 10 or more employees	WERS (2006: 135) ⁸²
	Percentage of workplaces answering 'yes' to this choice in the question, 'Are there other ways in which management communicates or consults with employees at this establishment?'				

Category	Practice: interview or survey question/report definition, where available	Percentage workplaces with practice [overall (public/private/health)]	Data collection method	Sample size; workplaces size	Source
Information sharing	Information disclosure over investment plans	41 (50/40/na)	Manager interviews	2047 managers; 10 or more employees	WERS (2004; 18) ⁸⁴
	Percentage of workplaces answering 'yes' to this choice in the question, 'Does management regularly give employees, or their representatives, any information about ... ?'				
	Information disclosure over financial position of workplace	55 (76/51/na)	Manager interviews	2047 managers; 10 or more employees	WERS (2004; 18) ⁸⁴
	Percentage of workplaces specifying an answer to the question, 'Does management regularly give employees, or their representatives, any information about ... ?'				
	Information disclosure over financial position of organisation	51 (53/51/na)	Manager interviews	2047 managers; 10 or more employees	WERS (2004; 18) ⁸⁴
	Percentage of workplaces answering 'yes' to this choice in the question, 'Does management regularly give employees, or their representatives, any information about ... ?'				
na	Information disclosure over staffing plans	64 (81/61/na)	Manager interviews	2047 managers; 10 or more employees	WERS (2004; 18) ⁸⁴
	Percentage of workplaces answering 'yes' to this choice in the question, 'Does management regularly give employees, or their representatives, any information about ... ?'				
	Guaranteed job security or no compulsory redundancies policy	14 (na/na/na)	Manager interviews	1926 managers Workplaces with 25 employees or more	WERS (2004; 18) ⁸⁴
	No formal arrangements	2 (0/3/na)	Manager interviews	2017 managers (overall) – 554 managers (public), 1463 managers (private); 10 or more employees	WERS (2006; 139) ⁸²
	Percentage of workplaces answering 'yes' to this choice in the question, 'Are there other ways in which management communicates or consults with employees at this establishment?'				
na, data not available.					

TABLE 12 Reported use of HRM practices (family friendly/work-life balance)

Category	Practice: interview or survey question/report definition, where available	Percentage workplaces with practice [overall (public/private/health)]	Data collection method	Sample size; workplace size	Source	
Hours	Permanent non-standard hours – any employees (includes reduced hours, increased hours, job sharing, etc.)	90 (99/92/na)	Manager interviews	1879 managers; 10 or more employees	WERS (2006: 269) ⁸²	
	Reduced hours	70 (na/na/na)	Manager interviews	2050 managers; 10 or more employees	WERS (2006: 250) ⁸²	
	Percentage of workplaces answering 'yes' to the question, 'Do you have any of the following working time arrangements for any employees at this workplace ... Ability to reduce working hours e.g. switching from full-time to part-time employment?'					
	Increased hours	57 (na/na/na)	Manager interviews	2050 managers; 10 or more employees	WERS (2006: 250) ⁸²	
	Percentage of workplaces answering 'yes' to the question, 'Do you have any of the following working time arrangements for any employees at this workplace ... Ability to increase working hours e.g. switching from part-time to full-time employment?'					
	Job sharing	31 (na/na/na)	Manager interviews	2050 managers; 10 or more employees	WERS (2006: 250) ⁸²	
	Percentage of workplaces answering 'yes' to the question, 'Do you have any of the following working time arrangements for any employees at this workplace ... Job sharing schemes, e.g. sharing a full-time job with another employee?'					
	Term time only	20 (na/na/na)	Manager interviews	2050 managers; 10 or more employees	WERS (2006: 250) ⁸²	
	Percentage of workplaces answering 'yes' to the question, 'Are any employees here entitled to any of the following? Working only during school term time?'					
	Compressed hours	16 (na/na/na)	Manager interviews	2050 managers; 10 or more employees	WERS (2006: 250) ⁸²	
	Percentage of workplaces answering 'yes' to the question, 'Do you have any of the following working time arrangements for any employees at this workplace, e.g. a 9-day fortnight or 4- to 5-day week?'					
	Annualised hours	6 (na/na/na)	Manager interviews	2050 managers; 10 or more employees	WERS (2004: 29) ⁸⁴	
Percentage of workplaces answering 'yes' to the question, 'Do you have any of the following working time arrangements for employees at this workplace: ... Annualised hours?'						
Zero-hour contracts	5 (na/na/na)	Manager interviews	2050 managers; 10 or more employees	WERS (2004: 29) ⁸⁴		
Percentage of workplaces answering 'yes' to this choice in the question, 'Do you have any of the following working time arrangements for employees at this workplace: ... Zero-hour contracts?'						

Category	Practice: interview or survey question/report definition, where available	Percentage workplaces with practice [overall (public/private/health)]	Data collection method	Sample size; workplace size	Source
	Shift working	54 (48/55/na)	Manager interviews	1879 managers; 10 or more employees	WERS (2006: 269) ⁸²
	Change working pattern	45 (na/na/na)	Manager interviews	2050 managers; 10 or more employees	WERS (2006: 250) ⁸²
	Percentage of workplaces answering 'yes' to the question, 'Do you have any of the following working time arrangements for any employees at this workplace ... Ability to change shift patterns?'				
	Overtime	80 (na/na/na)	Manager postal survey	1507 managers responsible for HR; 10 or more employees	ESWT (2006: 15) ⁸⁶
	'Overtime hours refer to those hours worked beyond the normal agreed (weekly or monthly) working hours'				
	Non-standard or 'unusual' working hours	53 (Saturday)	Manager postal survey	1507 managers responsible for HR; 10 or more employees	ESWT (2006: 31) ⁸⁶
	'those types of working hours that are regarded as 'unusual' in ... most countries ... i.e. night work from 22.00 to 06.00, and work on Saturdays or on Sundays'	41 (Sunday)			
		21 (night (na/na/na)			
	Flexitime	35 (na/na/na)	Manager interviews	2050 managers; 10 or more employees	WERS (2006: 250) ⁸²
	Percentage of workplaces answering 'yes' to the question, 'Do you have any of the following working time arrangements for any employees at this workplace ... Flexitime [where an employee has no set start or finish time but an agreement to work a set number of hours per week or per month]?'				
Hours, location of work	Flexibility over location or hours of work (e.g. home working, flexitime)	46 (56/43/na)	Manager interviews	1879 managers; 10 or more employees	WERS (2006: 269) ⁸²
Location of work	Home working	26 (na/na/na)	Manager interviews	2050 managers; 10 or more employees	WERS (2006: 250) ⁸²
	Percentage of workplaces answering 'yes' to the question, 'Do you have any of the following working time arrangements for any employees at this workplace ... Working at, or from, home in normal working hours?'				
	Mobile working: total availability	27 (na/na/na)	Postal survey	585 HR professionals; no limit	CIPD (2005: 6) ⁹⁴

continued

TABLE 12 Reported use of HRM practices (family friendly/work-life balance) (continued)

Category	Practice: interview or survey question/report definition, where available	Percentage workplaces with practice [overall (public/private/health)]	Data collection method	Sample size; workplace size	Source
Leave	Extrastatutory leave at time of birth (e.g. maternity or paternity leave on full pay)	82 (98/77/na)	Manager interviews	1879 managers; 10 or more employees	WERS (2006: 269) ⁸²
	Fully paid maternity leave	57 (84/51/na)	Manager interviews	1907 managers; 10 or more employees	WERS (2006: 258) ⁸²
	Percentage of workplaces answering 'yes' to the question, 'Would any female employees going on maternity leave from this workplace receive their normal, full rate of pay?'				
	Maternity leave	73 (na/na/na)	Postal survey to practice manager	477 general practices	Newton et al. (1996: 83) ¹⁰²
	Fully paid paternity or fully paid discretionary leave for fathers	55 (84/49/na)	Manager interviews	1863 managers; 10 or more employees	WERS (2006: 258) ⁸²
	Percentage of workplaces answering 'yes' to the question, 'Would any fathers taking (paternity or fully paid discretionary leave) from this workplace receive their normal, full rate of pay?'				
	Extrastatutory leave for carers (e.g. paid parental leave, emergency leave, etc.)	82 (98/77/na)	Manager interviews	1879 managers; 10 or more employees	WERS (2006: 269) ⁸²
	Paid parental leave or special paid leave for parents	25 (47/21/na)	Manager interviews	1975 managers; 10 or more employees	WERS (2006: 258) ⁸²
	Percentage of workplaces answering 'yes' to the question, 'With the exception of maternity leave, paternity leave and time off for emergencies, how do mothers and fathers usually take time off to look after their children? Paid parental leave ... take special paid leave'				
	Special paid leave for family emergencies	49 (80/43/na)	Manager interviews	1988 managers; 10 or more employees	WERS (2006: 258) ⁸²
Percentage of workplaces answering 'yes' to the question, 'With the exception of maternity leave, paternity leave and time off for emergencies, how do mothers and fathers usually take time off to look after their children? Take special paid leave?'					

Category	Practice: interview or survey question/report definition, where available	Percentage workplaces with practice [overall (public/private/health)]	Data collection method	Sample size; workplace size	Source
	Leave for carers of older adults	6 (16/4/na)	Manager interviews	1985 managers; 10 or more employees	WERS (2006: 258) ⁸²
	Percentage of workplaces answering 'yes' to the question, 'Are any employees entitled to any of the following? A specific period of leave for carers of older adults?'				
	Career breaks/sabbatical: total availability	42 (na/na/na)	Postal survey	585 HR professionals; no limit	CIPD (2005: 6) ⁹⁴
	Career break schemes	20 (na/na/na)	Postal survey	453 CIPD members whose organisations offer working from home; no limit	CIPD (2005: 6) ⁹⁴
Retirement	Sabbaticals	17 (na/na/na)	Postal survey	453 CIPD members whose organisations offer working from home; no limit	CIPD (2005: 6) ⁹⁴
	Phased retirement	53 (na/na/na)	Manager postal survey	1507 managers responsible for HR; 10 or more employees	ESWT (2006: 44) ⁸⁶
	'Employees beyond a certain age threshold have the possibility of gradually reducing the number of hours worked as they approach retirement age'				
	Early retirement	59 (na/na/na)	Manager postal survey	1507 managers responsible for HR; 10 or more employees	ESWT (2006: 45) ⁸⁶
	'Older employees are allowed to fully exit the labour market, either a few years or months before they reach the statutory retirement age'				
Employee benefits	Workplace nursery/child-care subsidy	10 (na/na/na)	Postal survey	2029 IPD members; no limit	IPD (1999: 2) ¹⁰¹
	Child-care subsidies	9 (na/na/na)	Postal survey	2029 IPD members; no limit	IPD (1999: 2) ¹⁰¹
	Assistance with nanny /au pair selection	4 (na/na/na)	Postal survey	2029 IPD members; no limit	IPD (1999: 2) ¹⁰¹
	After-school care	2 (na/na/na)	Postal survey	2029 IPD members; no limit	IPD (1999: 2) ¹⁰¹
	na, data not available.				

TABLE 13 Reported use of HRM practices: single status/status harmonisation

Category	Practice: interview or survey question/report definition, where available	Percentage workplaces with practice [overall (public/private/health)]	Data collection method	Sample size; workplaces size	Source
Single status	Single status: 'both groups [managers and non-managers] in a given workplace had the same entitlements (including where neither of them were entitled to a given benefit)'	48 (73/48/na)	Manager interviews	1994 managers; 10 or more employees	WERS (2004a: 21) ⁸⁴
Equal opportunities	Formal equal opportunity policy	73 (98/68/89)	Manager interviews	2053 managers; 10 or more employees	WERS (2006: 238) ⁸²
	Gender-monitoring recruitment and selection	24 (na/na/na)	Manager interviews	2030 managers; 10 or more employees	WERS (2006: 248) ⁸²
	Percentage of workplaces answering 'yes' to this choice in the question, 'Do you monitor recruitment and selection by any of these characteristics?'				
	Review procedures for recruitment and selection regarding gender	19 (na/na/na)	Manager interviews	2030 managers; 10 or more employees	WERS (2006: 248) ⁸²
	Percentage of workplaces answering 'yes' to this choice in the question, 'Do you review recruitment and selection procedures to identify indirect discrimination by any of these characteristics?'				
	Gender monitoring on promotion	10 (na/na/na)	Manager interviews	2030 managers; 10 or more employees	WERS (2006: 248) ⁸²
	Percentage of workplaces answering 'yes' to this choice in the question, 'Do you monitor promotions by any of these characteristics?'				
	Review procedures for promotion regarding gender	11 (na/na/na)	Manager interviews	2030 managers; 10 or more employees	WERS (2006: 248) ⁸²
	Percentage of workplaces answering 'yes' to this choice in the question, 'Do you review promotion procedures to identify indirect discrimination by any of these characteristics?'				
	Review of relative pay rates regarding gender	7 (na/na/na)	Manager interviews	2030 managers; 10 or more employees	WERS (2006: 248) ⁸²
	Percentage of workplaces answering 'yes' to this choice in the question, 'Do you review relative pay rates by any of these characteristics?'				
	Ethnicity monitoring recruitment and selection	24 (na/na/na)	Manager interviews	2030 managers; 10 or more employees	WERS (2006: 248) ⁸²
	Percentage of workplaces answering 'yes' to this choice in the question, 'Do you monitor recruitment and selection by any of these characteristics?'				

Category	Practice: interview or survey question/report definition, where available	Percentage workplaces with practice [overall (public/private/health)]	Data collection method	Sample size: workplaces	Source
	Review procedures for recruitment and selection regarding ethnicity	20 (na/na/na)	Manager interviews	2030 managers; 10 or more employees	WERS (2006: 248) ⁸²
	Percentage of workplaces answering 'yes' to this choice in the question, 'Do you review recruitment and selection procedures to identify indirect discrimination by any of these characteristics?'				
	Ethnicity monitoring on promotion	10 (na/na/na)	Manager interviews	2030 managers; 10 or more employees	WERS (2006: 248) ⁸²
	Percentage of workplaces answering 'yes' to this choice in the question, 'Do you monitor promotions by any of these characteristics?'				
	Review procedures for promotion ethnicity	11 (na/na/na)	Manager interviews	2030 managers; 10 or more employees	WERS (2006: 248) ⁸²
	Percentage of workplaces answering 'yes' to this choice in the question, 'Do you review promotion procedures to identify indirect discrimination by any of these characteristics?'				
	Review of relative pay rates regarding ethnicity	5 (na/na/na)	Manager interviews	2030 managers; 10 or more employees	WERS (2006: 248) ⁸²
	Percentage of workplaces answering 'yes' to this choice in the question, 'Do you review relative pay rates by any of these characteristics?'				
	Disability monitoring recruitment and selection	23 (na/na/na)	Manager interviews	2030 managers; 10 or more employees	WERS (2006: 248) ⁸²
	Percentage of workplaces answering 'yes' to this choice in the question, 'Do you monitor recruitment and selection by any of these characteristics?'				
	Review procedures for recruitment and selection regarding disability	19 (na/na/na)	Manager interviews	2030 managers; 10 or more employees	WERS (2006: 248) ⁸²
	Percentage of workplaces answering 'yes' to this choice in the question, 'Do you review recruitment and selection procedures to identify indirect discrimination by any of these characteristics?'				
	Disability monitoring on promotion	9 (na/na/na)	Manager interviews	2030 managers; 10 or more employees	WERS (2006: 248) ⁸²
	Percentage of workplaces answering 'yes' to this choice in the question, 'Do you monitor promotions by any of these characteristics?'				

continued

TABLE 13 Reported use of HRM practices: single status/status harmonisation (continued)

Category	Practice: interview or survey question/report definition, where available	Percentage workplaces with practice [overall (public/private/health)]	Data collection method	Sample size; workplaces size	Source
	Review procedures for promotion disability	10 (na/na/na)	Manager interviews	2030 managers; 10 or more employees	WERS (2006: 248) ⁸²
	Percentage of workplaces answering 'yes' to this choice in the question, 'Do you review promotion procedures to identify indirect discrimination by any of these characteristics?'				
	Review of relative pay rates regarding disability	4 (na/na/na)	Manager interviews	2030 managers; 10 or more employees	WERS (2006: 248) ⁸²
	Percentage of workplaces answering 'yes' to this choice in the question, 'Do you review relative pay rates by any of these characteristics?'				
	Age monitoring recruitment and selection	20 (na/na/na)	Manager interviews	2030 managers; 10 or more employees	WERS (2006: 248) ⁸²
	Percentage of workplaces answering 'yes' to this choice in the question, 'Do you monitor recruitment and selection by any of these characteristics?'				
	Review procedures for recruitment and selection regarding age	16 (na/na/na)	Manager interviews	2030 managers; 10 or more employees	WERS (2006: 248) ⁸²
	Percentage of workplaces answering 'yes' to this choice in the question, 'Do you review recruitment and selection procedures to identify indirect discrimination by any of these characteristics?'				
	Age monitoring on promotion	7 (na/na/na)	Manager interviews	2030 managers; 10 or more employees	WERS (2006: 248) ⁸²
	Percentage of workplaces answering 'yes' to this choice in the question, 'Do you monitor promotions by any of these characteristics?'				
	Review procedures for promotion regarding age	9 (na/na/na)	Manager interviews	2030 managers; 10 or more employees	WERS (2006: 248) ⁸²
	Percentage of workplaces answering 'yes' to this choice in the question, 'Do you review promotion procedures to identify indirect discrimination by any of these characteristics?'				
	Review of relative pay rates regarding age	6 (na/na/na)	Manager interviews	2030 managers; 10 or more employees	WERS (2006: 248) ⁸²
	Percentage of workplaces answering 'yes' to this choice in the question, 'Do you review relative pay rates by any of these characteristics?'				

Category	Practice: interview or survey question/report definition, where available	Percentage workplaces with practice [overall (public/private/health)]	Data collection method	Sample size; workplaces size	Source
	Training interviewers in diversity	53 (72/49/na)	Postal survey	659 HR professionals in UK organisations; no limit	CIPD (2006c: 15) ⁹⁸
	Advertising in different sources to widen interest from under-represented groups	41 (65/33/na)	Postal survey	659 HR professionals in UK organisations; no limit	CIPD (2006c: 15) ⁹⁸
	Using images and words that appeal to a wider audience	39 (45/37/na)	Postal survey	659 HR professionals in UK organisations; no limit	CIPD (2006c: 15) ⁹⁸
	Checking tests used are culture free and tested on diverse norm groups	37 (44/33/na)	Postal survey	659 HR professionals in UK organisations; no limit	CIPD (2006c: 15) ⁹⁸
	Recruitment documents in other formats (e.g. large print)	23 (53/9/na)	Postal survey	659 HR professionals in UK organisations; no limit	CIPD (2006c: 15) ⁹⁸
	Setting recruitment targets to correct workforce imbalance	11 (20/6/na)	Postal survey	659 HR professionals in UK organisations; no limit	CIPD (2006c: 15) ⁹⁸
	Formal equal opportunities policies	73 (na/na/na)	Postal survey to practice manager	477 general practices	Newton et al. (1996: 83) ¹⁰²
Appraisal	Subordinate feedback	11 (na/na/na)	Postal survey	506 HR practitioners; no limit	CIPD (2005: 3) ⁹⁵
	Continuous assessment	14 (na/na/na)	Postal survey	506 HR practitioners; no limit	CIPD (2005: 3) ⁹⁵
	Competence assessment	31 (na/na/na)	Postal survey	506 HR practitioners; no limit	CIPD (2005: 3) ⁹⁵
	Objective setting and review	62 (na/na/na)	Postal survey	506 HR practitioners; no limit	CIPD (2005: 3) ⁹⁵
	Staff appraisal	27 (na/na/na)	Postal survey to practice manager	477 general practices	Newton et al. (1996), ¹⁰² p. 83
		na, data not available.			

TABLE 14 Reported Use of HRM Practices (*Employee Involvement*)

Category	Practice: interview or survey question/report definition, where available	Percentage workplaces with practice [overall (public/private/health)]	Data collection method	Sample size; workplaces size	Source
Involvement	Problem-solving groups involving non-managerial employees	21 (33/19/na)	Manager interviews	2048 managers; 10 or more employees	WERS (2006: 94) ⁸²
	Suggestion schemes	30 (30/30/na)	Manager interviews	2057 managers; 10 or more employees	WERS (2006: 135) ⁸²
	Employee surveys	42 (66/37/na)	Manager interviews	2057 managers; 10 or more employees	WERS (2006: 135) ⁸²
	Direct participation 'Opportunities which management provide, or initiatives to which they lend their support, at workplace level, for consultation with and/or delegation of responsibilities and authority for decision-making to their subordinates either as individuals or as groups of employees, relating to the immediate work tasks, work organisation and/or working conditions'. European Foundation for the Improvement of Living and Working Conditions (2006)	83 (na/na/na)	Manager postal survey	5800 workplaces across 10 EU countries (including UK); 25 or more employees for smaller countries and 50 for larger countries	European Foundation for the Improvement of Living and Working Conditions (1996)
Representation	Joint consultative committees: workplace level committees	14 (28/11/13)	Manager interviews	2020 managers; 10 or more employees	WERS (2006: 127) ⁸²
	Joint consultative committees: higher level committees	25 (46/20/25)	Manager interviews	2020 managers; 10 or more employees	WERS (2006: 127) ⁸²
	Joint consultative committees: no committees at all	62 (26/69/62)	Manager interviews	2020 managers; 10 or more employees	WERS (2006: 127) ⁸²
	Aggregate union density Percentage of employees answering 'yes' to the question, 'Are you a member of a trade union or staff association?'	34 (64/22/44)	Employee postal survey	21,540 employees; 10 or more employees	WERS (2006: 110) ⁸²
	No union members	64 (7/77/na)	Manager interviews	1973 managers; 10 or more employees	WERS (2004a: 12) ⁸²
	Union density of 50% or more	18 (62/8/22)	Manager interviews	1973 managers; 10 or more employees	WERS (2006: 110) ⁸²
	Recognised unions	30 (90/16/41)	Manager interviews	1992 managers; 10 or more employees	WERS (2006: 119) ⁸²

na, data not available.

 a. European Foundation for the Improvement of Living and Working Conditions. *Fifteen years of working conditions in the EU: Charting trends*. Dublin: European Foundation for the Improvement of Living and Working Conditions; 2006.

TABLE 15 Reported use of HRM practices: performance management

Category	Practice: interview or survey question/report definition, where available	Percentage workplaces with practice [overall (public/private/health)]	Data collection method	Sample size; workplaces size	Source
Appraisal	Performance appraisals	71 (68/86/89)	Manager interviews	2025 managers; 10 or more employees	WERS (2004: 83) ⁸⁴
	Percentage of workplaces answering 'some', 'a lot' or 'all' to the question, 'What proportion of non-management employees at this workplace have their performance formally appraised?'				
	Annual performance review	62 (na/na/na)	Manager telephone survey	27,172 managers/ establishments	NESS (2005: 84) ⁹¹
	Percentage of workplaces answering 'some', 'a lot' or 'all' to the question, 'What percentage of your staff have an annual performance review?'				
	Twice-yearly appraisal	27 (na/na/na)	Postal survey	506 HR practitioners; no limit	CIPD (2005: 3) ⁹⁵
	Rolling appraisal	10 (na/na/na)	Postal survey	506 HR practitioners; no limit	CIPD (2005: 3) ⁹⁵
	360° appraisal	70 (na/na/na)	Postal survey	635 CIPD members in UK organisations; no limit on organisation size	CIPD (2006: 6) ⁹⁷
	Percentage of workplaces reporting they use this practice frequently, occasionally or rarely				
	360° appraisal	13 (na/na/na)	Postal survey	1115 organisations; 100 or more employees	CRANET (2003: 13) ¹⁰⁰
	Peer appraisal	8 (na/na/na)	Postal survey	506 HR practitioners; no limit	CIPD (2005: 3) ⁹⁵
Self-appraisal	30 (na/na/na)	Postal survey	506 HR practitioners; no limit	CIPD (2005: 3) ⁹⁵	
Team appraisal	6 (na/na/na)	Postal survey	506 HR practitioners; no limit	CIPD (2005: 3) ⁹⁵	
na, data not available.					

TABLE 16 Reported use of operational practices associated with HRM

Category	Practice: interview or survey question/report definition, where available	Percentage workplaces with practice [overall (public/private/health)]	Data collection method	Sample size; workplaces size	Source
Just-in-time (JIT)	JIT system of inventory control	29 (na/na/na)	Manager interviews	1926 managers; 25 employees or more	WERS (1998: 10) ⁸³
	JIT	na (78/na/45)	Manager telephone survey	1115 UK manufacturing or health organisations; more than 150; employees	Wood et al. (2004: 426) ⁸⁹
Total quality management (TQM)	TQM	na (88/na/73)	Manager telephone survey	1115 UK manufacturing or health organisations; more than 150 employees	Wood et al. (2004: 426) ⁸⁹

TABLE 17 Proxy indicators of the experience of HR practices in the NHS^{ab}

Category	HR practice (Tables 7–16)	Survey question/definition where available	Employee response (%) (KS where applicable)
Work design	Team working	Percentage of staff working in a well-structured team environment	39 (KS8)
	Job design	Quality of job design – clear job content, feedback and staff involvement (scale score)	3.30 (range: minimum + 1 – maximum + 5) (KS9)
Training and development	General training	Percentage of staff saying that they had taken part in at least one form of employer supported training, learning or development in the last 12 months	94
	Job relevant training	Percentage of staff receiving job relevant training, learning or development in the last 12 months	77 (KS7)
	Health and safety	Percentage of staff who had received health and safety training paid for or provided by the Trust in the last 12 months	71 (KS12)
	PDPs	Percentage of staff receiving the training, learning and development identified in their PDP (percentage of all with a PDP in place – see Performance management, below)	50 (i.e. one-quarter of all staff)
Communication	Unspecified	Communication between senior management and staff is effective	23
Family friendly/work-life balance	Total – all forms of flexible working	Staff using flexible working options	73 (KS3)
	Flexitime	'I work flexitime'	31
	Reduced hours	'I work reduced hours (e.g. part time)'	32
	Flexibility over location	'I work from home in normal working hours'	7

Category	HR practice (Tables 7–16)	Survey question/definition where available	Employee response (%) (KS where applicable)
Single status/ harmonisation	Annualised hours	'I work annualised hours'	21
	Term time only	'I work during school term only'	2
	Job sharing	'I job share with someone else'	4
	Equal opportunities	Training in diversity (all)	39
		Percentage of staff receiving training in age-related equality/diversity in last 12 months	17
		Percentage of staff receiving training in disability-related equality/diversity in last 12 months	18
		Percentage of staff receiving training in gender-related equality/diversity in last 12 months	15
		Percentage of staff receiving training in race-related equality/diversity in last 12 months	17
		Percentage of staff receiving training in sexual orientation-related equality/diversity in last 12 months	14
		Percentage of staff receiving training in religion-related equality/diversity in last 12 months	17
Employee involvement	Suggestion schemes	'Senior managers here try to involve staff in important decisions'	23
		'Senior managers encourage staff to suggest new ideas for improving services'	31
	Direct participation	'I am involved in deciding on the changes introduced that affect my work area/team/department'	48
Performance management		'I am consulted about changes that affect my work area/team/department'	48
		Percentage of staff reporting that they had received a performance appraisal or a performance development review in the previous 12 months	61 (KS4)
		Percentage of staff receiving well-structured performance appraisal review in the previous 12 months	24 (KS5)
	PDP	Percentage of staff with an agreed PDP as part of their appraisal	52 (KS6)

KS, key score; PDP, personal development plan.

a These data are not comparable with the data in Tables 7–16 – see Health sector-specific surveys, above.

b All data taken from the HCC National NHS Staff Survey 2007.⁰³

reduce hours, for example to switch from full- to part-time work, is the most frequently provided practice, with 70% of workplaces having it, while the provision of child-care facilities is the least used.

The Workplace Employment Relations Survey offers the only information that there is on single status, revealing that 48% of workplaces provide the same level of benefits for all staff (i.e. they provide or do not provide a particular benefit for managers and non-managerial staff alike). Five surveys are questions on this specifically. The nearest proxy is equal opportunities, which is covered extensively in surveys, although only a minority of organisations go beyond a formal equal opportunities policy (73%) or training interviewers in diversity (53%).

Information on employee involvement methods covers union representation, consultation, suggestion schemes and employee surveys. The usage of such practices varies considerably but in no case are they used in a majority of workplaces.

Information on performance management focuses exclusively on appraisal. The majority of workplaces have some form of appraisal, but only a minority (27% in WERS) do it more than once a year.

Separate figures for the health sector are available for only a small number of the practices (Tables 7–16, column 3), and indeed for the majority of HRM categories (e.g. family-friendly practices) we have no such data. For those for which we have data, in the majority of cases the frequency of use in the health sector is not that different from the overall use, and in most cases is even more similar to the use in the public sector. The two exceptions are related to trade unions. The first is the determination of pay by collective bargaining, as this exists in 82% of public workplaces but only in 36% of health sector workplaces and 14% of the private sector. The second is union recognition, which is granted in 90% of public workplaces, 41% of health sector workplaces, and only 16% of private sector workplaces.

Although evidence is reported on some HRM practices within each of the broad categories included in this review, the survey coverage is by no means comprehensive. It is clear from these results that crucial elements of the HRM system are not covered by a lot of the surveys.

Data from the NHS Staff Survey 2007

Data from the NHS Staff Survey¹⁰³ is presented in Table 17. Caution is needed when considering these data in relation to the data on HR practices in general. The NHS data shows the proportion of NHS staff who report work experiences that are consistent with the HR practices considered here. It is not, however, indicative of the number of Trusts in which such HR policies/practices exist, nor does it help address other important questions raised in this section, such as the percentage of the workforce covered by a particular HR practice in a given organisation.

Accepting the limitations of the NHS Staff Survey¹⁰³ data in relation to the focus of this chapter, it can be considered as providing proxy indicators of staff experiences in areas. This is of particular interest where organisational level HR practice data are not available.

Specifically the NHS Staff Survey¹⁰³ data indicate that 39% of NHS employees work in a well-structured team environment. This contrasts with data from the survey of HR practices, which indicate that 72% of all organisations surveyed have some employees working in teams and 79% of health sector organisations make some use of team working.

With regard to training, 54% of employers surveyed on HR practices had funded or arranged some training over the previous 12 months. No breakdown is available for health sector organisations, but 94% of NHS employees report taking part in some form of training over the previous 12 months. Eighty-one per cent of employers from the HR practice surveys provided job specific training and 80% health and safety training. From the NHS Staff Survey, 77% of staff reported receiving job relevant training, 71% health and safety training.

There are no health sector-specific breakdowns available for the wide range of communication practices covered by the HR practice surveys. The NHS staff survey indicates that 23% of NHS employees feel that senior management communicate effectively with staff.

No breakdown is available for the percentage of health sector employers offering family friendly/work-life balance HR practice; however, the NHS Staff Survey¹⁰³ indicates that between 2% and 32%

of NHS employees make use of one of a range of specific practices in this area, with 73% of all employees reporting that they use flexible working options.

Eighty-nine per cent of health sector organisations report having an equal opportunities policy in place, but no further breakdown of specific HR practices in this area is available. Thirty-nine per cent of NHS employees report receiving some form of diversity training. Levels of training in age, disability, gender, race, sexual orientation or religion-related equality/diversity range from 14% to 18% of employees surveyed.

With regard to employee involvement, there is some evidence from HR practice surveys in relation to health sector organisations. This mainly relates to union membership and joint consultative committees (*Table 14*). No breakdown is available for the percentage of health sector organisations using other employee involvement HR practices (such as suggestion schemes or problem-solving groups). Findings from the NHS Staff Survey¹⁰³ indicate that 23% of NHS employees feel that senior managers try to involve staff in important decisions and 31% feel that senior managers encourage staff to make suggestions to improve services.

With regard to direct participation, 48% of NHS staff surveyed felt that they were involved in decision-making, and/or consulted about decisions that affected them.

Finally, with regard to performance management, 89% of health sector employers reported using performance appraisals (compared with 71% for all organisations). From the NHS Staff Survey, 61% of respondents said that they had received an

appraisal in the previous 12 months. Interestingly, this drops to 24% when factors indicating a well-structured performance appraisal were taken into account. Fifty-two per cent of staff (as measured by the NHS Staff Survey¹⁰³) reported that they agreed a personal development plan (PDP) as part of their appraisal.

Conclusion

Human resource practice surveys and the NHS Staff Survey cover some common themes. NHS Staff Survey¹⁰³ data help to supplement the picture provided by organisational level surveys of HR practices by demonstrating the degree to which NHS employees in general may experience the results of HR practices in place in organisations. Some of the NHS Staff Survey data provide better proxy indicators than others (e.g. evidence of a PDP) and receiving training identified in a PDP are arguably stronger indicators of the existence of a specific HR practice in relation to appraisal and development than, say, the extent to which perceptions of the quality of communication between senior managers and staff indicate the existence of an HR communication practice.

Responses to the NHS Staff Survey¹⁰³ at an individual Trust level can help that Trust to assess the effectiveness of a range of HR practices within the organisation. Further breakdown of WERS data to reveal the extent of HR practices in the health sector would enable more meaningful comparisons to be made between data collected at the organisational level and individual data such as the NHS Staff Survey. Equally, systematic collection of HR practice data at Trust level would enable more detailed analysis to identify the presence and effectiveness of such practices.

Chapter 4

Implementation fidelity in HRM

Introduction

This report seeks to provide as requested in the invitation to tender (ITT) ‘an account of the different human relations policies and methods to determine the fidelity with which they were implemented’. Implementation fidelity relates to the fidelity with which both policies and research-based interventions are implemented by those responsible for delivering them. In this case, the concern was for the fidelity with which real-world HRM policies are implemented as practices. The aim was to understand better how knowledge about the effectiveness of HRM practices, evaluated and reported in previous sections, may best be transferred into practice.

Certain practices have been found by this report to be effective, for example in reducing mortality rates or patient waiting times, but these practices may only have the same potential effect when reproduced by policy-makers and practitioners if they are implemented properly, as they should be, i.e. with high fidelity to the original practices or interventions examined in the research.

This section reviews existing literature on this concept and measurement of fidelity, with the aim of understanding the process of implementation fidelity and thus informing and improving the success with which HRM policies may be implemented. With this in mind, the report was also required to provide guidance on how fidelity could be measured, and to produce a ‘checklist of actions, which an auditor for a resource management method, such as Investors in People, would use’, i.e. a checklist to be followed by those seeking to evaluate fidelity (ITT). The guidance was intended to inform implementation by outlining questions that need to be asked at every stage in the process if high fidelity is to be achieved. A tool to evaluate the fidelity with which policies have been implemented is provided as a checklist. This evaluation could be undertaken by researchers, policy-makers or practitioners, or anyone seeking to assess whether a policy has been implemented properly in practice, i.e. as intended by those designing and seeking to deliver the policy.

This section reviews the literature on ‘implementation fidelity’, develops a framework for understanding and explaining processes at work in evaluating and achieving implementation fidelity, and places this evidence and framework within the context of HRM and policy. Subsequent guidance outlines questions to be asked when implementing a policy. A checklist is presented for evaluating and explaining the degree of fidelity achieved in implementation of any such policy.

Policy–practice link and implementation fidelity

There is no shortage of research evaluating the impact of HRM practices on performance amid growing awareness of the need for evidence-based practice.⁵⁷ However, if a practice of demonstrated effectiveness is to have a positive impact it needs to be implemented faithfully. This idea is captured by the concept of implementation fidelity: ‘the degree to which ... programs are implemented ... as intended by the program developers’.¹⁰⁴ Unless an evaluation assesses whether a policy has been implemented properly, it is not possible to know whether lack of impact is due to poor implementation, (a so-called ‘Type III error’),¹⁰⁵ and covered by the ‘thesis of comprehensiveness’,¹⁰⁶ or inadequacies of the policy itself. Also, it would be unclear whether positive outcomes produced by a policy could be improved still further, if the policy had in fact not been implemented fully.

Monitoring of fidelity is of particular concern in HRM because of a long-standing concern about the gap between organisational HR policy prescriptions and actual practice.¹⁰⁷ Several scholars ascribe to poor implementation the divide between espoused people-management policies and the reality experienced by employees subject to the policies.^{107–110}

This section critically reviews the literature on implementation fidelity and considers the concept in relation to the implementation of policies in HRM. It begins by examining existing descriptions of a model of implementation fidelity. This is followed by a review of research that specifically

uses the term ‘implementation fidelity’ and uses this concept to evaluate the implementation and effect of interventions. This literature focuses on interventions to help and support people with mental health problems, criminal behaviour or addiction issues. This research provides examples of how to measure implementation, describes how to achieve high levels of fidelity and, in some cases, evaluates associations between level of implementation fidelity and the actual impact of an intervention. The concept of fidelity is then applied to HRM policy, both as a model and with reference to existing HRM ‘rhetoric versus reality’ literature, which deals with some elements of implementation fidelity, although it is less sophisticated and uses different terms. Finally, a new framework for understanding the process of evaluating fidelity is proposed. This framework is then used to develop guidance on evaluating fidelity, and a checklist for assessing the degree of fidelity with which a policy has been implemented.

Dimensions of fidelity

In the literature that specifically names and discusses the concept, implementation fidelity is described in terms of ‘five dimensions’ or ‘components’.^{104,111–113} These are adherence to a policy or intervention, dose, quality of delivery, participant responsiveness, and programme differentiation.

Within this framework, adherence is defined as whether a policy, practice, service or intervention is being delivered as it was designed or written’.¹¹¹ Dosage refers to the amount of a practice received by participants, in other words, whether the frequency and duration of the practice is as full as intended.^{104,111} It may be, for example, that not all of the aspects of a HRM practice are delivered or are delivered but not as often as required. Quality of delivery has been defined as ‘the manner in which a teacher, volunteer or staff member delivers a program’.¹¹¹ Participant responsiveness is ‘the extent to which participants are engaged by and involved in the activities and content of a program’.¹⁰⁴ Programme differentiation, the fifth dimension, is defined as ‘identifying unique features of different components or programs’ and ‘which elements of ... programs are essential’.¹⁰⁴ There are certain overlaps here with the concept of process evaluation.¹¹⁴

Two other issues need to be addressed. The first is *implementation over time*. Implementation of

an HRM policy may not be a simple one-stage process; it may take time to be implemented fully and, once it has been implemented, this level of implementation needs to be sustained. Implementation therefore requires ongoing monitoring and support.⁵⁴ Few studies examine how to sustain implementation over time. The second issue concerns the appropriateness of adaptations to fit ‘local’ conditions. Some specifications allow for local adaptation or, even if they do not explicitly do this, local adaptations may aim to improve a practice so that it fits more with the local context. Indeed, Blakely *et al.*¹¹⁵ refer to a proadaptation perspective that implies that successful interventions are those that adapt to local needs. Yet, others argue that the case for local adaptation may well have been exaggerated, where the evidence does not necessarily support it.¹¹⁶ The intermediate position is that implementation can be flexible as long as there is fidelity to the essential elements, the absence of which would adversely affect the capacity of the practice to achieve its goals, and without which the policy cannot be said to have been implemented in any meaningful fashion.^{104,111,112} However, the question remains about how to identify such essential elements. Possible options are either canvassing opinions of the practice designers themselves, or conducting a sensitivity analysis or evaluation to determine which components are most vital to its effectiveness. To date only the more unreliable former method has been used to identify such elements, and limitations of this approach are acknowledged.^{116–118} What is more, there is a growing appreciation that implementation data should accompany research on the effectiveness of interventions to facilitate their proper implementation.^{119,120} This involves specification of the essential components of an intervention or HRM practice because this defines exactly what needs to be implemented.

Overview of findings from fidelity studies in social policy

There is a growing body of literature on implementation fidelity. Studies summarised in *Table 18* are a sample of those published since the reviews conducted by Dusenbury *et al.*¹⁰⁴ and Mihalic.^{111,112} This literature focuses on interventions to help and support people with physical and mental health problems, criminal or antisocial behaviour, or addiction issues.

TABLE 18 Studies addressing implementation fidelity: 2004 to present

Study	Definition of fidelity	Domain	Intervention	Strategies to support implementation fidelity	Source of data I, programme	'Core' elements only? How identified?
Forgatch et al. (2005) ¹¹⁷	(p. 3) 'whether or not the programs are practised as intended'	Prevention	MAPS: A preventive intervention for recently married stepfamilies	MAPS manual	PMTO	Five 'core' components and processes Based on SIL model (p. 3 and p. 11)
O'Brien (2005) ¹²¹	(p. 244) 'the extent to which the program is replicated with fidelity to the intervention tested'	Prevention	Nurse-Family Partnership programme: Nurse home visits to support young mothers on low incomes	Site development, guidelines, training, an information system to record data for measures, ongoing quality improvement assessment and feedback	Unclear	Unknown
Resnick et al. (2005) ¹²²	(p. 140) 'Treatment fidelity impacts the internal and external validity of a study, as well as the effect size of a tested intervention ... If the treatment being tested does not adhere to the stated protocol, then ... the results may not be truly informative as to the utility of the treatment'	Health and medicine	Exercise plus vs exercise-only intervention programme: Exercise intervention for women, post hip fracture. Individualised programme involving weekly or monthly exercise, education, motivation and goal-setting sessions 1 year	Training manuals, standardised training program, ongoing direct observation of interventions with feedback, and ongoing training	Programme description (p. 140)	All elements
Elliott and Mihalic (2004) ¹¹⁶	None given	Prevention	Blueprint VP programme and LST programme 1 year	Capacity building/site development, training, ongoing technical assistance	Initiatives described in published reports	Core only '... judged by program developers as essential for program effectiveness ... not established by experimental manipulation or other formal tests' (p. 49)
Rinaldi et al. (2004) ¹¹⁸	(p. 282) 'Fidelity refers to the degree of implementation of an evidence-based practice'	Health and social care	ETHOS team vs ETHOS plus part-time vocational specialist: To support education and employment of young people (aged 17-30) with mental illness 1 year	None given	IPS model (Bond et al. 1997) ¹²⁹	Core only '... critical ingredients of evidence-based supported employment for people with severe mental illness' (p. 282) Items identified by 'brainstorming sessions among the authors' (Bond et al. 1997: 271) ¹²⁹

continued

TABLE 18 Studies addressing implementation fidelity: 2004 to present (continued)

Study	Definition of fidelity	Domain	Intervention	Strategies to support implementation fidelity	Source of data I, programme	'Core' elements only? How identified?
Penuel and Means (2004) ¹²³	(p. 294) 'the extent to which teachers enact innovations in ways that either follow designers' intentions or replicate practices developed elsewhere'	Education	GLOBE data reporting programme: 2 years	Teacher's guide/protocol on data collection, training in GLOBE resources and learning activities, follow-up training, mentoring, ongoing communications	GLOBE data reporting na and education programme described in a published teachers' guide	na
Cash and Berry (2003) ¹²⁴	(p. 66) 'examine treatment fidelity by comparing actual practices to the proposed principles of a service model'	Prevention	Family- and home-based programme to prevent child removal and the recurrence of child maltreatment	Training, incentives (pp. 82–3)	Principles of an ecologically and structural model of a family- and home-based intervention (Whittaker <i>et al.</i> 1986) ¹³⁰	Unclear
Resnick <i>et al.</i> (2003) ¹²⁵	(p. 141): 'fidelity scale ... to measure program implementation ... with higher numbers indicating greater fidelity to the model'	Health and social care	IPCC model (ACT) vs Standard Care (p. 140)	No information given	ACT (Mueser <i>et al.</i> 1998); ¹³¹ this is the basis of the IPCC model	Unknown
Herzog and Wright (2005) ¹²⁶	Study addresses 'the fidelity model of implementation ... a methodology for analysing the fidelity of PSMR implementation'	Prevention	PSRM in a 20-lesson martial arts programme	No information given	PSRM (Steinhardt 1992) ¹³²	Unknown
McGrew and Griss (2005) ¹²⁷	(p. 42): 'ensuring accurate, consistent implementation and maintenance of the model program ... to assess implementation of the model'	Health and social care	Supported employment programmes	Training (p. 43)	Five elements (respecting the rights and feelings of others, effort, self-direction, caring and transfer) Benchmark provided by ratings of the (SECT) Center	Unknown
Faw <i>et al.</i> (2005) ¹²⁸	(p. 78): 'the degree to which a service is delivered as intended by the program theory'	Prevention	ATP: A residential treatment programme for adolescent substance abuse	No information given	Prescriptions outlined by the theory of Holland (1986) ¹³³	Unknown

ACT, Assertive Community Treatment; ATP, Adolescent Treatment Programme; ETHOS, Early Treatment and Home-based Outreach Service; IPCC, Intensive Psychiatric Community Care; IPS, Individual Placement and Support; LST, Life Skills Training; MAPS, Marriage and Parenting for Stepfamilies; na, data not available; PMTO, Oregon Model of Parent Management Training; PSMR, Personal and Social Responsibility Model; SECT, Supported Employment Consultation and Training; SIL, social interaction learning; VP, violence prevention.

Elliott and Mihalic¹¹⁶ report that ‘the available research demonstrates that fidelity is related to effectiveness’, a finding echoed by other reviews^{111,112,114} and the primary research.^{117,127,127,136} Much of this research, summarised in *Table 19*, seeks only to measure implementation fidelity, but some studies do aim to analyse findings about fidelity in relation to the interventions’ outcomes too. Forgatch *et al.*¹¹⁷ have demonstrated how the level of implementation fidelity to a parent training programme, designed to improve interaction between parents and stepchildren, predicted the level of improvement in parenting practices.

Resnick *et al.*¹²⁵ found that employment outcomes among people with mental health issues ‘were weakest for those in poorly implemented Intensive Psychiatric Community Care (IPCC) programs’ (p. 142). The same correlation was found in a similar study by McGrew and Griss,¹²⁷ which also looked at supported employment programmes. Resnick *et al.*¹²² also found that participant outcomes were good when fidelity to an exercise programme was high, but no cases of low fidelity were present in this study, so a positive correlation could not be confirmed. The number of studies evaluating this association is small, but this research does indicate that the degree of fidelity with which a policy or intervention is implemented will be a factor in its achievement of successful outcomes.

Research has also found that detailed or specific policies are more likely to be implemented with high fidelity than those that are vague. For example, well-planned violence protection interventions, where all the key components are identified in advance, have been found to produce higher levels of adherence than less well-structured interventions.¹¹² Specificity enhances delivery. Indeed, by far the majority of policies and interventions implemented in our sample are very detailed and are based on published models (*Table 18*: Source of data 1). In one case where the source is unclear,¹²¹ strategies to support implementation fidelity, for example guidelines, suggest that a highly specific model is behind the intervention. High specificity may be prerequisite to meaningful measurement.

Specificity does not mean complexity. A policy or intervention can be specific but simple, and there is evidence that it is easier to achieve high fidelity of simple guidelines or policies with fewer ‘response barriers’ than complex ones.^{54,104} For example, a study of guidelines intended for general practitioners (GPs) found that detailed

and clear recommendations were almost twice as likely to be followed as vague and complex recommendations.¹³⁷ Generally, research indicates that simple but specific policies or interventions are more likely to be implemented with high fidelity than complex or vague ones. As such, the comprehensiveness and nature of an HRM policy’s description may moderate how far the implemented practice actually adheres to the policy.

Two further points are raised by this research. Firstly, the level of implementation fidelity is not determined purely by the simplicity or specificity of a policy or intervention, strategies are usually employed to facilitate the achievement of the highest possible fidelity. Seven of the studies reviewed here report the employment of strategies to support adherence to the policy or intervention as it was designed, and to ensure high quality of delivery. In some cases, these strategies include ongoing monitoring and feedback to ensure continuing adherence and quality of delivery over time.^{116,121,122} Monitoring such as this exists not only to optimise, but also to standardise implementation fidelity, i.e. to ensure that everyone is receiving not only the most effective training or support to aid implementation, but also exactly the same training.¹³⁸ These studies aim not only to evaluate fidelity, but also to achieve the highest fidelity possible. However, the potential role of these strategies in implementation fidelity has not been considered by research. It is possible that these strategies, like the nature of a policy or intervention’s description, may potentially moderate the degree of adherence: the more that is done to help implementation, through guidelines, training, support and monitoring, the higher the level of fidelity achieved. This is especially the case for complex interventions, which can be multifaceted and more vulnerable to variation in their implementation.¹³⁹ The role of such strategies in optimising fidelity and standardising what is being implemented arguably is even more important in this case, and even more likely to influence the level of fidelity achieved. However, there is currently no research to confirm the potentially important role of facilitation strategies as moderators of the relationship between policies and actual implemented practices, but they should be considered as such.

Secondly, there is no generic measure of fidelity. All of the studies used different measures. In each case the content of measures is determined by the content or description of the HRM practice or

TABLE 19 Studies measuring implementation fidelity

Study	How fidelity is measured	Source of data 2	Dimensions of fidelity (Dusenbury et al. 2003) ¹⁰⁴	Validity and reliability of measures	Results
Forgatch et al. (2005) ¹¹⁷	FIMP	Independent observation by FIMP raters of video-taped sessions	Adherence Quality of delivery ('competent execution') (p. 3)	Predictive validity Inter-rater reliability for FIMP See also Knutson et al. (2003) ¹³⁴	High implementation fidelity associated with more effective parenting independent of specified variables
O'Brien (2005) ¹²¹	Outcomes Outcomes are perceived to be indicative of level of implementation fidelity (p. 246) Measures relate to maternal and child functioning. Results compared to national benchmark standards	Data collected by local programme staff	Unclear Dose is acknowledged (p. 251) based on frequency and duration of nurse home visits, but no formal measure is given	Only given for 1 of the measures	Good implementation fidelity Indicators 'in expected direction' but 'weaker' than RCTs (p. 251) Reduction in maternal smoking and drug use, but below target levels Positive impact on immunisation rates Positive impact on language development Positive impact on maternal education
Resnick et al. (2005) ¹²²	Checklists, logbooks, calendars	Checklists completed by direct observation of random sessions Logbooks of staff delivering the intervention (self-report) Calendars of patients receiving the intervention (self-report)	Delivery (adherence) Receipt 'that the treatment has been received' (p. 142) (dose) Enactment 'that the treatment has been ... understood ... that the individual performs treatment-related ... skills and strategies' (p. 142) (participant responsiveness)	No information given	Good implementation fidelity 90%+ score for delivery, receipt and enactment
Elliott and Mihalic (2004) ¹¹⁶	Fidelity score (%) No. of core components 'correctly and fully implemented' (p. 49) divided by total number of core components to give fidelity score	VP: Not clear how these data are collected LST: Checklist rated by classroom observers	Adherence Dose: lessons taught 'at recommended levels ... dosage elements in the prescribed amounts' (p. 50)	No information given	Good implementation fidelity Adherence levels high Dosage levels for LST low
Rinaldi et al. (2004) ¹¹⁸	Supported EFS 15-item scale; items use 1–5 Likert scale	'Independent assessment' (p. 282)	Adherence	Bond et al. (1997) (cited) provide validity and reliability information on the Fidelity Scale	Good implementation fidelity 71 out of possible 75 on fidelity score

Study	How fidelity is measured	Source of data 2	Dimensions of fidelity (Dusenbury et al. 2003) ¹⁰⁴	Validity and reliability of measures	Results
Penuel and Means (2004) ¹²³	Outcomes Persistence and consistency of data reporting. 'If students report high quality environmental data consistently over time, the program can judge teachers' implementation fidelity to be adequate' (p. 311)	GLOBE student data archive: objective, reported data	Unclear	No information given	Low implementation fidelity Less than half of the schools report data consistently (p. 309)
Cash and Berry (2003) ¹²⁴	Service delivery tracking log This covers: structure of service, service time, ecological forms of service; compared with principles of model	Caseworkers' complete log	Adherence	No information given	Low implementation fidelity Low percentage of family- and home-based contact, and low service time compared with model
Resnick et al. (2003) ¹²⁵	DACTS Items use 1–5 Likert scale; the higher the score, the higher the fidelity Mean score 4.5 or above (high fidelity), 4.0–4.5 (moderate), 3.5–4.0 (low), 3.5 and below (not ACT)	Self-report by interview Baseline and 1 year	Unclear	Bond et al. (2001) ¹³⁵ (cited) provides validity and reliability information on the DACTS Fidelity Scale	Four sites demonstrate adequate fidelity (4.04–4.30); three sites demonstrate inadequate fidelity (2.39–3.09) (p. 141) High fidelity associated with improved participant outcomes (employment) (pp. 142–143) Low fidelity associated with poor outcomes (pp. 142–143)

continued

TABLE 19 Studies measuring implementation fidelity (continued)

Study	How fidelity is measured	Source of data 2	Dimensions of fidelity (Dusenbury et al. 2003) ¹⁰⁴	Validity and reliability of measures	Results
Herzog and Wright (2005) ¹²⁶	Nine-item log Five items address programme leader's promotion of PSRM; four items address the degree to which participants accept these responsibilities	Self-report of participants Self-report of programme leader	Adherence (items 1–5) Participant responsiveness (items 6–9)	Reliability: interparticipant agreement (80%); programme leader–participant agreement (75%)	High implementation fidelity of two of five elements Low implementation fidelity of one of five elements Low implementation fidelity increasing to high implementation fidelity of two of five elements
McGrew and Griss (2005) ¹²⁷	IPS Fidelity Scale (IPS scale) 15-item scale; items use 1–5 Likert scale QSEIS: 33-item scale; items use 1–5 Likert scale	Phone interviews with SE providers at multiple sites	Adherence (SECT Center Adherence Rating) (p. 43)	QSEIS has adequate validity and reliability, but internal consistency reliability was low (p. 45) QSEIS good predictive validity IPS low reliability, validity	Adequate implementation fidelity for QSEIS and higher levels of fidelity associated with outcomes (pp. 45–6) Low implementation fidelity for IPS and levels of fidelity not associated with outcomes (pp. 45–6)
Faw et al. (2005) ¹²⁸	ATP daily activity logs, ATP environment scale	Completed by staff Completed by participants	Adherence (do reported levels reach prescribed levels of hours for specified activities?) Participant responsiveness (therapeutic milieu)	Reliability scores given for ATP Environment Scale; scores good	50% adherence (authors claim this is difficult to interpret regarding whether this level is adequate or not) (p. 89) High levels of quality of delivery (p. 86)

ATP, Adolescent Treatment Programme; DACTS, Dartmouth Assertive Community Treatment Scale; EFS, Employment Fidelity Scale; FIMPY, Fidelity of Implementation Rating System; IPS, Individual Placement and Support; LST, Life Skills Training; QSEIS, Quality of Supported Employment Implementation Scale; SE, supported employment; SECT, Supported Employment Consultation and Training; VP, violence prevention.

intervention as it appears in the policy document or as espoused by the designers of the intervention. Nine of the studies collected data on fidelity using measures that were developed specifically for the intervention being studied. For example, the Individual Placement and Support Scale (IPS Fidelity Scale) was developed to measure fidelity to interventions that were designed to help people with mental health issues into employment,¹²⁷ and the service delivery tracking log, completed by social workers, was used to monitor implementation of an intervention to protect children potentially at risk.¹²⁴ Two other studies evaluated fidelity using outcomes: they assumed that positive outcomes are a proxy for high fidelity of implementation,^{121,123} which, in effect, negates the primary reason for assessing fidelity, i.e. to see if it moderates the link between policy and outcomes.

Data collection on fidelity involves independent observation or reporting in four of the studies, and the self-report of staff delivering or participants receiving the intervention in the remaining seven studies. The measurement of fidelity in two studies combines data from independent observers with data from staff and participants. Independent observation of delivery offers the best source of data about both adherence and quality of delivery. Six of the eleven studies give validity and reliability information on the scales used. Three studies aim to measure whether the 'essential' elements of the intervention or practice have been implemented, with the opinions of experts being used to identify these elements.¹¹⁶⁻¹¹⁸

The implementation fidelity measures applied by this research literature are intervention specific and heterogeneous in their data collection methods, but they all seek to measure implementation fidelity by measuring adherence, and have as their starting point highly specific descriptions of their interventions. They also aim to achieve high levels of fidelity by employing similar support strategies, and seek to provide accurate measurement of implementation fidelity. However, none examines whether any of the following may have a moderating effect; the complexity or simplicity of the interventions' descriptions; strategies to facilitate implementation, quality of delivery; or the responsiveness of participants.

Fidelity of HR policy

Organisations establish HRM policies, and occasional change programmes, which may become

embedded in policy. Typically, such policies and programmes involve installing new practices or maintaining central activities or approaches within core areas of HRM, for example recruitment and selection, training, employee involvement, and equal opportunities. Assessing their fidelity is about gauging whether policies are implemented fully as practices.

Adherence is then about assessing whether practices are implemented in accordance with policy. 'Dosage' refers to ensuring that all aspects of the policy are covered, and all employees and sites to be covered by a particular element are actually involved in it. They must also be exposed to it as frequently, and for as long, as prescribed by policy. 'Quality of delivery' refers to how well the practice is delivered or performed by those responsible for doing so. For example, a policy may prescribe that training is delivered by specialist trainers and involve feedback on quality from participants. In this sense, quality of delivery is part of implementation adherence. Alternatively, a policy may simply state that training in a particular skill should be given to all new members of staff but make no specific prescriptions to guarantee the quality of the training. Quality of delivery is therefore no longer a dimension of implementation fidelity, an element of adherence, but rather a moderator of the relationship between a policy and successful implementation. Participant responsiveness concerns the reaction of employees to the practices. It may involve assessing whether employees are engaged in each element of the practice to the extent that they should be, and as such may also moderate the implementation–outcome relationship. Programme differentiation is relevant if certain components are core. For example, if employee involvement is key to an HRM policy we would naturally expect practices associated with the high-involvement model to be used. Other practices may include supporting training programmes. A 'programme differentiation' analysis, to use the earlier terminology, may reveal that supporting practices are just as important as core practices, or that their delivery is a vital adjunct if the core practices are to have an impact. Indeed, within employee involvement it is widely recognised that the not-so-essential practices support the essential ones, and hence are necessary if the performance effects of the policy are to be realised. In effect they are practices that ensure the quality of its delivery.

As with all evaluations, an assessment of the fidelity of policies is an important complement to the

evaluation of its impact. However, there are several other reasons why it is important to assess the fidelity of HRM policies and practices.

First, the issue of policy implementation may contain interesting questions in its own right precisely because adherence is not such a straightforward matter. Policy-makers themselves would no doubt value understanding the organisational processes through which policies are implemented and the factors (organisational, group and individual) that may facilitate and impede implementation fidelity. For example, Cunningham *et al.*¹⁰⁷ in an analysis of four case studies, identified a range of factors that militated against the implementation of a policy on job security for ill workers. These included contradictory policy requirements, weakness in training, and various work and budgetary pressures. Implementation fidelity is therefore inherently important in understanding and evaluating how HRM policies are implemented.

Second, non-adherence to a policy may adversely affect employees. For example, if an organisation has a policy of paying high wages but does not give out wage increases, employees' pay satisfaction and perception of trust in their employer may decline and affect their performance or commitment to the organisation. It is often claimed that management espouses policies that they do not operationalise fully, or even at all, precisely because the policies are designed to make them appear employee-centred but their implementation falls considerably short of the implied aspiration. This claim often falls under the rhetoric-versus-reality label^{107,140} and is applied especially to employee involvement and equal opportunities, but also sometimes to TQM. For some employees, perhaps especially management, this policy infidelity may affect their morale and commitment. Indeed, the disparity between an organisation's practice and its professed values may be one possible cause of burnout or disengagement amongst employees.

Finally, policies are important because they drive and shape practices, and should be accompanied by strategies to achieve adherence. As a result, policies may also ensure that a practice is implemented well, i.e. the quality of delivery is high. One problem that has to be faced, however, is that the lower the level of specificity the greater the possibility that the policy will be adhered to, on the grounds that it is easier for practice to fall within parameters that are broad, or at least to appear to be within them when they are opaque.

This implies that the effect of fidelity on outcomes of policies will be moderated by the level of specificity of a policy. Alternatively, it may be the case that low specificity leads to non-adherence, because if policies are vague they can be easily neglected, even allowing for the implied ease at which it might be met. In the extreme, policies may be so vague as to contain no clear intentions in which case assessing the policy against intentions is not possible. In less extreme cases, where some intentions can be inferred, little of interest may emerge from an assessment of the implementation fidelity of a vague policy.

In HRM, policies are often not clearly specified if they exist at all. They are often not self-contained, have evolved incrementally and statements only refer to the most salient, perhaps most novel, features. Other elements are taken for granted or left unspecified. Modern managerialism may encourage policy-makers and managers to develop policy statements that simply convey homilies and exhortations to go in a particular direction.¹⁴¹

Certainly, the presence of a policy should not be inferred from HR practices, and, in the same way, the presence of practices should not be inferred from the existence of a policy. Indeed, this is a recognised issue in HRM research.¹⁴²⁻¹⁴⁴ As a result research increasingly looks to measure practices by collecting data from multiple sources rather than relying on a single managerial respondent, whose response about uptake may be determined by their knowledge of policy rather than practice.

As a consequence, most recent HRM research concentrates on practices and not policies or programmes. More specifically, attempts to link HRM to performance, i.e. gauge its impact, focus on practices, perhaps because of the problems of vagueness surrounding policies or because small and medium firms may well not have formal policies, or simply because they want to focus on what organisations do rather than what they profess to do. Some studies measure HR practices by coverage, i.e. the proportion of staff covered by a practice, but if we do not have information about the level of coverage stated in any policy then we cannot use it as a measure of dosage. For example, a practice may cover 60% of staff. This is the measure of the coverage of a practice, typically assessed by surveys, such as the figures reported above. However, if a practice is found to cover 60% of staff but should in fact cover 100%, i.e. all staff then it becomes a measure of implementation fidelity because this suggests that the organisation

has an acknowledged benchmark for the practice, perhaps provided by written policy.

It may even be possible to employ theoretical or model benchmarks against which to measure adherence. For example, if an organisation claims to be using TQM then seeing whether reported practices adhere to the accepted model of TQM could offer a measure of implementation fidelity.^{34,144} However, the danger is that the benchmark is a pure 'textbook' model that is unlikely ever to be implemented in this form. Nonetheless, Patterson *et al.*³⁴ successfully audited companies against pre-determined definitions of 'good practice' for advanced manufacturing technologies, TQM, JIT, job enrichment and skill enhancement, and, in so doing, circumnavigated the implementation problem by assuming that the measures reflected both the existence and the effective use of a practice.

Finally, the question that naturally follows an assessment of how fully a policy has been implemented concerns the effectiveness of the resulting practice. Only two studies have sought to measure effective implementation in the HRM field.^{145,146} Khilji and Wang¹⁴⁵ argued that high levels of implementation of practices correlate with high levels of performance, with satisfaction as a mediator. However, this study only compared manager and employee perceptions rather than actual implementation fidelity and assumed that satisfaction was a recognised mediator of the relationship between implemented practice and performance, the practices being the prior variable. The study was also unable to determine the direction of causality in these relationships. Another study aimed to measure how well HRM practices were implemented by measuring outcomes: successful outcomes implied successful implementation or practices.¹⁴⁶ This relationship cannot be assumed, however. On the whole, studies have ignored whether how well practices are implemented affects outcomes, and simply concentrated instead on studying the effects of the adoption of practices, regardless of how well they are implemented.

In the field of HRM, few studies have collected and evaluated data on the implementation of policy (*Table 20*), the equivalent of the interventions described in the implementation fidelity literature (*Table 18*). Despite a lack of concern about implementation fidelity within the HRM literature, there are similarities between the literature described in *Tables 18* and *20*. Although

the HR studies sought to evaluate whether policy is being implemented rather than to do so while also trying to achieve high levels of fidelity or evaluate its relationship with performance, the need for support strategies is recognised: three studies report how such strategies had been used by organisations.^{107,140,147} Like much implementation fidelity research, they focused entirely on adherence (including dose). The principal difference between the two literatures concerns data collection: the HR literature used only self-report of participants rather than independent observation – employee experience rather than the report of quantitative data.

In many cases, studies compare details about policy given by HR managers or documents, with the report of employees. Disparities between the two are highlighted. In most cases, greater weight is given to the report of the employees, even though self-report of employees can be an unreliable measure of a practice and its implementation.^{110,143,148,149} No validity or reliability information was given about any measures. Measures used were basic by comparison with the fidelity scales, logs and checklists used in the fidelity literature (*Table 21*). HR studies reported little more than employees' opinions about whether or not a policy has been implemented; fidelity studies often reported percentages or exact fidelity scores. Also, none of the HR studies sought to relate fidelity to outcomes.

Research needs to test whether specificity of HRM policy aids or hinders implementation fidelity (adherence and quality), and to ascertain if this effect varies according to context. This is a gap in the HR literature and implementation fidelity research. Research also fails to address adequately the issue of local adaptation, which in HR is particularly pronounced in multinationals and large public bodies where adaptations to local demands and differing cultures is acknowledged as legitimate, and may be incorporated in the policy or may be implicit in management's approach to it. The effect of specificity may in fact be moderated by the extent to which local adaptation is allowed or more importantly vital for successful performance.

The sophisticated knowledge of the concept and measurement of fidelity apparent in the specific implementation fidelity research and associated literature is clearly lacking in the field of policy implementation research in HRM.

TABLE 20 HRM studies measuring implementation

Study	Definition of fidelity	Domain	Intervention	Strategies to support implementation fidelity	Source of data 1, programme	'Core' elements only? How identified?
Cunningham <i>et al.</i> (2004) ¹⁰⁷	None	HRM	Management of long-term absence: p. 278	Training: pp. 283–4	Policy documents	Unknown
Currie and Procter (2003) ¹⁴⁷	None	HRM Six offices in one UK organisation	Teamworking: pp. 588–9 Allocation of work to groups rather than individuals. Change in management style	Selection of managers, training of managers, training of employees, team development activities (e.g. Team Development Pack)	Semi-structured interviews with all grades of staff (including HR staff)	Unknown
Hutchinson and Purcell (2003) ¹⁰⁸	None	HRM Units in 12 UK organisations	Appraisal: p. 26 Employee Involvement: p. 35 (These were the only HR practices covered by the study which make explicit reference to policy)	None	'Information on company HR policies' (p. 4)	Unknown
Truss (2001) ¹¹⁰	None	HRM Single UK organisation	Policy (the HR department): p. 1128	None	The HP Way (document) Focus group (HR department) Interviews (HR department)	Unknown
McGovern (1997) ¹⁴⁰	None	HRM Eight UK organisations	Performance appraisal	Institutional reinforcements: Performance objectives for managers; training	Company handbooks	Unknown
Cunningham <i>et al.</i> (2004) ¹⁰⁷	Interviews Return to work record sheets Relevant letters and memos	Line managers Returnees Occupational health HR staff Trade union representatives	Adherence: pp. 282–83	No information given	Medium implementation fidelity 'a number of employees reported positively ... at the same time ... a marked gap was apparent between policy prescriptions ... and the treatment [employees] actually received' (p. 287)	
Currie and Procter (2003) ¹⁴⁷	Semi-structured interviews Employee experience	All grades of staff (including HR staff)	Adherence: p. 589 Dose: Take-up of team development activities (pp. 591–2) Participant responsiveness: Outcomes of team development activities (pp. 591–2)	No information given	High implementation fidelity 'clerical worker and management responses suggest that teamworking was successfully implemented' ... regardless of 'the uneven take-up of team development activity' (p. 593)	

TABLE 21 Method of measuring fidelity in HRM studies

Study	How fidelity is measured	Source of data 2	Dimensions of fidelity (Dusenbury et al. 2003) ¹⁰⁴	Validity and reliability of measures	Results
Hutchinson and Purcell (2003) ¹⁰⁸	Face-to-face interviews Structured questionnaires	Front-line employees	Adherence, dosage: presence, frequency and purpose	No information given	Low implementation fidelity 'gaps between policy and practice employees views on the purpose of the appraisal scheme differed from company policy' (p. 28); 'policy practice gap' in EI initiatives (p. 35)
Truss (2001) ¹¹⁰	Interviews Questionnaires Focus groups Documentary evidence The enactment of HR policies: employee experiences (p. 1134)	Senior managers Line managers Non-managerial staff HR staff (p. 1128)	Adherence: (p. 1135: I receive the training I need to do my job) Dose: (p. 1135: days training this year)	No information given	Low implementation fidelity 'discrepancies between rhetoric and reality ... problems of implementation and interpretation occur' (pp. 1145–6)
McGovern et al. (1997) ¹⁴⁰	Semi-structured interviews Surveys Focus groups	Staff (all grades)	Adherence, dosage: presence/frequency Quality of delivery: 'the actual conduct of the appraisals' (p. 17)	No information given	Low implementation fidelity 'in the case of frequency ... implementation was uneven within organisations and the actual quality of the practice was also subject to significant variations' (p. 26)

A framework for implementation fidelity

Current models and descriptions of implementation fidelity are therefore inadequate. A new framework is presented here (Figure 2), informed by the discussions and limitations of the existing review and research literature, which seeks to describe and clarify more fully the function of the various components and processes involved in the relationship between a policy or intervention and the fidelity with which it is implemented in practice. This model is designed primarily for the evaluation of implementation fidelity in the area of HRM policy and practice, but applies equally to the evaluation of any intervention.

The framework begins with a written policy. Measurement of implementation fidelity is basically measurement of adherence, i.e. has the policy been implemented fully in practice, as intended. This requires that an evaluation assesses how far the policy has been implemented as a practice, preferably by independent observation to reduce bias.^{138,150} The degree to which it is successfully implemented may, in turn, be moderated, i.e. influenced, by the complexity of the practice's description, the adequacy of the strategies employed (if any) to facilitate the implementation

process, how well the policy is delivered in practice, and how receptive managers and employees are to the new practice.

An example of this might be the introduction of teamworking: questions relating to adherence need to be asked: are people now performing a task as a team rather than individuals; is the composition of the team as required (both 'content'). Then, however, there may be an issue about whether the people in the team are actually working in the way required, such as all team members being involved in decision-making ('coverage', 'dose' and 'frequency'). However, the level of adherence or implementation fidelity achieved may be moderated by participants' understanding of their new roles (determined by the quality of the training delivered by those charged with explaining and implementing the new practice, which, in turn, may be affected by the complexity of the practice), and/or whether their managers or they themselves are committed to the new way of working (participant responsiveness). The degree of adherence or fidelity achieved may thus be influenced by all of the potential moderators in the framework.

Another example might be training in a skill; for 'adherence' we would ask: Have all those been trained who are eligible?; Did the training take

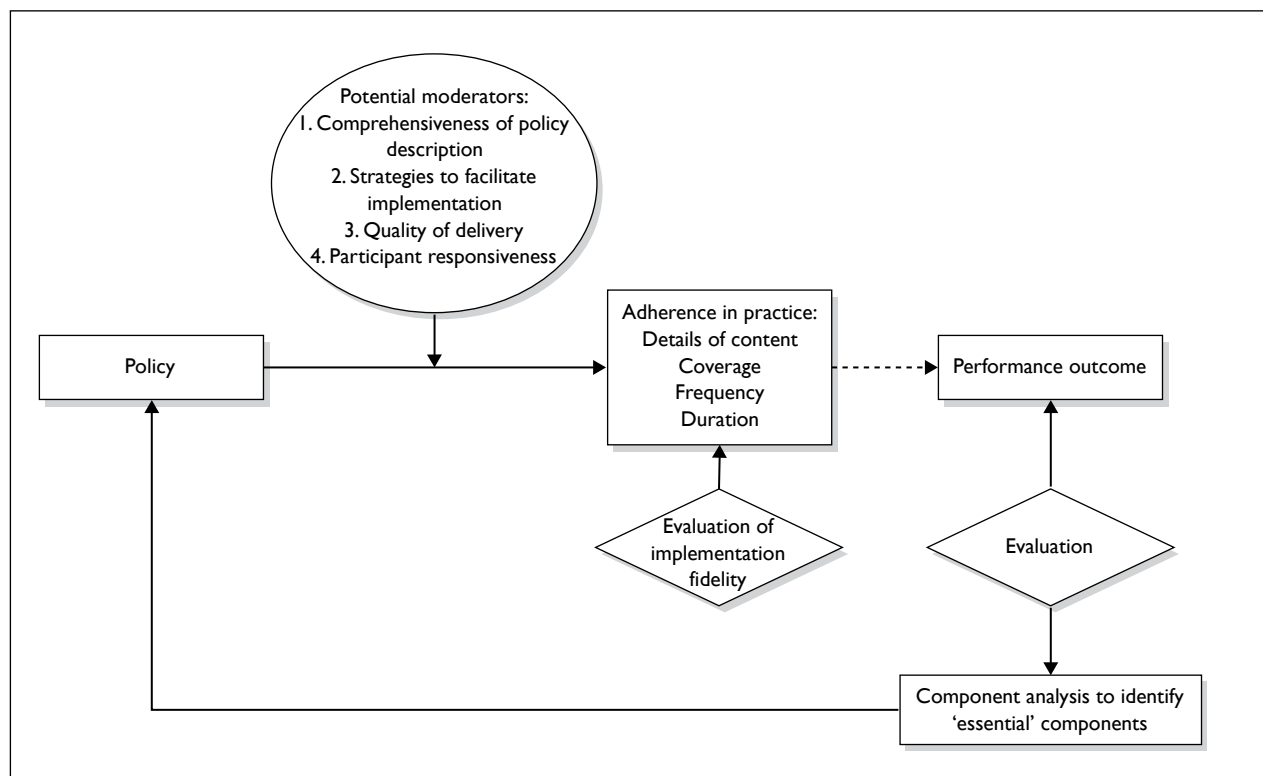


FIGURE 2 Conceptual framework for fidelity of implementation.

place as often as it should?; Did it last as long as it should?; and Did it contain what it should have done? However, implementation fidelity might also require that the participants actually acquire knowledge of a new skill as a result of the training. Whether or not they did so might again be influenced by the complexity of the training programme, the quality with which the training was delivered (quality of delivery), the strategies that were in place to support the delivery and implementation of the training (such as a manual or guidelines), and whether the participants themselves were actually receptive to the training (participant responsiveness).

Whether the new knowledge acquired affects outcomes or performance is a separate question, beyond fidelity. This is the remit of measures of the practice–performance relationship. Implementation fidelity is therefore a potential moderator of this relationship, as represented by the broken line in *Figure 2*. A sensitivity analysis based on performance outcomes could then determine which, if any, components or combination of components are essential if the practice is to have its desired effect. The scope for adaptability would then be known, and the issue of external validity addressed more fully.

Finally, the fidelity with which apparently less complex HRM practices are implemented may still be affected by the moderators described here. For example, appraisals: Have all those who are eligible been covered? Are they appraised as often as they should be? Does the appraisal last the set amount of time? Are the required elements of the process covered? The description of the process, the support provided for its implementation, the quality of any training given to the managers delivering the appraisals, their own delivery of the new practice, and the enthusiasm of both managers and employees for the practice may all affect how far the policy is adhered to in practice, i.e. the level of implementation fidelity achieved.

The framework in *Figure 2* outlines and clarifies processes to be taken into account in any evaluation of implementation fidelity. This framework informs the guidance presented at Appendix 4 and checklist in Appendix 5. The guidance outlines the questions that need to be asked at every stage in the process if high levels of implementation fidelity are to be achieved. The checklist is a tool to

evaluate the fidelity with which policies have been implemented. This evaluation could be undertaken by researchers, policy-makers or practitioners, indeed anyone seeking to assess whether a policy had been implemented properly in practice, i.e. as intended by those designing and seeking to deliver the policy.

Conclusion

Introduction of new practices, or the revision of existing practices, requires formulation of policy or programmes. There is a growing interest in data for assessing the quality of implementation.^{119,120,151} However, even if the requisite data are provided within examples of effective HRM interventions, it is still necessary to measure fidelity to gauge whether evidence-based policies are being implemented properly, in accordance with a specific policy. Achievement of high implementation fidelity is one way of replicating the success achieved by original research. Obviously, the successful development and implementation of policy is governed by more than the principles of evidence-based practice,¹⁵² but the above framework helps to understand why and how policy implementation should be evaluated.

This review concerns the entire HRM performance chain, from HR policy through to performance outcomes. This chain has several stages, from policy to practice, from practices to intermediate outcomes, and from intermediate outcomes to final outcomes. The link between HRM practices and intermediate outcomes (e.g. job satisfaction, burnout), and the link between such intermediate outcomes and final outcomes (e.g. productivity/patient care outcomes), are often measured by the research and are analysed in depth elsewhere in this review. The HR policy to practice link, called here implementation fidelity, is measured much less if at all. This section therefore considered the first stage in the HR policy to performance chain, critically examined current literature on the concept, outlined its importance, described how it can be measured and the problems presented by measuring it. The relevance of this lies in how it highlights the processes involved in implementing practices of demonstrable effectiveness and how the implementation process may be evaluated. As such, it is of value to policy-makers and those seeking to develop evidence-based practice.

Chapter 5

Identifying linkages between HRM practices and performance outcomes

Introduction

This chapter provides context and theoretical background for Objectives 2–6. Specifically, it discusses current thinking about intermediate outcomes of HRM. First, the links between HRM and performance are considered. The chapter then goes on to describe the method used for identifying the intermediate outcomes considered in the review and provides conceptual definitions for each intermediate outcome.

Intermediate outcomes linking HRM and performance

Two of the principal aims of this review are to evaluate the research evidence linking HRM practices and organisational performance and also the evidence for mechanisms or intermediate outcomes of HRM that may explain any link between HRM and performance; specifically, how and why HRM practices may impact on performance. While researchers have devoted a great deal of attention to examining the linkage between HRM practices and firm performance, there has been less empirical work attempting to better understand possible causal mechanisms. Without examining intervening variables or intermediate outcomes of HRM, it is difficult to rule out alternative explanations for an association between HRM and performance.²³

There are a number of rationales and models explaining a link between HRM and performance,^{13,22,153,154} and while there are differences there are also constant themes that are shared across the approaches. At a general level, most models are based on the assumption that superior HRM practices are believed to result in more skilled, motivated, satisfied, committed, and hence productive, employees, who, in turn, promote a more effective firm.¹⁵⁵ That is, employee skills, psychological states (such as attitudes and motivation) and specific behaviours (such as job performance and absenteeism) are purported to

be the mediating path between HRM and final organisational performance outcomes, although we would expect HRM practices to also directly influence performance outcomes by creating operational and structural efficiencies. It is a short step to specify the HRM practices that promote high knowledge, skills and abilities,²² for example through careful attention to recruitment, selection, appraisals and investment in training. Less straightforward is the series of mental, emotional and attitudinal processes¹⁵⁶ that are frequently proposed to link HRM and performance, and which are implied by labels such as high-commitment and high-involvement HRM.

Intermediate outcomes

Although there are a multitude of variables that are implicated in this process, some of the more important proposed mental, emotional and attitudinal states are employee well-being, an effective psychological contract, perceived organisational support, fairness and justice, motivation, job satisfaction, commitment job involvement and organisational climate.¹⁵⁶ An organisation's HR architecture will be closely tied to these states. For example, satisfaction of employees, perceptions of fairness and trusting management–employee relationships may be influenced by HR practices that provide employees with opportunities for participation and autonomy. Intrinsic motivation could well be influenced by work design interventions, such as job enrichment and empowerment. Firms offering job security and organisation pay programmes, such as profit-related pay, can engender employee perceptions' of organisational support, and their identification with, and commitment to, the organisation.

However, a lack of clarity remains about the degree of overlap between the constructs describing employee states and their causal ordering (e.g. Does satisfaction precede commitment, and under what circumstances?; Is job satisfaction a consequence of job involvement or is the relationship reciprocal?). Also the relationships between any one individual's feelings,

attitudes, motives and performance will not be straightforward.¹⁵⁷ As Ostroff and Bowen¹⁵⁵ point out, 'Lower performance is only one possible response to dissatisfaction. A dissatisfied employee could file a grievance, engage in sabotage, ask for a transfer, try to improve performance or fail to pass on important information.¹⁵⁸ In contrast, a satisfied employee could work harder, engage in more citizenship behaviours, improve skills or make suggestions for improvements in work procedures' (p. 228). But although the relationship between satisfaction and performance at the individual level may be not be large, the collective effects for the organisation as a whole may be enhanced due to the overall cumulative impact of the responses of satisfied or dissatisfied employees.¹⁵⁵

Productivity-related employee behaviours

How do employee mental, emotional and attitudinal states get converted into organisational performance? The assumption is through their influence on employee behaviours salient to effective organisational performance, i.e. when these mental, emotional and attitudinal states are favourably directed then employees are more likely to display performance-orientated behaviours.¹⁵⁶ Three pertinent sorts of employee behaviour are task performance, withdrawal behaviours and organisational citizenship behaviour (OCB).¹⁵⁴

Task performance behaviours include job-related tasks and activities comprising the employee's formal role.

Withdrawal behaviours refer to absenteeism and turnover.

Organisational citizenship behaviours include components of so-called prosocial behaviours, and refer to constructive or cooperative gestures that are not mandatory, but which contribute to organisational effectiveness.¹⁵⁹ OCB refers to work-related behaviour that is outside traditional task performance, in-role job performance and the formal organisational reward system, but is beneficial to the organisation.¹⁶⁰ Typically, employees who engage in OCBs are those who go the extra mile for their organisations and therefore contribute to its effective functioning. This discretionary work performance has been conceptualised in a number of ways (e.g. contextual performance, prosocial organisational behaviour, extra role performance), but the research literature has focused most prominently on OCB. The

most popular conceptualisation of OCB is a five-dimension model proposed by Organ,¹⁵⁹ consisting of altruism, courtesy, conscientiousness, civic virtue and sportsmanship.

Although much of the work on OCB takes the position that there is a clear boundary between in-role and extra-role behaviour, the distinction is not as clear as much of the literature suggests.¹⁶¹

Research has suggested that employees who are satisfied with their jobs and committed to their organisation, and feel that they are treated fairly, are more likely to engage in OCBs.¹⁶² Consequently, OCBs have recently emerged as a potential important linking mechanism between employee attitudes, such as commitment and satisfaction, and organisational outcomes. Any single incidence of citizenship may have a minor or moderate effect – 'however, across multiple acts of citizenship from a single employee, and across multiple employees, the aggregate impact should be more substantial' (Ostroff and Bowen:¹⁵⁵ 227). However, so far, arguments for an association between employee OCB and organisational performance are conceptual rather than empirical.

In summary, despite the paucity of evidence on these relationships (evidence that will be reviewed in later chapters), it has been consistently theorised that satisfaction, motivation and other mental, emotional and attitudinal states of employees are key factors in determining appropriate productivity-related employee behaviour, which ultimately contribute to organisational performance.

A large number of variables may serve as intermediate outcomes linking HRM practices and final performance outcomes, from job satisfaction to organisational commitment, and from burnout to organisational support. Given the vast range of potential intermediate outcomes available from the research, and the limitations of project time and resources, it was necessary to select a limited number of intermediate outcomes.

Selecting intermediate outcomes

It is important to state at this stage that while we support the notion that HR practices have a direct impact on the knowledge and skills of employees that may translate to improved organisational performance, here, and in line with the research

brief, we concentrate on the role of employee mental, emotional and attitudinal states as intermediate outcomes of HRM practices.

The intention was to select only those variables for which high-quality data were available, and which were likely to prove most instructive about the relationships being examined by this report.

For this reason, a list of potential intermediate outcomes was compiled from the following sources:

- The longitudinal research examining the link between HRM practices and their outcomes (Chapters 6–8).
- A list of 40 systematic reviews identified by a search of electronic databases (ASSIA, MEDLINE, EMBASE, CINAHL, PsycINFO, Cochrane Library, Emerald, King's Fund, DH-Data, HMIC, SSCI, SCI) using the search terms 'human resource' or 'HRM' or 'high performance' or 'high involvement' or 'high commitment' and 'systematic review' or 'meta-analysis'.
- Six recent major HRM reviews (Hyde *et al.*,⁷⁷ Boselie *et al.*,⁷⁸ Wall and Wood,³⁰ Michie and West,⁷⁹ National Institute of Clinical Studies,⁸⁰ Wood³⁵).
- Literature modelling the mediators and moderators of the HRM practice–performance relationship).^{153,154,163–167}

This produced a comprehensive list of the intermediate outcomes cited by both secondary research and primary longitudinal research into HRM. If two or more of the above sources cited an intermediate outcome then it was included.

In addition, intermediate outcomes that would be otherwise excluded were included, nevertheless, if they were present in a meta-analysis that reported correlations between this intermediate outcome and three or more selected intermediate outcomes identified specifically to address Objectives 2 and 3 (see Chapter 9). For example, job involvement was originally excluded as an intermediate outcome because it was only mentioned by one of the four sources described above, but meta-analyses reported correlations between organisational commitment, professional commitment, burnout and OCB and this variable. It was then included as an additional intermediate outcome of interest. Finally, a decision was made in consultation with the expert panel to include three 'wildcard' variables – employee engagement, organisational support and organisational climate. Engagement is

a newer concept in the literature but is increasingly seen as important employee orientation for performance, and organisational climate and organisational support play a prominent role in some models of HRM and performance.

Selected intermediate outcomes

- Motivation.
- Job satisfaction.
- Organisational commitment.
- Occupational/professional commitment.
- Engagement.
- Burnout.
- Job involvement.
- Turnover intentions.
- Psychological contract.
- Organisational justice (distributive, procedural).
- Organisational support.
- Organisational climate.

Excluded intermediate outcomes

The following potential intermediate outcomes were in the initial list identified from the sources above, but were excluded because they were only cited by a single source:

- work-related irritation
- job anxiety/tension
- job exhaustion
- health complaints
- psychosomatic complaints
- psychophysiological stress reactions
- somatic complaints
- physical symptoms
- psychological well-being
- depression
- strain (depression /anxiety)
- occupational stress
- frustration
- life distress
- life satisfaction
- self-esteem
- conscientiousness
- level of participation
- transfer of learning
- overflow.

Definitions of selected intermediate outcomes

Motivation

Work motivation can be generally defined as the direction, intensity and persistence of work behaviour;¹⁶⁸ i.e. what drives a person's choice

of what to do, how hard they try and how long they keep trying. Motivation is clearly critical to performance. Indeed, work performance is often used as a measure of a person's motivation,¹⁶⁹ although there are many other factors that influence performance other than motivation (e.g. ability, resources, employee collaboration and cooperation). There are many motivation theories that have been advanced to help understand behaviour at work but it is often difficult to know which theory is helpful in any individual case.¹⁶⁹ Some theories are more relevant to the notion that HRM practices effect employee motivation, such as goal-setting theory, equity theory and job design theory.

Job satisfaction

Job satisfaction is the most widely researched concept in organisational psychology and organisational behaviour. Locke¹⁷⁰ estimated that over 3300 studies on job satisfaction had been conducted up to 1973. Judge *et al.*¹⁷¹ then identified a further 7856 studies on job satisfaction since 1973 using the PsycINFO database. Studies and papers have been written about its definition, meaning, specific dimensions of job satisfaction, its antecedents and its consequences. Its popularity stems from the key role it plays in many theories and models of organisational practices and processes, individual attitudes and behaviours. Job satisfaction is important as an end in itself for employees and also because of proposed relationships with individual and organisational effectiveness (e.g. turnover and performance). It is a widely held belief that 'a happy worker is a productive worker' (although there is considerable debate about the validity of this statement), and job satisfaction is one way of measuring happiness at work.

Locke¹⁷⁰ defined job satisfaction as 'a pleasurable or positive emotional state resulting from the appraisal of one's job or job experiences'. Thus job satisfaction involves affective (emotional) states or how one feels about one's job, and cognition, deriving from appraisal of the situation. Although there is some debate about the emphasis placed on affect and cognition, it is probably most helpful to think of job satisfaction as the interplay of cognition and affect, or thoughts and feelings.¹⁷¹

Job satisfaction can be thought of as an overall assessment of one's job but which comprises various job facets, such as satisfaction with pay, recognition, promotion, co-workers, supervision and the work

itself. In addition, the concept is sometimes separated into intrinsic satisfaction, which involves satisfaction with supervision, co-workers and the work itself, and extrinsic satisfaction that targets features extrinsic to task activities, such as pay and promotion.

Organisational commitment

Employee commitment to an organisation has been defined in a variety of ways but is most popularly operationalised as the level of attachment and loyalty to an organisation among its employees.¹⁷² The concept has been particularly popular in the HRM literature as many scholars advocate that the traditional relationship between employer and employee, based on control, must be replaced by a high-commitment approach.¹

Mowday *et al.*¹⁷³ who were influential in the early work on commitment, characterised it as a strong belief in and acceptance of the organisation's goals and values, a willingness to exert considerable effort on behalf of the organisation, and a strong desire to maintain membership in an organisation. They have developed a widely used scale, the Organisational Commitment Questionnaire (OCQ), to measure these elements. But the definition and the measure have been criticised for conflating commitment with outcomes such as effort and propensity to stay.

Meyer and Allen¹⁷⁴ have suggested definitions and measures based on three broad themes. *Affective commitment* describes an employee's liking for an organisation and emphasised identification and involvement in the organisation. Employees with a strong affective commitment continue employment with the organisation because they want to do so.¹⁷⁵ *Continuance commitment* refers to an awareness of the costs associated with leaving the organisation. Employees whose primary link to the organisation is based on continuance commitment remain with the employer because they need to do so. Finally, *normative commitment* reflects a feeling of obligation to continue employment. Employees with a high level of normative commitment feel that they ought to remain with the organisation.

The HRM literature has, not surprisingly, concentrated on the affective aspect of commitment because of the assumed associated positive organisational gains. The general theory of organisational commitment predicts that high commitment should result in greater motivation and performance, lower absenteeism and lower

labour turnover,¹⁷² with consequent organisational benefits.

Occupational/professional commitment

Much of the theoretical and empirical work on commitment has focused on the organisation; however, it is clear that workers have multiple commitments at work (such as work itself) and the organisational unit (such as the team, department or branch). An important commitment domain outside the employing organisation is commitment to the profession or occupation as well as the family.

As with organisational commitment it is the state of psychological attachment that is important in the occupational commitment literature.¹⁷⁶ Occupational commitment is the individual's psychological attachment to, and identification with, his/her occupation, based on an affective reaction to that occupation.¹⁷⁷

The strength of employees' occupational commitment may have important consequences for organisations because of its potential links to retention and work performance. Also, the salience of occupational commitment may be on the rise as a means of coping with the uncertainty of extensive organisational change.¹⁷⁸ Workers may increase their identification with their occupation on the basis that they retain more control over that aspect of their working life.

Although there has been debate over the possible inherent conflict between occupational commitment and organisational commitment, more recent work argues that the two forms of commitment are not incompatible, but rather they are positively associated.¹⁷⁷

Work engagement

Work engagement refers to 'a positive, fulfilling, work-related state of mind characterized by vigour, dedication and absorption'.¹⁷⁹ Vigour is characterised by high levels of energy and mental resilience while working, a desire to invest effort in one's work and persistence in the face of adversity. Dedication refers to a strong psychological involvement in one's work, together with feelings of pride, significance, enthusiasm and inspiration. Finally, absorption refers to total concentration on, and pleasant immersion in, work.

Although the concept is relatively new, work engagement does overlap with established concepts also included in this review as intermediate outcomes. Vigour is conceptually similar to motivation, and the dimension of dedication shares conceptual space with those of job involvement and commitment.¹⁸⁰ Engagement has been defined as the opposite of burnout,¹⁸¹ as, contrary to employees suffering from burnout, engaged employees are energetically and effectively connected to their work, and able to cope well with the demands of the job.¹⁸²

Engagement is influenced by the availability of job resources that reduce job demands, help achieve work goals and stimulate learning and development.¹⁸³ Examples of possible resources are training and coaching, performance feedback and participative management.

Burnout

Burnout is defined as 'a persistent, negative, work-related state in normal individuals that is primarily characterised by exhaustion, which is accompanied by distress, a sense of reduced effectiveness, decreased motivation and the development of dysfunctional attitudes and behaviours at work'.¹⁸⁴ It is a psychological strain resulting from chronic work stress, such as job demands.

The concept of burnout was initially associated with human services work such as health care and social work, where employees are engaged in 'people' work, for example, providing patient care. It is usually characterised as a three-dimensional syndrome. Le Blanc *et al.*¹⁸⁵ describe the dimensions in relation to burnout in nursing staff in three stages:

- First, high emotional demands in interpersonal relationships with patients lead workers to feel emotionally exhausted.
- Second, as a coping strategy they may try to protect themselves by detaching from their patients by treating their patients in an indifferent and cynical way.^{186,187} This detached attitude towards patients is called *depersonalisation*.
- Finally, as a result of this dysfunctional attitude, workers are unable to perform adequately, and the quality of their care is impaired. In turn, this may lead to a decline in their feelings of personal accomplishment or professional efficacy.

More recent research has argued that burnout exists outside the realm of human services. Consequently, the concept has been adapted to apply to all employees, by replacing the depersonalisation dimension with cynicism, which reflects indifference towards work in general, not necessarily towards other people.¹⁸⁸

Burnout may have negative consequences not just for the individual (such as health problems), but also in relation to organisational outcomes such as absenteeism and performance.

Job involvement

The concept of job involvement has been the subject of a large volume of research for over 40 years. Although it is subject to some definitional confusion, Brown¹⁸⁹ notes that most research has followed Lawler and Hall's¹⁹⁰ definition of job involvement as 'psychological identification with one's work' and 'the degree to which the job situation is central to the person and his [or her] identity'. The more recent concept of employee engagement treads on similar territory.

Multiple outcomes are often attributed to high job involvement. Job involvement has been considered important for promoting employee motivation,¹⁹¹ goal-directed behaviour, personal growth and satisfaction, and consequently performance.^{190,192,193} For example, Janssen¹⁹⁴ describes it as 'the key that unlocks motivation' to exert extra effort. Increasing job involvement has been advocated as a means to 'enhance organisational effectiveness and productivity by engaging employees more completely in their work and making work a more meaningful and fulfilling experience'.¹⁸⁹ Developing enriched jobs is regarded as an important means for stimulating job involvement.^{192,195}

Turnover intentions

Morrell *et al.*¹⁹⁶ describe turnover as 'voluntary cessation of membership of an organisation by an employee of that organisation'. Turnover intention or intention to quit is the psychological state that precedes this cessation.

Psychological contract

The relationship between employees and employers is central to HRM. The concept of the psychological contract explores this relationship

by describing the mutual obligations or exchange relationship perceived by the employee to bind him or her with the organisation.¹⁹⁷ The individual's psychological contract reflects his or her understanding of each party's obligations, derived in part from HRM practices, and also verbal statements and actions each party has made.

Psychological contracts have important implications for employee attitudes and behaviours, especially when employees perceive that obligations or promises explicitly or implicitly made by an employer have been unfulfilled. Contract perceptions are associated with attitudes such as mistrust, employee behaviour (including effort and contribution), frequency of absence, and intention to stay or leave.¹⁹⁸

Organisational justice

Organisational justice is one of the most popular research topics in HRM, organisational psychology and organisational behaviour.¹⁹⁹ The literature has 'grown around attempts to describe and explain the role of fairness as a consideration in the workplace',²⁰⁰ and much of the research in this area starts from the premise that employees' judgements of fairness are important in determining organisational outcomes such as job satisfaction, organisational commitment, intention to quit and OCB.²⁰¹ What is just or unjust is based on individuals' perceptions of fairness.

Organisational justice research has primarily been concerned with distributive justice and procedural justice. Distributive justice deals with perceived fairness of the distribution of outcomes, such as pay and promotion decisions, whereas procedural justice focuses on the fairness of the process by which outcomes are determined.²⁰² The process for making organisational decisions may be equally or more important to employees as their perception of outcome fairness.

Interactional justice,²⁰³ as more recently advanced in the justice literature, relates to the quality of the interpersonal treatment people receive when procedures are implemented, and can be seen as taking two forms.^{204,205} First, interpersonal justice, which pertains to the degree to which individuals feel they are treated with respect, politeness and honesty in the process. The second, informational justice, reflects employees' perceptions about whether they feel that they are provided with adequate explanations for the use of procedures or for outcome distribution.

Organisational support

Perceived organisational support refers to employees' global beliefs concerning the extent to which the organisation values their contributions and cares about their well-being.^{206,207} Employees view their favourable or unfavourable treatment as an indication that the organisation favours or disfavors them. Perceived favourable treatment can be around issues such as fairness, organisational rewards and favourable job conditions (e.g. pay, promotions, participation). Favourable treatment contributes more towards perceived organisational support if the employee believes that they result from the organisation's voluntary actions, as opposed to external pressures such as government regulations.^{206,207}

Employees who perceive themselves to be supported and valued are more likely to respond in a favourable manner. Organisational support theory proposes three psychological mechanisms underpinning the consequences of support.²⁰⁸ First, on the basis of reciprocity, organisational support should produce an obligation in employees to care about the organisation's welfare and goal attainment. Second, the support and respect provided by the organisation should satisfy socioemotional needs, leading to employees psychologically identifying with the organisation. Third, perceived organisational support should increase employees' beliefs that the organisation recognises increased performance. These processes should result in positive attitudes (e.g. commitment and satisfaction) and behaviours (e.g. reduced turnover, increased performance).

Perceived organisational support has been found to be related to, but distinct from, organisational commitment, procedural justice and job satisfaction.²⁰⁸

Organisational climate

Central to most, if not all, models of organisational behaviour are employee perceptions of the work environment, referred to generally as *organisational climate*.²⁰⁹ Primarily understood as an intervening variable between the context of an organisation and the behaviour of its members, and attempting to understand how employees experience their organisations, the concept has inspired many descriptions and operationalisations. The dominant approach conceptualises climate as employees' perceptions of what their organisation is like in terms of its routines, practices, procedures and rewards.²¹⁰

An initial assumption of theory and research in this area was that social environments could be characterised by a limited number of dimensions. Typical dimensions were role stress and lack of harmony; job challenge and autonomy; reward orientation; leadership facilitation and support; work group cooperation, friendliness and warmth.^{211,212} However, over the years the number of climate dimensions identified as targets of assessment has proliferated to cover numerous dimensions of organisational life. Confusingly, some of the dimensions that are frequently used in climate research overlap or match other constructs considered in this review, such as perceived organisational support, and work design variables, such as autonomy and role conflict.

An important distinction has been made between psychological climate and organisational climate.²¹³ Psychological climate is based on individuals' perceptions of the organisation, but when individuals in the same unit (e.g. team, department) or organisation agree or share their perceptions, organisational climate emerges, represented by the mean score across all employees within a particular unit or organisation. The rationale behind aggregating individual data to a unit level is the assumption that organisational collectives have their own distinct climate.

Culture and climate are similar concepts since both describe employees' experiences of their organisations. Organisational climate, according to Schneider,²¹⁴ represents the descriptions of the things that happen to employees in an organisation, they tell us what is happening, whereas culture comes to light when employees are asked why these patterns exist. The question is answered in relation to shared values, common assumptions, and patterns of beliefs held by organisational members and it is these which define organisational culture.

Schneider²¹⁴⁻²¹⁶ eschews the use of general multidimensional measures of climate and argues for a facet-specific climate approach where climate has a focus and is tied to something of interest. Schneider suggests that the dimensions of organisational climate will differ depending on the purpose of the investigation and that general measures of organisational climate will contain dimensions that are not relevant for each specific study. This line of argument has encouraged the development of measures with a particular strategic focus such as service²¹⁷ and safety,²¹⁸ which are

predictive of relevant outcomes (e.g. customer service, safe behaviours).

Research has suggested that climate perceptions are associated with a variety of important outcomes at the individual, group and organisational levels. These include leader behaviour,^{209,219} absenteeism and turnover,²²⁰ job satisfaction,²²¹⁻²²³ commitment,²²⁴ individual job performance,^{225,226} and organisational performance.³⁶

For the purposes of this review, the focus was initially on general multidimensional measures and performance outcomes. However, very little was found in this area so the criteria were expanded to include facet-specific measures.

Within HRM and performance models, climate is often conceived as a linking mechanism between the HR system and collective employee thoughts, emotions and attitudes.¹⁵⁴ That is, the HR system influences climate, which shapes employee states, such as satisfaction and motivation, and subsequently employee behaviours and performance.

Distinguishing final outcomes and intermediate outcomes

Various organisational stakeholders may consider organisational effectiveness quite differently. For example, employees may well consider some of the intermediate outcomes identified above, such as job satisfaction, to be their goal, rather than organisational performance. This has led to the use of the 'balanced scorecard' approach²²⁷ to reflect the objectives of all major stakeholders (e.g. shareholders, managers, customers and employees). However, the brief for this review clearly focuses on organisational performance as the final outcomes in a framework linking HRM and performance. In the health sector we have defined the final outcomes, in accordance with the review brief, as patient outcomes. Outside the health sector, we view final performance outcomes as financial outcomes (e.g. profits, sales revenue, market share) and organisational outcomes (e.g. customer satisfaction, output measures such as productivity). This approach has determined the remainder of this report.

Chapter 6

The impact of HRM practices on intermediate outcomes among health professionals

Introduction

One objective of this review is to evaluate whether HRM practices have an impact on intermediate outcomes, such as job satisfaction. The findings presented in Chapter 6 focus exclusively on evidence from the health sector and examine the extent to which HRM practices have an impact on intermediate outcomes. Specifically, it addresses:

- *Objective 5: 5.1* What is the evidence for the impact of HRM practices on the intermediate outcomes identified for this review?

This chapter provides a narrative summary for relevant longitudinal research relating specifically to the health sector and health professionals. This synthesis also enables a comparison of this research and its findings with that of the non-health sector.

This chapter first summarises the specific method for this part of the review then gives an overview of the intermediate outcomes for which evidence was found. Finally, narrative syntheses and data tables are presented for each intermediate outcome.

Review methodology

The broad approach to systematic review methodology adopted to identify the evidence presented in Chapters 6–8 is described in Chapter 2. This section describes aspects of the review methodology specific to this search.

Studies in this section are drawn from two systematic reviews of longitudinal studies:

- The first, a broad review of HRM practices and intermediate and/or final outcomes (reported fully in Chapter 8), used a simple protocol to identify relevant papers. The population for the searches was identified as working adults and the intervention was determined as any HRM or personnel management practice. No

comparison was specified, but a longitudinal filter was developed and used in the search. No specific outcomes were stipulated.

- The second, a more specific search for HRM and patient outcomes (reported fully in Chapter 7) used a more focused search strategy in which the population was working adults, the intervention was fixed as one of the broad categories of HRM practice (see Chapter 3 for details) and the outcomes identified as a range of patient outcomes (again, described fully in Chapter 7).

In both searches there was no exclusion of studies based on formal quality assessment. However, longitudinal study design was a criterion for inclusion in the review and served as a form of quality assessment. This ensured that the search was focused on causal relationships.

The search strategies and methodology used for identifying longitudinal studies in Chapters 7 and 8 therefore apply here also; only the inclusion criteria are different. To be included in this part of the review, studies had to satisfy the following criteria.

Inclusion criteria

- Longitudinal study design.
- HRM practice (e.g. work design, training, appraisal).
- One of the intermediate outcomes identified in Chapter 5 (e.g. job satisfaction, burnout, organisational commitment).
- The intermediate outcome must apply to health professionals.
- The study must test the causal relationship between the practice and the intermediate outcome.

Exclusion criteria

- Unpublished dissertations.

Results

Summary of evidence

References identified by the search were scanned by two reviewers for studies that satisfied the inclusion criteria. Intermediate outcomes are categorised with the corresponding numbers of studies as shown in *Table 22*, below.

Job satisfaction

All of these studies consider the impact of HRM interventions or practices on job satisfaction among health professionals. A narrative synthesis is preferred here despite the homogeneity of some clusters of studies in this sample. No systematic reviews of this relationship in the health sector have been found.

Details of studies

Ten studies met the inclusion criteria (*Table 23*). All were published in English between 1982 and 2002. Five studies were conducted in the USA, two in the UK, and one each in Denmark, Sweden and the Netherlands. Two studies had experimental designs,^{228,229} but the remainder were all prospective in design. Studies varied in duration, from 13 weeks to 5 years, and sample sizes ranged from 24 staff to over 2000.

HRM practice

Nine of the 10 studies examined work design or a facet of work design. Four studies considered re-allocation of work in some form, such as changing

who performed certain functions or how a certain task was performed.^{228,230-232} Five studies examined the impact of job characteristics on various outcomes. Job characteristics were evaluated in several different ways. Two studies considered them from the perspective of job demand and control,^{229,233} two from the perspective of role conflict or ambiguity,^{234,235} and one considered task complexity.²³⁶ Two of these studies also considered the impact of pay on job satisfaction^{234,236} and one evaluated the causal relationship between employee participation in decision-making and job satisfaction.²³⁵ Finally, one study evaluated the impact of the implementation of a new care policy – work reorganisation generally, rather than a specific element of work design.²³⁷

Outcomes

Most studies measured a range of outcomes in addition to job satisfaction, including burnout, organisational commitment, collaboration, costs, climate, and patient care outcomes, such as length of stay and patient satisfaction. Only two studies measured job satisfaction alone.^{234,236} Each study in this set of 10 used a different instrument to measure job satisfaction, ranging from specific job satisfaction scales such as Sandman's²³⁸ Job Stress Index, to broader work psychology measures, for example the Job Diagnostic Survey (JDS)¹⁹⁵ or health scales, such as the General Health Questionnaire (GHQ).²³⁹ Two studies developed their own instrument.

Results

All four of the work re-engineering and task reallocation studies found some form of positive outcome for job satisfaction. The move to greater team working/collaboration in two of these studies had a positive effect on job satisfaction, and significant improvement was found for all but two of the additional outcomes measured by these studies also.^{230,231} In the third such study, the performance of tasks in certain settings (surgical and male wards) was found to be associated with improved satisfaction,²²⁸ and the reorganisation of work, involving an increase in workload, was found not to have an adverse effect on satisfaction by the fourth study.²³²

The sample of studies evaluating the relationship between job characteristics and job satisfaction found more inconsistent results. In terms of job demands and control, one study found that levels of demand or control had no effect on job satisfaction,²²⁹ whereas the second found that social

TABLE 22 Number of studies satisfying inclusion criteria

Intermediate outcomes	No. of studies satisfying inclusion criteria
Motivation	0
Job satisfaction	10
Burnout	3
Job involvement	0
Occupational commitment	0
Turnover intentions	1
Organisational commitment	1
Engagement	0
Organisational justice	0
Organisational climate	1
Psychological contract	0
Perceived organisational support	0

support was positively related to improved job satisfaction, while high demands were associated with low job satisfaction.²³³ The former study used a superior study design and a much larger sample, suggesting that this job characteristics model may not significantly predict job satisfaction in the health sector. Role conflict or ambiguity was also found to have no effect on job satisfaction,^{234,235} although task complexity did demonstrate a significant association: complex tasks were associated with high job satisfaction, routine tasks with low job satisfaction.²³⁶

Studies of payment practices found different results. Blau²³⁶ found that high wages increased job satisfaction, but Agho *et al.*²³⁴ found no causal relationship between salary and this outcome. Both studies used the same study design. Also, Bateman and Strasser²³⁵ found that participation in decision-making did not impact on job satisfaction. Finally, the introduction of a new care policy had a significant negative effect on job satisfaction.

Omissions

These studies only focused on the HRM practices of pay, employee involvement and work design, especially job characteristics. Longitudinal studies of the impact of other HRM practices on health professionals' job satisfaction were not identified by this review.

Summary

There is little consistency in the findings of this group of studies. Most studies examined either some aspect of work design or pay, and its impact on job satisfaction, but only reallocation of roles or tasks consistently demonstrated a positive effect on job satisfaction, and role conflict consistently showed no effect at all. In both cases, results were found across two studies only. The remaining studies found some positive effects, some absence of effect, and, in one case, the intervention produced a negative effect. However, there are substantial gaps in the literature and the potential relationship between many practices and job satisfaction in the health sector has not been tested by longitudinal research.

Burnout and morale

All studies consider the impact of HRM interventions or practices on burnout and morale among health professionals. No systematic reviews of this relationship in the health sector have been found.

Details of studies

Three studies met the inclusion criteria^{237,248,249} (Table 24). All studies were published in English, with the earliest dating from 1999. Each study was conducted in a different country: the UK, Australia and Sweden. Two studies were of the same duration, i.e. 3 years; the other was 15 months. The sample design was between 200 and 900 health-care staff; in one case the sample size was not given.

HRM practice

Two studies examined either team working²⁴⁸ or new forms of team working as part of the intervention:²⁴⁹ the former affected nurses only and the latter all staff. The third study examined a very different type of work reorganisation intervention: the introduction of a new patient care policy.²³⁷

Outcomes

Two of these studies examined morale, an inverse measure of burnout,^{248,249} and both measured this by evaluating sickness absence rates and turnover. These studies also measured several patient and performance outcomes. The third study evaluated burnout using the Pines *et al.*²⁵⁰ measure of this dimension of psychological well-being.²³⁷

Results

The two team-working studies both found that the introduction of team working had a positive effect on staff morale.^{248,249} In fact, a positive effect was found on almost all outcomes measured by these two studies. The two studies used different, but relatively strong (experimental and prospective cohort) study designs. The third study also used a prospective cohort design but found that the HRM practice – the introduction of a new policy – increased burnout and thus had a negative effect.²³⁷

Omissions

These studies only focused on the impact of a single element of work design on morale and burnout. The effect of no other type of practice was found in this review of the longitudinal HRM literature.

Summary

Two of the three studies found were quite homogeneous in terms of their intervention and outcome, and found very similar results: team working can improve morale. The third study was quite different in terms of both the intervention and outcome, and found that the introduction of a particular care policy had a significant negative effect in terms of increased burnout.

TABLE 23 Job satisfaction

Study, country	Design, sample size, duration	Intervention(s)	Fidelity measure	Outcomes	Outcome measure(s)	Results +ve/-ve
Jones et al. (1997) ²³⁰ USA	Prospective cohort with historical controls 119 staff Patient numbers unknown 15 months	Re-engineered work design for patient focused care; use of multidisciplinary collaboration	No	Employee satisfaction; patient satisfaction; collaboration; cost of care; length of stay	Attitude survey programme for health care (1985) ²⁴⁰	Positive effect: Employee satisfaction, patient satisfaction, length of stay decreased Negative effect: Collaboration decreased No effect: Costs
O'Connor (1993) ²³¹ UK	Prospective cohort with historical controls 38 patients 10 staff: activity 24 staff: satisfaction 6 months	Daily patient allocation (old system) vs team nursing (continuity of care) (new system)	No	Job satisfaction; activity analysis; QICC	Job satisfaction: 20-item scale (own scale)	Positive effect: All
Parke (1982) ²²⁸ UK	Prospective cohort with concurrent controls 164 student nurses 13 weeks	Practices Medical vs surgical ward duty Male vs female ward duty	No	Work satisfaction; work performance; affective states; somatic symptoms; social dysfunctions; depression; anxiety; sickness/absence	Affective states: GHQ, Goldberg (1978) ²³⁹	Surgical wards were higher in satisfaction than medical wards, and male wards were higher than female wards Other outcomes mixed
Jung et al. (1994) ²³² USA	Prospective cohort with historical controls 265 nurses 21 months	Workload redistribution programme: decrease nurse workload, increase use and productivity of nursing assistants, educate nurses to direct and supervise ancillary staff	No	Job satisfaction; nurses ability to supervise nursing assistants, coordination of care; quality of nursing care; workload; patient satisfaction	Job satisfaction: Price and Mueller (1986) ²⁴¹	No effect: Work delegated increased with no significant effect on outcomes
Nielsen et al. (2002) ²²⁹ Denmark	Prospective cohort with concurrent controls 2068 employees 5 years	Psychological demands Control (decision authority and skill discretion) Social support Meaning of work Predictability	No	Job satisfaction; self-rated health; perceived stress; absence from work; labour turnover	Marmot et al. (1991) ²⁴²	No effect: Job satisfaction Positive effect: Decision authority had positive impact on self-rated health, perceived stress and absence. Skill discretion had positive impact on health and absence but no impact on perceived stress Negative effect: Psychological demands had a negative impact on self-rated health

Study, country	Design, sample size, duration	Intervention(s)	Fidelity measure	Outcomes	Outcome measure(s)	Results +ve/-ve
de Jonge et al. (2001) ²³³ Netherlands	Prospective cohort with historical controls 261 employees 12 months	Job demand Job autonomy Workplace social support	No	Job satisfaction Emotional exhaustion, work motivation	Scale for job satisfaction was constructed by the authors	Positive effect: Workplace social support was positively related to job satisfaction Negative effect: Job demand was found to be negatively related to job satisfaction
Bateman and Strasser (1984) ²³⁵ USA	Prospective cohort with historical controls 129 employees 5 months	Job tension (role conflict/ambiguity/overload) MPS: measured as a cumulative score from administration JDS Centralisation: a measure of participation/autonomy in decision-making	No	Job satisfaction; organisational commitment	Job satisfaction: JDI (Smith et al. 1969) ²⁴³ Organisational commitment: Porter et al. (1974) ²⁴⁴	Positive effect: MPS has a positive impact on job satisfaction No effect: Neither role conflict nor centralisation had significant effect on job satisfaction or organisational commitment
Agho et al. (1993) ²³⁴ USA	Prospective cohort with historical controls 405 employees 3 months	Pay; role ambiguity; role conflict; role overload; autonomy; supervisory support; task significance; routinisation	No	Job satisfaction	Job satisfaction: Six items selected from 18-item index developed by Brayfield and Rothe (1951) ²⁴⁵	No effect: After controlling for effects of other variables, role ambiguity, role conflict and role overload had no effect on job satisfaction
Blau (1999) ²³⁶ USA	Prospective cohort with historical controls 672 medical technologists 4 years	Wages; task responsibility (measured as a continuum ranging from routine/simple to complex tasks) Performance appraisal satisfaction	No	Job satisfaction	Job satisfaction: JDS (Hackman and Oldham 1975) ¹⁹⁵	Positive effect: Higher wages and satisfaction with performance appraisal also had positive impact on job satisfaction Task complexity had a significantly positive impact on job satisfaction Negative effect: Routine task had a significantly negative impact on job satisfaction
Lovgren et al. (2002) ²³⁷ Sweden	Prospective cohort with historical controls 225 health staff 3 years (1995 and 1998)	Introduction of a new care policy, which made statements about greater work satisfaction and an open climate	No – but strategies such as training were put in place to aid implementation	Job satisfaction Burnout; creative and innovative climate	Sandman 1992; ²³⁸ Karasek and Theorell 1990; ²⁴⁶ Rasmussen 1996 ²⁴⁷	Negative effect: Significant reduction in satisfaction, increase in burnout and decrease in climate on 2–3 of the wards studied

JDI, job descriptive index; JDS, Job Diagnostic Survey; MPS, motivating potential score; QICC, quality indicator for client care.

TABLE 24 Burnout and morale

Study, country	Design, sample size, duration	Intervention(s)	Fidelity measure	Outcomes	Outcome measure(s)	Results +ve/-ve
MacDonald and Bodzak (1999) ²⁴⁸ UK	Experimental 100 patients 879 staff 15 months	Self-managing day surgery nurse-led team – expanded nurse role	No	Morale; patient satisfaction; day-case activity; financial performance	Morale Sickness absence rates (team vs all hospital personnel) Source: hospital personnel record system	Positive effect: Staff morale Patient satisfaction also high but not reported as a significant improvement. Financial performance within targets
Browne et al. (2000) ²⁴⁹ Australia	Prospective cohort with historical controls Unknown 3 years	Seamless model of ED management: designed by a strategic planning committee consisting of physicians and nursing staff reviewing working practice. Areas in ED defined by function, staff work in functional teams, staff redeployed to functional area (acute, emergency, observation) of greatest need	No	Staff morale; patient waiting times; critical care performance; patient satisfaction	Turnover rate and sick leave of 2 days or less Average waiting time (against benchmark) Time to craniotomy for patients with acute head injuries Patient and relative satisfaction judged by number of complaints	Positive effect: Significant positive effects on all outcomes
Lovgren et al. (2002) ²⁴⁷ Sweden	Prospective cohort with historical controls 225 health staff 1995–8	Introduction of a new care policy, which made statements about greater work satisfaction and an open climate	No – but strategies such as training were put in place to aid implementation	Burnout; job satisfaction; creative and innovative climate	Pines et al. 1981 (p. 204), ²⁵⁰ Sandman 1992, ²³⁸ Karasek and Theorell 1990, ²⁴⁶ Rasmussen 1996, ²⁴⁷ Ekvall et al. 1983 (p. 204) ²⁵¹	Negative effect: Increase in burnout Significant reduction in satisfaction, and decrease in climate on 2–3 of the wards studied
ED, emergency department.						

Turnover intentions

All studies considered the impact of HRM interventions or practices on health professionals' turnover intentions or intention to withdraw or quit. No systematic reviews of this relationship in the health sector have been found.

Details of studies

Only one study met the inclusion criteria (Table 25),²⁵² published in English and conducted in Israel. It used a prospective longitudinal design over 12 months. The sample consisted of 146 health professionals.

HRM practice

The study examined the effect of job scope (job variety) on intention to leave among health professionals in an Israeli hospital.

Outcomes

It examined health professionals' intentions to leave, and used its own scale to measure this staff attitude.

Results

The study found that greater scope for variation within the job made it less likely that the health professionals would seek to leave their current position.

Omissions

This study focused on a very specific facet of work design. No longitudinal research was identified that examined the impact of any other HRM practices, such as training, pay, performance management or selection, on an individual's intention to leave.

Summary

One study has found that the job characteristic of having scope for variation within a job is positive in relation to turnover intentions among health professionals, i.e. such personnel were less likely to leave if there was good scope for variety within their work. However, this was a finding of only a single, small-scale study. No other dimensions of work design, or any other HRM practices, have been examined for their impact on turnover intentions using longitudinal research.

Organisational commitment

A single study considered the impact of HRM interventions or practices on organisational commitment among health professionals. No systematic reviews of this relationship in the health sector have been found.

Details of studies

One study met the inclusion criteria (Table 26).²³⁵ This study was conducted in the USA, was prospective in design, and the study lasted 5 months. The study's sample was 129 health sector employees.

HRM practice

The study examined a facet of work design, role conflict or ambiguity, and employee participation in decision-making.

Outcomes

The study measured organisational commitment using the Porter *et al.*²⁴⁴ OCQ.

Results

Neither role conflict nor employee involvement was found to have any effect on organisational commitment.

Omissions

This study only focused on the HRM practices of employee involvement and a particular job characteristic. The impact of other HRM practices on health professionals' organisational commitment does not appear to have been tested by longitudinal research.

Summary

The only study that examined any potential causal relationship between an HRM practice and organisational commitment found that neither role conflict nor employee participation in decision-making had any impact. However, this is the finding of a single study only and must be treated with caution. There is very little longitudinal research in this field in the health area.

Climate

A single study considered the impact on HRM intervention or practice on the cultural or working climate among health professionals. No systematic reviews of this relationship in the health sector were found.

Details of studies

The one study that met the inclusion criteria (Table 27)²³⁷ was conducted in Sweden, written in English in 2002, and lasted 3 years. The population was 225 health-care staff.

HRM practice

The study examined the introduction of a new care policy, which included a call for a more open climate and greater work satisfaction.

TABLE 25 Turnover intentions

Study, country	Design, sample size, duration	Intervention(s)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Krausz <i>et al.</i> (1995) ²⁵² Israel	Prospective longitudinal 146 employees 12 months	Job scope [measured using a 10-item scale, based on Hackman and Oldham's (1975) ¹⁹⁵ JDS scale]	No	1. Intention to leave 2. None 3. None	Own scale	Positive effect: High job scope led to low intention to leave

TABLE 26 Organisational commitment

Study, country	Design, sample size, duration	Intervention(s)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Bateman and Strasser (1984) ²³⁵ USA	Prospective cohort with historical controls 129 employees 5 months	Job tension (role conflict/ambiguity/overload); MPS, measured as a cumulative score from administration of JDS Centralisation: A measure of participation/autonomy in decision-making	No	Job satisfaction; organisational commitment	Job satisfaction: JDI (Smith <i>et al.</i> 1969 ²⁴³) Organisational commitment: Porter <i>et al.</i> (1974) ²⁴⁴	Positive effect: MPS has a positive impact on job satisfaction No effect: Neither role conflict nor centralisation had significant effect on job satisfaction or organisational commitment

JDI, Job Descriptive Index; JDS, Job Diagnostic Survey; MPS, motivating potential score.

Outcomes

The study evaluated creative and innovative climate in the setting using Ekvall *et al.*'s²⁵¹ instrument for creative organisational climate. The study also measured the outcomes of job satisfaction and burnout.

Results

The introduction of this particular new care policy had a significant negative effect on all the staff outcomes studied, including creative organisational climate.

Omissions

Although widely studied in other settings, longitudinal research on climate in the health sector is rare.

Summary

The included study found that the introduction of a new care policy had a significant negative effect in terms of a decrease in climate scores across most of the wards studied within this setting of a Swedish hospital, contrary to expectations.

Conclusions

Thirteen different studies from the longitudinal literature identified for Chapters 7 and 8 examined the relationship between an HRM practice or job characteristic and one of the intermediate outcomes selected by this review within the health sector. All studies examined some facet of work design, such as teamworking,^{248,249} reallocation or reorganisation of work,^{228,230-232,237} job demands and control,^{229,233} role conflict,^{234,235} and variation²⁵² or task complexity.²³⁶ A subset assessed the impact of additional practices on intermediate outcomes. These practices were pay^{234,236} and employee involvement.²³⁵ Consequently, most HRM practices we have considered in this review, i.e. recruitment and selection, staffing, training and development, communication, family friendly, harmonisation and performance management have not been subject to longitudinal research in the health sector that has examined their relationship with the relatively common intermediate outcomes described above.

Very few intermediate outcomes of potential relevance were studied: job satisfaction, burnout,

TABLE 27 Climate

Study, country	Design, sample size, duration	Intervention(s)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Lovgren <i>et al.</i> (2002) ²³⁷ Sweden	Prospective cohort with historical controls 225 health staff 1995–8	Introduction of a new care policy, which made statements about greater work satisfaction and an open climate	No – but strategies such as training were put in place to aid implementation	1. Creative and innovative climate 2. Burnout, job satisfaction 3. None	Ekvall <i>et al.</i> (1983); ²⁵¹ Pines <i>et al.</i> (1981); ²⁵⁰ Sandman (1992) ²³⁸	Negative effect: Decrease in climate on 2–3 of the wards studied; increase in burnout; significant reduction in satisfaction

organisational commitment, organisational climate and turnover intentions. The following outcomes were not addressed by any longitudinal studies: professional commitment, job involvement, motivation, justice and psychological contract. Some outcomes were only evaluated by one study; only job satisfaction was examined by more than three.

Other longitudinal studies did consider potential intermediate outcomes, but were excluded from this current analysis because the particular outcomes studied were not included in the shortlist of intermediate outcomes selected for this report. Such outcomes included staff perceptions of care,²⁵³ staff attitude or beliefs,^{254,255} staff knowledge,^{256–259} numbers of hours slept by residents²⁶⁰ and, rather than a measure of an individual's own job satisfaction, co-worker satisfaction with waiting times²⁶¹ and staff satisfaction with a service.²⁶² Firmer conclusions may be drawn on account of the greater homogeneity of relationships studied within, and across, sections.

Given the number of gaps in the research linking HRM practices and staff outcomes, further

longitudinal research is highly recommended. This section is limited because the sample of included studies is small. This could be partly because the sample was a broad search on HRM and a specific search on patient outcomes. An explicit search for longitudinal studies examining specific practices and staff outcomes may find additional material; however, such an approach would have to surmount the associated problems identified in Chapter 2.

Overall, the findings are far from conclusive. Positive effects were found for team working on morale and job satisfaction, for job variety on turnover intentions, and for job complexity on job satisfaction. However, these findings were only demonstrated by a small number of studies, and job demand and control, task reallocation, role ambiguity, pay and employee involvement were not found to have a consistent impact on job satisfaction, climate or organisational commitment.

Although cross-sectional studies consistently find relationships between these variables, more stringent longitudinal research is far more limited and it is therefore difficult to draw generalisable conclusions from this body of evidence.

Chapter 7

The impact of HRM practices on final outcomes in the health sector

Introduction

This chapter presents findings from a systematic review of the evidence on the impact of HRM practices on final outcomes in the health sector. The findings reported here relate to objective six of the overall review, specifically:

- *Objective 6: 6.2* Which HRM practices have an impact on patient care outcomes?

Chapter 7 describes aspects of the methodology specific to the health sector systematic review. It then presents the narrative syntheses and data tables summarising the evidence for the impact of HRM outcomes on patient care outcomes.

The narrative syntheses and data tables drawing together evidence for the impact of HRM on intermediate outcomes in the health sector are presented in Chapter 6.

Chapter 2 of this report outlines the systematic review methodology approaches used to guide all the reviews. The search strategies for this review were based on the broad HRM categories described in Chapter 3 and on patient outcomes.

In this chapter, the classification of patient outcomes is described first then the specific methodology is described. The chapter then goes on to describe the results.

Patient outcomes

One of two principal questions to be addressed is whether there is any demonstrable link between HRM practices and final performance outcomes in health, and between intermediate outcomes (such as morale and motivation) and final performance outcomes in health. A clear definition of this particular outcome offers the only viable approach to dealing with this question and reducing the number of outcomes to be investigated.

The tender specified ‘patient’ outcome variously as patient care and patient outcomes, which include patient satisfaction, mortality rates, hospital acute infection rates, clinical quality standards, and patient safety and well-being. However, a more specific definition of patient care outcomes is not given. An earlier report commissioned by the SDO on the impact of HRM in the health sector⁷⁷ failed to examine the relationship between HRM practices and clearly defined patient care outcomes. The type and nature of the patient care outcomes therefore lacked definition. Scoping exercises were undertaken to examine a broad spectrum of patient outcomes that appear in the medical and health literature, including clinical outcomes, which are treatment- or condition-specific. This literature was vast and unmanageable, and outcomes were diverse and heterogeneous. It was decided to prioritise a set of patient outcomes based on Department of Health and NHS performance literature.

Policy-makers and practitioners want information that is locally applicable, timely and relevant.^{52,263} Given that the invitation to tender for this research described the target audience as ‘NHS managers, HR practitioners and researchers, ... commissioners, ... and the NHS HR community as a whole’, it was decided to focus on patient care outcomes of relevance to these groups. The Healthcare Commission NHS Performance Indicators²⁶⁴ and the NHS Improvement Plan²⁶⁵ therefore provided a potentially good rationale for examining a limited, but specific, list of patient care outcomes.

This review focused on seven patient outcomes derived from the Healthcare Commission NHS Performance Indicators²⁶⁴ and the NHS Improvement Plan²⁶⁵ (*Table 28*). There are no standard definitions for any of these outcomes. Definitions used in this review are either those provided by the Healthcare Commission²⁶⁴ and NHS Improvement Plan²⁶⁵ or the terms as they appear in the health services research literature. For example, patient satisfaction has

TABLE 28 Sources of patient care outcomes

Patient care outcome	Source
Patient safety (includes infection/HAI/ MRSA)	1. NHS Improvement Plan Standards (Domains 1 and 6): Safety and Care Environment and Amenities 2. Healthcare Commission Performance Indicators: MRSA 3. ITT
Patient-centred care	1. NHS Improvement Plan Standards (Domains 4 and 5): Patient Focus and Accessible and Responsive Care 2. Healthcare Commission Performance Indicators 3. Appleby 2003 ²⁶⁶ (Manchester report)
Patient waiting times (includes delays and cancellations)	1. NHS Improvement Plan Standards (Domain 5): Accessible and Responsive Care 2. Healthcare Commission Performance Indicators: Waiting; delays; cancellations
Patient satisfaction	1. Healthcare Commission Performance Indicators: Patient complaints; patient surveys 2. ITT
Patient health-related quality of life	1. Healthcare Commission Performance Indicators 2. ITT 3. Appleby 2005 ²⁶⁷ (Manchester report)
Patient mortality	1. Healthcare Commission Performance Indicators: Deaths related to certain operations 2. ITT
Patient stay and re- admission	1. Healthcare Commission Performance Indicators: Emergency re-admissions

no standardised measure, but is a self-explanatory term widely used in the literature. Definitions appearing in this review's protocols relating to patient care outcomes, and the related literature searching, are perhaps broader and more vague than would be required by standard systematic review methodology, but this reflects the non-standardised nature of the outcomes being measured. Further research may add to this list, but it provides a sound starting point for looking at specific patient care outcomes of demonstrable relevance to the target audience.

Patient care outcomes considered by the review are:

Patient safety refers to 'activities that prevent or reduce the risk of harm to patients' (NHS 1). This includes activities to reduce 'the risk of hospital acquired infection' and MRSA, and to achieve high standards of hygiene and cleanliness (NHS 1 and 6). MRSA is also a standards indicator under the Clinical Focus element of the Healthcare Commission Performance Indicators, which states, 'Infection control (IC) is an integral part of healthcare and the NHS is working to improve hospital cleanliness and reduce infection rates. Rates of infection with MRSA are an increasing public concern and reducing them is a key priority for the Government. Including this indicator will

help maintain the profile of infection control.' This outcome does not include adverse events or medication errors.

Patient centred-care refers to 'health care that is provided in partnership with patients, their carers and relatives, respecting their diverse needs, preferences and choices' (NHS 4). This involves giving 'patients and carers information when they want or need it, seeking their feedback and consulting them regarding their care, and treating their choices regarding their care or food with respect' (NHS 4). This also includes taking into account their views and choices regarding access to services and treatments (NHS 5). It is measured in two indicators under the Patient Focus standards for Acute Trusts. These are the 'Outpatient and A&E patient surveys: better information, more choice' and 'Outpatient and A&E patient surveys: building closer relationships' indicators. The former measures 'patients' experience of these aspects of care, such as information about care and treatment, and involvement in care', and the latter, 'feedback from patients ... taking account of their views and priorities ... and placing the patient at the centre of health services'.

Patient waiting times refers to 'delay at ... [the] stage of service delivery' (NHS 5). It is an

integral element of the Healthcare Commission Performance Indicators. Waiting times makes up five of the eight Key Targets and 10 of the 16 Patient Focus Targets for Acute Trusts. These targets range from standards regarding waiting times in A&E and waiting times from GP referral to consultation, to the number of cancelled operations and delays in transfers. They also constitute three of the eight Key Targets and 3 of the 13 Access to Quality Services indicators for Primary Care Trusts.

Patient quality of life is a common measure in the health services research literature.^{268,269} It is measured in the Healthcare Commission Performance Indicators using 'feedback from patients ... taking account of their views and priorities'. Patient surveys and complaints constitute 5 of the 16 Patient Focus Targets for Acute Trusts, and 5 of the 13 Access to Quality Services indicators for Primary Care Trusts.

Patient satisfaction is a common measure in health services research²⁷⁰⁻²⁷³ and is covered by a substantial number of the Healthcare Commission Performance Indicators. These indicators measure 'feedback from patients ... taking account of their views and priorities'. Satisfaction, as with patient quality of life, makes up 5 of the 16 Patient Focus Targets for Acute Trusts, and 5 of the 13 Access to Quality Services indicators for Primary Care Trusts.

Patient mortality rates is a common measure in the health services research literature^{274,275} and is covered by 2 of the 10 Clinical Focus standards of the Healthcare Commission Performance Indicators for Acute Trusts, and two of the nine Improving Health indicators for Primary Care Trusts.

Patients' length of stay and re-admission rates are common measures in the health services research literature.^{274,276,277} Re-admissions that are 'potentially avoidable' are also covered by 2 of the 10 Clinical Focus standards of the Healthcare Commission Performance Indicators for Acute Trusts.

An example of the resulting patient outcomes search strategy is given in Appendix 6. This search string was modified for the different databases to take account of the different keywords and thesauri they use.

Many of these outcomes are acknowledged proxies for patient care, although it is also true that they

have their limitations.²⁷⁸ For example, Mitchell and Shortell²⁷⁹ point out that mortality may be a good 'bottom-line outcome', but it is arguably more dependent on patient characteristics than organisational factors, such as HRM practices.

Review methodology

Protocol development

Protocols were produced for the review question 'Which HRM practices have an impact on patient care outcomes?' but much was left open because of the lack of clear definitions and because the literature itself was an unknown quantity. The literature was so diverse and heterogeneous that nothing was fixed beyond the broad categories of HRM practice (Chapter 3) and the patient outcomes described above, and the plan for the systematic search of the literature by various methods. There was to be no exclusion of studies based on formal quality assessment. However, longitudinal study design was a criterion for inclusion in the review and served as a form of quality assessment. The details of the data extraction and synthesis remained open and flexible. Such flexibility is permitted by evolving systematic review methods, especially when dealing with complex literatures.^{52,56,58,60,63}

Search strategy

Literature search strategies were developed and performed on the following electronic databases: ASSIA, BNI, Business Source Premier, Campbell Collaboration, CENTRAL, CDSR, CINAHL, DARE, DH-Data, EMBASE, HMIC, IBSS, King's Fund database, MEDLINE, NHS EED, NRR, PREMEDLINE, PsycINFO, ReFeR, SSCI and SCI. Search strings were modified for the different databases to take account of the different keywords and thesauri they use. Examples of the search filters and strategies can be found in Appendices 6 and 7. The searching of electronic databases using pre-designed search filters was supplemented by reference tracking of selected studies.

Study selection

A pilot sift was conducted by two reviewers to test the study selection criteria form and to assess inter-rater reliability. Titles and abstracts of studies identified by both electronic database searching and reference tracking were sifted using the following inclusion criteria.

Studies that:

- were longitudinal in design
- examined an intervention which could be described as an HRM practice, such as training, work design or performance appraisal
- evaluated the impact of this intervention on a patient care outcome.

Studies were excluded if they were unpublished theses.

All of the identified articles were sifted by one of the research associates and half by a second reviewer. The κ -statistic for inter-rater reliability across the double-sifted articles was 0.9. This complies with the standards required by conventional systematic review methodology.⁴⁷ In cases where there was disagreement, the two reviewers attempted to reach a consensus. If they could not, a third reviewer took the decision about inclusion. There was no formal quality assessment of the studies at this stage. The only quality criterion applied was that the study needed to be longitudinal. Papers were included only if they had a longitudinal study design, an HR intervention and a stated outcome. Papers were excluded if they did not satisfy these criteria or if they were student theses or dissertations.

Data extraction

A data extraction form was piloted by two reviewers. This process indicated the high degree of heterogeneity between the studies. As a result, the team designed a first-level form to extract only the minimal amount of key data: study design, intervention, fidelity measure, outcome(s), outcome measure(s), and to identify any potentially relevant additional studies. This form served two purposes. First, it enabled the team to gain a quick overview of the studies' interventions and outcomes in order to test their potential for synthesis. Given the number and apparent heterogeneity of the studies, more in-depth data extraction would have been time-consuming and potentially of little added value. Second, reference tracking was used to identify additional potentially relevant studies. The new forms were piloted by all six members of the team and questions were resolved at team meetings. The data extraction was then completed for each study by a single reviewer. Double data extraction was rejected because of the number of selected studies and the limited potential for synthesis. This process provided a necessary overview of the available literature.

Data synthesis

Despite the apparent heterogeneity of the studies, a second stage of data extraction was then undertaken by the research associate leading on this question (CC) when it became apparent that some studies demonstrated sufficient homogeneity to be grouped together for synthesis. This additional data extraction compiled information on country, the unit of analysis, staff involved in the intervention, sample size, length of the study, bottom-line results, staff outcomes and whether staff variables had been used as moderators or mediators.

Study design was the principal method of quality weighting studies in the synthesis. RCTs were considered to be the best-quality studies because this design limits the scope for bias in the study.⁴⁸ The next best studies had a quasi-experimental design: a research design that resembles a RCT but has no random assignment. These were followed by prospective studies and, finally, retrospective studies were considered to be the longitudinal design most vulnerable to bias. This hierarchy was applied in the synthesis. For example, the findings of a RCT are given greater weight than those of all other study designs examining the same intervention or outcomes, and the findings of a quasi-experimental study are given greater weight than a prospective or retrospective study. As far as possible, the review used authors' own descriptions of their study's design in order to limit potential bias in the labelling of studies as particular designs by reviewers in the project team.

This provided all the data required for a worthwhile summary and synthesis of the studies.

Results

After the removal of duplicates, a total of 1277 citations were identified by the searches of the electronic databases and grey literature sources. The titles and abstracts of retrieved citations were then screened using the stated inclusion and exclusion criteria. At this stage, 1083 citations were rejected because they did not meet the required criteria. Attempts were made to retrieve the full papers of the remaining 106 references. When examining the full paper, 29 papers were rejected because they did not meet the inclusion criteria. Reference tracking was then performed on the remaining 77 papers, as well as any included papers resulting from the reference tracking process. This process yielded 33 papers, 12 of

which were rejected when the full paper was retrieved because they did not meet the inclusion criteria. Therefore, in total, reference tracking yielded 21 additional references. A member of the project team also encountered a relevant paper while working on another project. Overall, therefore, 99 studies were identified (*Table 29*). The QUOROM flow chart²⁸⁰ in *Figure 3* explains how many studies were rejected and at which stage, and the means by which included studies were identified.

Data extraction was performed on the resulting 99 studies, which were then categorised by intervention following the framework of broad HRM practices (developed earlier in the review and described in Chapter 3). The tables below describe the key data for the studies and the accompanying narrative offers a basic synthesis of these data. Some studies appear under more than one category, either because the interventions being examined have a number of different components or because the nature of the intervention means it can be justifiably categorised under more than one heading, for example education and feedback.

Work design

All of these studies consider interventions or practices changing or affecting the content of a job or the way it is to be done. The term 'work design' is rarely used in the literature relating to HRM in

the health sector and is not used to describe any of the interventions in this sample of longitudinal research. However, the interventions fall under the heading of 'work or job design' because they all involve the redesign or extension of job content. The absence of any existing systematic review or meta-analysis of health sector studies described as work design may be explained by difficulties in creating a clear, structured definition of work design or operationalising the concept as a search strategy. It may also have been prevented by the potentially limited number of relevant studies and the heterogeneity of their interventions and outcomes, as demonstrated by this sample. In fact, there is only one meta-analysis covering job enrichment, an element of work design, in the non-health sector.²⁸¹

Details of studies

Fourteen studies met the inclusion criteria (*Table 30*). All studies were published in English, with the earliest being published in 1992. Eight studies were conducted in the USA, four in the UK, one in Hong Kong and one in Australia. One study used an experimental design, but most of the studies used a prospective longitudinal design, and there were also three retrospective studies. The studies varied in duration, from 6 weeks to 3 years. The sample sizes ranged from as few as 10 staff or 38 patients to 879 staff or 5037 patients, depending on the outcomes being studied. In three studies the relevant patient sample size was not given.

TABLE 29 Summary of studies included by HRM practice

HRM practice	Subcategories	No. of studies	Systematic reviews: health sector
Work design		14	0
Staffing	Staffing levels and working hours	19	2
	Innovation	13	5
	Substitution	23	5
	Transfer	8	5
Training and development		16	5
Compensation and rewards		3	7
Communication		0	0
Family friendly		0	0
Single status		0	0
Employee involvement		5	0
Performance management, appraisal		7	0
Bundles		0	0

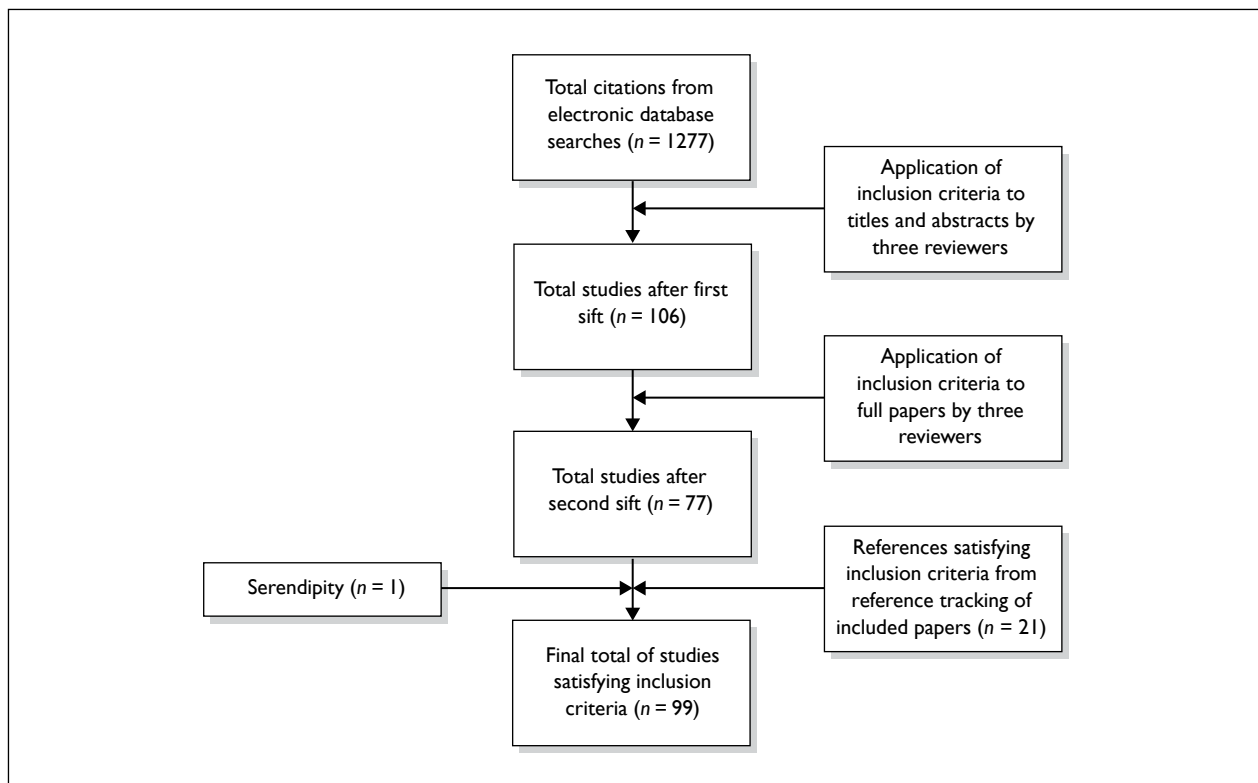


FIGURE 3 QUOROM flow chart for patient outcomes review.

In all cases the unit of analysis consisted of units or specific services or departments in hospitals, including emergency departments.

HRM practice

All of the interventions considered here involved the introduction of new systems or programmes affecting either who performed what tasks within a team or how work was allocated to team members. However, analysis of the literature reveals that some of the interventions studied may be placed into two groups, each containing three studies.

In the first group, three studies, two by the same authors, examined the implementation of an outcomes management model of working developed from quality circles: jobs were redesigned with the intention of achieving outcome benchmarks.²⁸²⁻²⁸⁴

In the second group of three studies, the intervention focused on skill enhancement of nurse practitioners (NPs), i.e. nurses taking on expanded roles. This involved an increase in workload and the assumption of more duties by these staff, or a redistribution of workload combined with increased supervision of more junior members of staff.^{232,248,285} In two of these studies, this job redesign was accompanied by education of relevant

staff members to facilitate the revision or extension of roles.^{232,248}

The remaining studies all involved elements of job redesign, including within the interventions components such as team working^{231,286} and redesigned task allocation.^{231,287,288} One study measured the fidelity with which the new systems were implemented by recording when protocols required by the new system were activated.²⁸⁴ However, none of the other studies reported any measures of implementation fidelity for the systems or programmes being examined.

Outcomes

The three outcomes management studies all researched the impact of this model on patient length of stay, but had no other outcomes in common. Two of the three studies evaluating skill enhancement for NPs measured both patient satisfaction and staff satisfaction. One study used validated scales for both of these outcomes,²³² but the other study used its own instruments.²⁴⁸ The remaining seven outcomes measured by these studies were all different. The latter study also assessed other staff psychological and behavioural outcomes, including the ability to supervise staff and workload.

The remaining studies measured a wide variety of patient care outcomes. Patient satisfaction was measured by five studies and waiting times by four. Overall, unlike the majority of other interventions considered by the longitudinal research included in this review, several work design studies did examine staff psychological outcomes. Six studies measured job satisfaction, employee satisfaction or morale. None of these outcomes was analysed as a moderator or mediator but only as direct outcomes, and the job and employee satisfaction measures used by these studies were all different.

Results

Two of the three studies evaluating the outcomes management model found that this intervention had a positive effect on all outcomes, which included length of stay and patient mortality rates.^{282,283} However, the third study found that the impact of this intervention on outcomes such as length of stay was positive, but not significant.²⁸⁴ All three studies used a prospective cohort design with historical controls.

In the group of skills enhancement studies, one intervention (workload redistribution) had no significant positive or adverse effect on staff or patient satisfaction.²³² A second study, using a superior experimental design, also examining the relationship between increased role responsibility and these outcomes, found that the intervention had a positive effect on morale, but no significant impact on patient satisfaction.²⁴⁸ The weakest study in this group in terms of study design only measured the impact of the intervention on length of stay, and found a significant positive effect.²⁸⁵

In the remaining studies, the work redesign intervention significantly improved patient satisfaction in almost every study that measured this outcome,^{230,249,287,289} although one study found that the provision of continuity of care by physicians, as opposed to their rotation, made no difference to patient satisfaction or patients' perception of the atmosphere in a ward.²⁸⁸ However, all three studies examining the impact of interventions on staff psychological outcomes found a significant positive impact on these outcomes,^{230,231,249} and all four studies examining waiting times found significant positive outcomes.^{249,286,287,290} In the four studies examining financial performance or cost as an outcome, the results were positive for three of the interventions, and only had no effect in the case of re-engineering work design for patient-focused care.²³⁰ Prospective

and retrospective designs all produced the same inconsistent results.

Omissions

The unit of analysis used by these studies did not include the hospital or primary or community care. Several staff outcomes were measured by these studies, but no study controlled for any staff variables and none examined these staff psychological or behavioural variables as moderators or mediators of the relationships being evaluated. Unlike many other interventions considered by this review, only two patient safety indicators were examined as an outcome by any of these studies: errors and urinary tract infection (UTI) rates; and only one study considered mortality rates.

Summary

The job design interventions considered here had certain basic elements in common, but they also differed markedly in parts of their content. Neither outcomes management nor skill enhancement interventions demonstrated consistent results, but other job and work design interventions all had positive effects on staff satisfaction, patient satisfaction and patient waiting times.

Staffing level and working hours

These studies consider research into two elements of staffing practice: staffing level and staff working hours. The staffing level literature considers whether increased ratios of staff-patients improve patient care outcomes or whether decreased ratios have an adverse effect on these outcomes. This ratio may relate either to numbers of staff or to grades of staff, such as registered nurses (RNs). There is one systematic review of studies of staffing levels in the health sector.²⁹⁵ Two of the longitudinal studies described below have been included in this previous systematic review.^{296,297} However, the majority have not been included in existing systematic reviews and therefore add to the review literature on this topic. There are no systematic reviews or meta-analyses on staffing levels in the non-health sector HRM literature.

The working hours literature considers both the variable of total numbers of hours worked and interventions that affect the number of hours worked by health professionals, especially reductions or rescheduling. There are two meta-analyses that include studies of health sector working hours, reflecting the sizeable number of

TABLE 30 Work design

Study, country	Design, sample size, duration	Intervention(s)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Burns <i>et al.</i> (2003) ²⁸² USA	Prospective cohort with historical controls 1105 patients 30 months	Outcomes management: developed from quality circles: pathway, protocols, four nurses as OMs	No	Ventilator duration ICU length of stay Hospital length of stay; mortality; costs	Ventilator: duration: Data collection by OMs ICU length of stay: Data collection by OMs Hospital length of stay: Data collection by OMs Mortality: Data collection by OMs Costs: Routine collection	Positive effect: All outcomes
Russell <i>et al.</i> (2002) ²⁸³ USA	Prospective cohort with historical controls 524 patients 18 months	Outcomes management: (generated from quality circle): OM (NPs), pathway and protocol	No details	Length of stay; rates of UTI and skin breakdown; discontinuation of catheter and mobilisation; cost savings	Length of stay: Routine data collection Rates of UTI and skin breakdown: Routine data collection Discontinuation of catheter and mobilisation: Routine data collection Cost savings: Routine data collection	Positive effect: Significant improvements on all outcomes
Burns <i>et al.</i> (1998) ²⁸⁴ USA	Prospective cohort with historical controls 305 patients 24 months	Outcomes management: (generated from quality circle): OM, pathway and protocol	Yes: recorded when protocols were activated	Duration of mechanical ventilation Hospital length of stay Cost per case	Duration of mechanical ventilation: Routine data collection Hospital length of stay: Routine data collection Cost per case: Routine data collection	No effect: Outcomes management better but not significant
Macdonald and Bodzak (1999) ²⁴⁸ UK	Experimental study 100 patients 879 staff 15 months	Self-managing day surgery nurse-led team – expanded nurse role	No	Morale; patient satisfaction; day case activity; final outcome	Morale Sickness absence rates (team vs all hospital personnel); source: hospital personnel record system Self-completion survey questionnaire (p. 860) Patient satisfaction survey Day-case activity performance vs national performance indicators on 15 procedures Financial performance Performance against budget Cash-releasing efficiency savings (comparing savings against total budget)	Positive effect: Staff morale. Patient satisfaction also high but not reported as a significant improvement. Financial performance within targets

Study, country	Design, sample size, duration	Intervention(s)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Jung <i>et al.</i> (1994) ²³² USA	Prospective cohort with historical controls 265 nurses 21 months	Workload redistribution programme: decrease nurse workload, increase use and productivity of nursing assistants, educate nurses to direct and supervise ancillary staff	No	Nurses ability to supervise nursing assistants; job satisfaction; coordination of care; quality of nursing care; workload; patient satisfaction; final outcomes: job satisfaction	Nurses ability to supervise nursing assistants: own scale Job satisfaction: Price and Mueller (1986) ²⁴¹ Coordination of care: Price and Mueller (1986) ²⁴¹ Quality of nursing care: Atwood and Hinshaw (1988) ²⁹¹ Workload: Atwood and Hinshaw (1988) ²⁹¹ Patient satisfaction: Press-Ganey Survey	No effect: Work delegated increased with no significant effect on outcomes
Schweeer <i>et al.</i> (2004) ²⁸⁵ USA	Retrospective Unknown 3 years	Role of trauma paediatric NPs (trauma PNP) was re-engineered to a joint practice model with trauma PNP assuming increased responsibility	No	Length of stay		Positive effect: Significant decrease in LOS
Sakr <i>et al.</i> (2003) ²⁹⁰ UK	Prospective cohort with historical controls 2760 patients 10 months	A&E vs NP staffed MIU	No	Waiting times; no. of errors in clinical assessment, treatment and disposal; costs	No. of errors in clinical assessment, treatment and disposal: Pre-designed forms of ideal vs what happened Costs: Obtained from trust	No effect: No difference in safety between MIU and A&E Positive effect: MIU shorter waiting times Negative effect: MIU greater costs, more outpatient referrals
Barry <i>et al.</i> (2002) ²⁸⁹ USA	Prospective cohort with historical controls 245 patients 3 months	Implementation of 'Case Management' programme Use of CCCs and case managers	No	Financial performance Family-centred care/satisfaction; clinical process improvement	Financial performance: No details Family-centred care/satisfaction: No details Clinical process improvement: No details	Positive effect: Cost savings, improved patient satisfaction, improved length of stay and re-admission rates for patients with diabetes

continued

TABLE 30 Work design (continued)

Study, country	Design, sample size, duration	Intervention(s)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Browne <i>et al.</i> (2000) ²⁴⁹ Australia	Prospective cohort with historical controls Unknown 3 years	Seamless model of ED management: designed by a strategic planning committee consisting of physicians and nursing staff reviewing working practice. Areas in ED defined by function, staff work in functional teams, staff redeployed to functional area (acute, emergency, observation) of greatest need	No	Patient waiting times Critical care performance Patient satisfaction Staff morale; final outcome: staff morale	Average waiting time (against benchmark) Time to craniotomy for patients with acute head injuries Patient and relative satisfaction judged by number of complaints Turnover rate and sick leave of 2 days or less	Positive effect: Significant positive effects on all outcomes
Jones <i>et al.</i> (1997) ²³⁰ USA	Prospective cohort with historical controls 119 staff Patient numbers unknown 15 months	Re-engineered work design for patient focused care; use of multidisciplinary collaboration	No	Patient satisfaction; employee satisfaction; collaboration; cost of care; length of stay; final outcome: employee satisfaction	Press-Ganey Survey Attitude survey programme for Health Care (1985) ²⁴⁰ Routine data collection	Positive effect: Employee satisfaction, patient satisfaction, length of stay No effect: Costs Negative effect: Collaboration decreased
O'Connor (1993) ²³¹ UK	Prospective cohort with historical controls 38 patients 10 staff: activity 24 staff: satisfaction 6 months	Daily patient allocation (old system) vs team nursing (continuity of care) (new system)	No	Staff perception of changes; activity analysis; QICC; final outcomes: job satisfaction; staff activities	Staff perception of changes: job satisfaction: 20-item scale (own scale) Activity analysis: observation exercise QICC: 85-item questionnaire based on Goldstone <i>et al.</i> (1984) ²⁹²	Positive effect: All

Study, country	Design, sample size, duration	Intervention(s)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Lau and Leung (1997) ²⁸⁶ Hong Kong	Prospective cohort with historical controls 2583 patients 8 months	Small team consultation vs common patient pool	No	Waiting times	Interval between registration and being seen by doctor	Positive effect: Significant reduction in waiting times
Sparr et al. (1994) ²⁸⁸ USA	Retrospective 120 patients 6 weeks	House officer rotation vs no rotation	No	Patient satisfaction; patient perception of ward atmosphere	Patient satisfaction questionnaire (PSS) (Speedling et al. 1983); ²⁹³ revised version of Ward Atmosphere Scale (WAS) (1974) ²⁹⁴	No effect
George et al. (1992) ²⁸⁷ UK	Retrospective 5037 patients 6 weeks	Formal nurse triage vs informal prioritisation process	No	Waiting times Patient satisfaction	Waiting times: routine data collection Patient satisfaction: 14-item questionnaire (own)	Positive effect: Informal prioritisation more effective than formal triage for most urgent category waiting times No effect: Patient satisfaction

CCC, clinical care coordinators; ED, emergency department; ICU, intensive care unit; LOS, length of stay; MIU, Minor Injuries Unit; OM, outcomes manager; QICC, quality indicator for client care; trauma PNP, trauma paediatric NP.

studies in this field.^{298,299} However, none of the studies described below has been included in these existing reviews. This sample therefore adds to the review literature on this topic. There is only one meta-analysis in the non-health sector HRM literature reviewing studies on a similar subject.³⁰⁰

Details of studies

Nineteen studies met the inclusion criteria (Table 31). All were published in English, with the earliest being published in 1988, and all but three of the studies were conducted in North America. Most of the studies used a retrospective or prospective longitudinal design, but there was one RCT.³⁰¹ The studies varied in duration, from 3 months to 7 years. The sample sizes ranged from 347 to more than 300,000 patients, although in five cases the study's sample size was not given. In terms of units of analysis, seven studies used the hospital as the unit and 12 used units or specific services or departments in hospitals.

HRM practice

Analysis of the literature reveals that these longitudinal studies may be examined in three separate groups: six studies examine the relationship between patient care outcomes and the total number of hours worked by staff; six studies look at how nurse or medical staff–patient ratios impact on patient care outcomes; and seven studies compare the effect of shifts of different lengths being worked by physicians, for example long hours compared with an overall reduced total numbers of hours or shifts of shorter hours. In the case of this last grouping of studies, the intervention was often introduced as a consequence of new working hour limits. The fidelity with which these interventions were implemented was clearly measured in only one study,³⁰² but there was also some monitoring of compliance in another.³⁰³

Outcomes

In the first two groups, all but one of the studies examined the relationship between staffing or working hours and a single patient care outcome. Three of the studies that examined total number of hours worked all looked at the outcome of patient satisfaction. These three studies used two different measures and the two studies which used the same patient satisfaction measure reported different findings.^{297,304} The three other studies examining total number of hours worked looked at three very different outcomes; length of stay, mortality and prescribing errors. Four of the nurse–patient ratio studies looked at the same outcome: in-hospital mortality. One of the nurse–patient ratio studies

measured the patient safety variable ‘unplanned extubations’. The remaining study from this cluster considered the staff outcome: medically certified sick leave.

The studies comparing different lengths of working hours can be separated further into several smaller groups examining three or more of the same or similar outcomes. Four studies investigated the relationship between this intervention and mortality rates. In only one study was this the only outcome; the remainder all evaluated multiple outcomes. Three examined the relationship with length of stay, medication errors and adverse events, although these last-named outcomes were only nominally the same. In total, an additional 15 different outcomes were also examined by these studies. Five of the seven studies assessed multiple outcomes rather than a single outcome.

Results

Two of the studies examining the impact of total number of hours worked found that this variable had no impact on patient satisfaction,^{297,305} and two others found no significant relationship with mortality or prescribing errors.^{296,306} Only one study found lower numbers of hours to be associated with lower satisfaction among patients, and one study found that higher nurse intensity, that is, more hours, led to decreased length of stay.³⁰⁷ All of these studies used either retrospective or prospective study designs.

The results for the four nurse–patient ratio studies examining the outcome of mortality rates were inconsistent. The two prospective studies found that there was no significant association with mortality rates regardless of the ratio,^{308,309} while the two studies using a less powerful retrospective design did find that higher ratios of staff–patient produced lower mortality rates.^{310,311} The results of these latter two studies may also have been determined by their patient population of newborn children, which was very different from the adult populations of the two studies that reported no effect. A lower nurse–patient ratio was found to have the negative effect of increased unplanned extubations and increased sick leave absences by head nurses.^{312,313}

Two of the seven studies examining reduced working hours recorded some negative outcomes, such as an increase in certain complications, negative patient safety indicators and delays in the provision of some diagnostic tests. However, reduction in working hours consistently appears

not to have any adverse effect on the patient outcomes of mortality rates, length of stay, transfers to intensive care, discharge disposition, prescribing or medication errors, complications, re-admissions, reinterventions, cost per patient, adverse events or perception of care.^{302,303,314–316} In some cases, this intervention was associated with positive outcomes regarding length of stay, medication errors and maternal and neonatal health outcomes.^{260,301,314} This was the same across study designs: RCTs generated the same outcomes as simple prospective or retrospective designs. In fact, some of the positive outcomes were found by the more powerful RCT.³⁰¹

Omissions

None of the studies reported here took emergency departments or primary or community care as its unit of analysis. Also, staff psychological or behavioural outcome (sick leave) was only measured by one of these studies, but no study controlled for any staff variables and none examined these variables as moderators or mediators of the relationships being evaluated.

Summary

According to this sample of longitudinal research, neither lower numbers of hours worked nor the reduction of working hours appears to have an adverse effect on mortality rates, length of stay, transfers to intensive care, discharge disposition, prescribing or medication errors, complications, re-admissions, reinterventions, cost per patient or adverse events. These variables may potentially have a negative effect on patient satisfaction, although they may equally have some positive effect on some patient outcomes. The evidence on staff–patient ratios is inconsistent for mortality as a patient outcome, although those studies with a superior design suggest there is no adverse effect. However, the research also indicates that lower nurse–patient ratios may lead to adverse events and increased absences among senior nursing staff.

Introduction of a new type of worker to existing teams or services

The staffing category includes skill mix at work, which involves ‘practices affecting enhancement (increasing depth of job by extending roles of skills), substitution (working across professional divides or exchanging one type of worker for another), delegation, innovation (creating new jobs by introducing a new type of worker), transfer of services, relocation of staff and services, and

liaison (using specialists in one sector to educate and support staff in another)’.³¹⁸ The following synthesis focuses on studies researching innovation: the introduction of a new type of worker to existing teams or services. There are five recent systematic reviews or meta-analyses on staffing in the health sector workforce, reflecting both the sizeable number of studies and the growing interest in this field.^{295,319–322} However, only one of the studies described below has been included in any of these systematic reviews.³²³ There is no meta-analysis in the non-health sector HRM literature reviewing studies on a similar subject.

Details of studies

Thirteen studies met the inclusion criteria (*Table 32*). All were published in English, with the earliest being published in 1988. Eight studies were conducted in the USA, two from Australia, and one each in the UK, Switzerland and Turkey. Of the 13 studies, one was experimental,³²⁴ nine were prospective in design and three were retrospective. The studies varied in duration, from 1 month to 5 years, and the sample sizes ranged from 203 to 6909 patients. However, no sample size was given by five studies. Almost all of these studies were conducted on units, wards or specific hospital services or departments. There was one study of a community nursing home.

HRM practice

Analysis of the literature reveals that the interventions studied may be examined in three groups. Five studies look at whether the introduction of physicians with specific training or skills has any impact on patient care outcomes. Five studies compare the impact on patient care of teams made up of physicians alone versus teams composed of physicians and newly introduced NPs. Finally, three studies examine the impact of the creation of new NP or senior nurse services. The units of analysis were all either emergency departments or intensive care units (ICUs). None of the studies made any attempt to measure the fidelity with which the new staffing practice was being implemented.

Outcomes

The five studies which looked at the introduction of new types of physicians assessed a small number of consistent outcomes. Four of the five studies assessed one outcome only, either length of stay, mortality or discharge rates. Length of stay was evaluated by three of the five studies and mortality by two. There were only two additional patient outcomes.

TABLE 31 Staffing level and working hours

Study country	Design, sample size, duration	Intervention(s)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Bolton <i>et al.</i> (2003) ³⁰⁴ USA	Prospective cohort with historical controls Unknown 18 months	Total hours of nursing care per patient-day (p. 610)	No	Patient perceptions of care	Picker Institute Inpatient Questionnaire (p. 609)	Positive effect: Lower number of total nursing hours per patient, less satisfaction
Potter <i>et al.</i> (2003) ³⁰⁵ USA	Prospective cohort with historical controls Unknown 12 months	Nurse staffing Measures: Average number of hours of nursing care per patient per day on the day shift (p. 161)	No	Patient satisfaction (post discharge) (p. 159)	Patient satisfaction measure (Burroughs <i>et al.</i> 1999) ³¹⁷	No effect
Davydov <i>et al.</i> (2004) ³⁰⁶ USA	Prospective cohort with historical controls Unknown 3 months	No. of hours worked	No	Errors in prescribing	Errors per hour worked	No effect: No significant association between errors and numbers of hours worked
Beglinger (2006) ³⁰⁷ USA	Retrospective Unknown 13 years	No. of hours worked by nurses	No	Length of stay	Routine data collection	Positive effect: Decreased length of stay
Tourangeau <i>et al.</i> (2002) ²⁹⁶ Canada	Retrospective 46,941 patients 12 months	Predictors: Higher dose of nurse staffing (greater number of nursing hours)	No	30-day mortality rates	30-day risk-adjusted mortality rates: Routine data collection	No effect: All other predictors had no significant effect
Sovie and Jawad (2001) ²⁹⁷ USA	Retrospective 12 hospitals (1997) 16 hospitals (1998) 24 months	No. of hours worked per patient-day	No	Patient satisfaction	Picker Institute Inpatient Questionnaire Press-Ganey Survey	No effect
Amaravadi <i>et al.</i> (2000) ³⁰⁹ USA	Prospective cohort with concurrent controls 366 patients 5 years (1994–8)	Different night time nurse-patient ratios in ICU (postoperative care)	No	'Clinical and economic outcomes'	In-hospital mortality	No effect
Dimick <i>et al.</i> (2001) ³⁰⁸ USA	Prospective cohort with historical controls 569 patients 5 years (1994–8)	Nurse-patient ratio (night-time in ICU)	No	In-hospital mortality	Routine data collection	No effect: No association with mortality regardless of ratio

Study country	Design, sample size, duration	Intervention(s)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Marcin <i>et al.</i> (2005) ³¹² USA	Retrospective 1004 patients 4 years	Nurse-patient ratio	No	Unplanned extubations	Routine data collection	Negative effect: Lower nurse-patient ratio significantly associated with increased unplanned extubations Positive effect: Highest infant-staff ratio (1.71+) produced significantly lower mortality
Callaghan <i>et al.</i> (2003) ³¹⁰ Australia	Retrospective 692 patients 4 years	Nurse-patient ratio	No	Mortality (survival to hospital/discharge)	Mortality (survival to hospital discharge): routine data collection	Negative effect: Lower nurse-patient ratio significantly associated with increased taking of sick leave by head nurses (not all nurses) Positive effect: Lower staff ratio, higher mortality
Bourbonnais <i>et al.</i> (1992) ³¹³ Canada	Retrospective 1165 nurses 41 months	Nurse-patient ratio	No	Medically certified sick leave	Routine data collection	Positive effect: Intervention schedule had lower rates of errors and adverse events
Stiwell <i>et al.</i> (1988) ³¹¹ UK	Retrospective Unknown 7 years (1977-83)	Level of staffing/all staff-patient ratio (medical, nursing, midwives)	No	Mortality	Mortality per 1000 births	No effect: Only ICU length of stay showed a significant difference, 3-shift model was longer
Landrigan <i>et al.</i> (2004) ³⁰¹ USA	RCT Unknown (2203 patient-days) 12 months	Traditional schedule (normal working hours) vs intervention schedule (reduced working hours)	No	Medical errors; adverse events	Routine data collection	No effect: Medication errors, patient perceptions Positive effect: Some maternal and neonatal outcomes significantly improved
Bollschweiler <i>et al.</i> (2000) ³¹⁵ Germany	Prospective cohort with concurrent controls 347 patients 4 months	Daily working hours (as a result of limits): 2 x 12-hour shifts vs 3 x 8-hr shifts	No	Mortality; Complications; re-admissions; reinterventions; ICU length of stay; hospital length of stay; APACHE II score	Routine data collection	No effect: Medication errors, patient perceptions Positive effect: Some maternal and neonatal outcomes significantly improved
Bailit and Blanchard (2004) ³¹⁴ USA	Prospective cohort with historical controls Unknown 24 months	Reduction in working hours	No	Medication errors; maternal and neonatal outcomes; patient perception	All routine data collection Patient perception measured by numbers of complaints	continued

TABLE 31 Staffing level and working hours (continued)

Study country	Design, sample size, duration	Intervention(s)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Gottlieb et al. (1999) ²⁶⁰ USA	Prospective cohort with historical controls 445 patients 2 months	Change in work schedule/rotation, which reduced hours of typical longest shifts	No	Hours slept by house staff; no. of patients admitted; length of stay; no. of laboratory tests; no. of consultations; medication errors; mortality; nosocomial fever (adverse event); re-admissions; discharge to nursing home; final outcome; no. of hours slept by residents	Routine data collection	Positive effect: Length of stay, medication errors, number of laboratory tests No effect: All other outcomes
Laine et al. (1993) ³¹⁶ USA	Prospective cohort with historical controls 526 patients 13 months	Limitation placed on residents' working hours	No	In-hospital mortality; transfers to ICUs; cardiopulmonary resuscitation attempts; discharge disposition; length of stay; In-hospital medical complications; delays in ordering and performing diagnostic tests	No details on measure and its reliability or validity	No effect: On mortality, transfer to intensive care, discharge disposition and length of stay Negative effect: More patients suffered complications or had diagnostic test delays
Poulose et al. (2005) ³⁰² USA	Retrospective 85,000+ patients 7 years (1995–2001)	Resident work hours limit	Yes: surveillance performed to evaluate compliance with limit (p. 848)	PSIs	Rates per 1000 discharges per quarter of: APL, PEDVT, FB, PTX, postoperative WD	No effect: For three of five patient safety indicators Negative effect: For two of five patient safety indicators
Howard et al. (2004) ³⁰³ USA	Retrospective 300,000+ patients 4 years (1988–91)	Residents' work hours limits	Some monitoring of compliance, but authors recognise this was not universal, and therefore cite this as a limitation of the study	In-hospital mortality	In-hospital mortality for the following diagnoses: CHF, AMI and iatrogenic PNU Source: New York SPARCS database (p. 2)	No effect: Mortality rates declined but no different between experiment and control

AMI, acute myocardial infarction; APL, accidental puncture or laceration; CHF, congestive heart failure; FB, foreign body left during procedure; ICU, intensive care unit; PEDVT, postoperative pulmonary embolus or deep vein thrombosis; PNU, pneumonia; PSI, patient safety indicators; PTX, pneumothorax; SPARCS, Statewide Planning and Research Co-operative System; WD, wound dehiscence.

Length of stay was the only outcome examined by more than one of the five studies examining the introduction of NPs or senior nurses into physician teams. This outcome was evaluated in four of these studies. The remaining 15 outcomes evaluated by these studies were all different. Only one of these studies evaluated any staff psychological outcomes: staff satisfaction with the new service.²⁶²

In the grouping of three studies examining the new introduction of a new nurse service, length of stay and patient satisfaction were both measured in two studies. The two patient satisfaction studies used different scales and none was an established measure. Four other outcomes were also evaluated by these studies.

Results

The results of those studies that examined the introduction of new types of physicians were consistently positive. This intervention was found to reduce mortality rates significantly in both studies examining this outcome,^{325,326} and reduce length of stay in two of the three studies evaluating this variable.^{324,327} All other outcomes were also positively affected.³²⁸ Different study designs produced the same outcomes.

Results for the studies examining innovative joint working between physicians and NPs were very inconsistent. A positive effect was found in three of the four studies examining length of stay,^{285,329,330} but many of the remaining diverse outcomes being measured showed no effect at all, regardless of quality of study design.^{262,331}

Two of the three studies examining the introduction of a new nurse service found consistently positive outcomes for length of stay, waiting times and patient satisfaction,^{323,332} but the third study, which was of much longer duration, found no effect on the outcomes of length of stay and re-admission rates.³³³ All of the studies employed a similar prospective design.

Omissions

None of the studies reported here took primary care or the hospital as its unit of analysis. Only one study measured any staff psychological or behavioural outcomes, and no study controlled for any of these variables or examined them as moderators or mediators of the relationships being evaluated. The key patient outcome of patient safety was not considered by longitudinal studies looking at this type of innovative intervention.

Summary

This sample describes longitudinal research relating to innovation in the skill mix of staff members. The small samples of studies examining the introduction of new specially trained physicians and new nurse services both found that these interventions had positive effects on most of the outcomes being tested, especially length of stay, mortality and patient satisfaction. However, the results were far less consistent for the introduction of NPs or their equivalent into teams with physicians, when this new team was compared with teams of physicians alone.

Substitution of one type of staff for another

The following synthesis focuses on studies researching substitution. There are five recent systematic reviews or meta-analyses on staffing in the health sector workforce, reflecting both the sizeable number of studies and growing interest in this field.^{295,319–322} However, only three of the studies described below have been included in any of these systematic reviews,^{296,334,335} so this sample also clearly adds to the review literature on this topic. There is no meta-analysis in the non-health sector HRM literature reviewing studies on a similar subject.

Details of studies

Twenty-three studies met the inclusion criteria (*Table 33*). All studies were published in English, with the earliest being published in 1982. Nineteen studies were conducted in the USA. Most of the studies employed a prospective or retrospective longitudinal design, but there was one RCT and three studies used a quasi-experimental design. The studies varied in duration, from 6 weeks to 6 years, and the sample sizes ranged from 96 to more than 100,000 patients. The studies focused on different units of analysis. In 15 cases, the unit was a hospital unit, ward or specific service or department; in seven cases a hospital; and in one case a primary care practice.

HRM practice

Analysis of the literature reveals that the interventions studied may be examined in three groups. The largest group of 14 studies compared results found for the substitution of RNs, regular or employed nurses with other nursing grades or members of staff. Substitute staff included pool or bank staff, nursing aides (NAs), contract nurses, patient care associates, licensed practice nurses,

TABLE 32 Innovation

Study, country	Design, sample size, duration	Intervention(s)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Partovi et al. (2001) ³²⁴ USA	Experimental Unknown 16 weeks	Faculty (additional staff member) vs no faculty triage (skill mix)	No	Length of stay	Routine data collection: Nurse triage time to nurse discharge time	Positive effect: Faculty triage significantly reduced LOS
Topeli et al. (2005) ³²⁵ Turkey	Prospective cohort with historical controls 559 patients 23 months	New staff: an intensivist plus closed ICU policy vs no intensivist plus open policy	No – implementation more than just a new staff member	Mortality; length of stay in ICU; length of stay in hospital	Mortality: Routine record collection Level of sickness of admitted patients: APACHE II score Length of stay in ICU: In days Length of stay in hospital: In days	Positive effect: Better mortality rates No effect: Length of stay
Bucheli and Martina (2004) ³²⁷ Switzerland	Prospective cohort with historical controls 360 patients 5 weeks	Addition of medical personnel to the existing staff (staffing)		Length of stay		Positive effect: Significantly reduced LOS for outpatients; No effect: ED LOS of those admitted to hospital
Pepe et al. (1993) ³²⁸ USA	Prospective cohort with historical controls 352 patients 5 years	Comparison of existing hospital discharge rates pre- and post recruitment of specialised emergency medical services system physician	No	Hospital discharge rates		Positive effect: Significant improvement in discharge rates
Reynolds et al. (1988) ³²⁶ USA	Retrospective 212 patients 24 months	CCM physician staffing	No	Impact on patients with septic shock: Mortality		Positive effect: Significant reduction in mortality rates post-designated CCM staffing
McMullen et al. (2001) ²⁶² USA	Prospective cohort with concurrent controls 701 patients 12 months	Physician vs NP/physician service (skill mix)	No	Patient health status Patient satisfaction Physician and other staff satisfaction with service Final outcomes: Physician and other staff satisfaction with service	Patient health status: SF-12 Patient satisfaction: Picker Commonwealth Institute Questionnaire Physician satisfaction with service: University Health Consortium Referring Physician Survey Other staff satisfaction with service: Own two-item scale	Positive effect: Patients more healthy, better mental health at admission, better communication; high staff satisfaction Negative effect: Traditional service better at explaining tests

Study, country	Design, sample size, duration	Intervention(s)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Grouse and Bishop (2001) ³³⁰ Australia	Prospective cohort with concurrent controls 6909 patients 12 weeks	Normal ED staffing vs normal ED staffing plus nurses trained to perform ED clinicians' role (non-medical technicians)	No	Waiting times; length of stay	Arrival at triage to time first seen by doctor Arrival at triage to time first seen by doctor	Positive effect: Significant reductions in waiting times for most frequent categories and numbers who leave without being seen No effect (positive): on mortality and cost per patient Positive effect: Reduction in all lengths of stay
Christmas et al. (2005) ³²⁹ USA	Prospective cohort with historical controls Unknown 3 years	Surgical residents with no work hour limitations vs surgical residents with limited working hours plus NPs (p. 918)	No	No. of patients admitted to trauma service Hospital length of stay Intensive care stay Floor length of stay Mortality Direct cost per patient	No details of measure	No effect (positive): on mortality and cost per patient Positive effect: Reduction in all lengths of stay
Aigner et al. (2004) ³³¹ USA	Retrospective 203 nursing home residents 12 months	NPs and physicians vs physicians only	No	Acute visits; no. of treatments given; ED visits; ED costs; hospitalisations; LOS; hospital costs; performance of progress visits; performance of annual history	Acute visits: routine data collection No. of treatments given: routine data collection ED visits: routine data collection ED costs: routine data collection Hospitalisations: routine data collection LOS: routine data collection Hospital costs: routine data collection Performance of progress visits: routine data collection Performance of annual history: routine data collection	Small effect: NP/physician team did more acute visits and gave more treatments

continued

TABLE 32 Innovation (continued)

Study, country	Design, sample size, duration	Intervention(s)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Schweer et al. (2004) ²⁸⁵ USA	Retrospective Unknown 3 years	Role of trauma PNP was re-engineered to a joint practice model with physicians and surgeons	No	Length of stay		Positive effect: Significant decrease in LOS
Green and Edmonds (2004) ³³³ Australia	Prospective cohort with historical controls Unknown 6 years	Developing and introducing an 'advanced practice nursing position' (ICU liaison nurse)	n/a	Length of stay in ICU; re-admission rates in ICU		No effect
Spisso et al. (1990) ³²³ USA	Prospective cohort with historical controls Unknown 24 months	Introduction of NPs	No	Cost-benefit Quality of care: waiting times/length of stay; patient satisfaction Impact of healthcare team: time spent doing certain tasks	Cost-benefit: FISCAL and routine collected patient data Quality of care: Waiting times/length of stay (routine data collection); patient satisfaction: number of patient complaints Impact of health-care team: team spent doing certain tasks: 30-day review	Positive effect: Length of stay, waiting times and patient complaints decrease; time saved for team increased; costs offset
Barr et al. (2000) ³³² UK (NI)	Prospective cohort with historical controls 241 patients 1 month	NP services to cope with increased demand	No	Patient satisfaction	Patient satisfaction	Positive effect: High patient satisfaction, but not a comparison with a control

CCM, Critical Care Medicine; ED, emergency department; LOS, length of stay; PNP, paediatric nurse practitioner.

unlicensed assistive personnel, unregulated staff and nursing assistants. Therefore, despite the apparent homogeneity of the intervention, the substitutes were not always the same. However, 13 of these 14 studies focused exclusively on nursing staff.

In the same way, the second largest group (a group of five studies) examined the substitution of one type of physician for another, such as part-time for full-time physicians. However, in each case both the physician being replaced and his/her substitute were different.

The final group of four studies examined the replacement of physicians by NPs or senior nurses. Once again, however, the details of each intervention were different. None of the studies made any attempt to measure the fidelity with which the intervention was being implemented.

Outcomes

In the group of 14 studies examining the substitution of one type of nurse for another, or for a more junior member of health staff, only four patient outcome measures were examined by more than one study: patient satisfaction, mortality, quality of nursing care and length of stay. Six studies considered the outcome of patient satisfaction and all used different measures or tools, only three of which were named scales (Press-Ganey Survey; Burroughs Patient Satisfaction Measure; Patient Judgement of Hospital Quality Questionnaire). Quality of nursing care was also only measured by a recognised instrument (Hinshaw and Atwood³³⁶ scale) in one of the two studies examining this outcome. Four studies evaluated mortality rates as an outcome and three length of stay. Cost was the only other outcome to be measured by more than one study. These twelve studies also measured an additional 13 different outcomes, several of which related to patient safety, such as patient falls. Jung *et al.*²³² also measured a number of staff psychological and behavioural outcomes, including job satisfaction, ability to supervise staff and workload. This was the only one of the 23 substitution studies to measure any staff outcomes.

The group of five studies examining the substitution of one physician for another made a more limited but consistent choice of outcomes. Mortality was measured as an outcome by three studies, and was the only outcome examined by two of these studies. Other outcomes measured were length of stay, transfer time, patient satisfaction

and adverse events. Unlike the studies focusing almost exclusively on nurses, there was little consideration of patient satisfaction or patient safety.

Mortality was the only outcome to be examined by more than one study in the group examining the replacement of physicians by NPs or senior nurses. The remaining eight outcomes were all different. Patient satisfaction was measured by one study; once again the researchers used their own scale.

Results

Results for interventions examining the substitution of one type of nurse for another, or for a more junior member of health staff, were inconsistent. Two prospective studies found that the higher the ratio of RNs, the higher the patient satisfaction,^{305,337} but another study, using a higher-quality experimental design, found that using RNs alone was less effective at improving patient satisfaction than replacing some RNs with NAs.³³⁸ The use of more RNs or regular nurses compared to other grades was also positively associated with lower mortality rates by all five studies that examined this outcome, although all of these studies were retrospective, which is the weakest form of longitudinal study design. All-RN staffing versus staffing by temporary nurses or other grades was found to have a positive impact on length of stay, and, in a study of a burns unit, infection rates among patients. Employee nurses were also found to have a better impact on quality of nursing care and patient satisfaction than contract nurses.³³⁹ However, the remaining three studies found that the substitution of RNs with others generally had no effect on outcomes.^{232,340,341}

Results from those studies examining the substitution of one physician for another were again inconsistent. In two cases there was no effect on mortality rates,^{342,343} but one did have a positive effect.³⁴⁴ However, the latter was a retrospective study³⁴⁴ and one of the studies that found no effect was a RCT,³⁴³ the results of which may be more robust. Cross-coverage by physicians was found to have a negative effect on adverse events when compared to residency³⁴⁵ but otherwise there was no significant effect, either positive or negative, on almost any of the remaining outcomes.^{342,343,346} Only the study of full- versus part-time primary care physicians controlled for any staff variables, but these were purely demographic.³⁴⁶

The studies examining the replacement of physicians by NPs or senior nurses generally found

that such a substitution had no adverse effect on the outcomes measured, regardless of study design.^{290,347–349} Two studies in this group also indicated that this intervention had a positive effect on patient satisfaction and some waiting times, although these studies used less reliable prospective designs.^{290,348}

Omissions

All of the principal patient care outcomes were covered by this sample of studies. However, only one study measured any staff psychological or behavioural outcome, and no study controlled for any of these variables or examined them as moderators or mediators of the relationships being evaluated.

Summary

This sample describes longitudinal research relating to substitution of staff members in the health sector literature. This research suggests that staffing by RNs only, rather than their replacement with other grades of staff, is better for mortality rates, length of stay and some infection rates but has limited impact on other outcomes. The replacement of one type of physician with another was also shown to have neither an adverse nor positive impact on patient outcomes. The most consistent results were found for the replacement of physicians with senior nursing staff: there were no adverse effects as a result of this substitution.

Transfer or relocation of staff and services

The following synthesis focuses on studies researching transfer or relocation of services. There are five recent systematic reviews or meta-analyses on staffing in the health sector workforce, reflecting the sizeable number of studies in this field and the growing interest in this field.^{295,319–322} However, only one of the studies described below has been included in any of these systematic reviews.³³⁵ There is no meta-analysis in the non-health sector HRM literature reviewing studies on a similar subject.

Details of studies

Eight studies met the inclusion criteria (Table 34). All were published in English, with the earliest being published in 1984. Six of the studies were conducted in the USA, one in the UK and one in Australia. The studies used either a prospective or a retrospective design. The studies varied in duration, from 6 months to 3 years, and the sample sizes ranged from 274 to more than 22,000

patients. All eight studies were conducted on units, wards or specific services.

HRM practice

Analysis of the literature reveals that the interventions studied may be examined in two groups.^{335,355–357} Four studies all examine the same intervention: the specific transfer of services to a particular team of physicians, to the exclusion of physicians who were previously involved in the care under a different model. These studies examined the impact of a move from open ICUs, in which the physician responsible for admission retained some input into a patient's care, to closed units in which care was controlled exclusively by the intensive unit critical care team. The remaining four studies may also be grouped together because they examine the effect on patient care outcomes of the presence or absence of certain physicians, although in each case the unit of analysis, and, therefore, the type of physician, was different. None of these studies made any attempt to measure the fidelity with which the intervention was being implemented.

Outcomes

The group of studies evaluating open versus closed ICUs all considered mortality as an outcome. In one study it was the only outcome measured, but in the remainder it was one of multiple outcomes: length of stay and duration of mechanical ventilation were examined as outcomes by two of these studies, but eight further different outcomes were also studied.

In the same way, in the remaining four studies, two outcomes were examined by two studies: mortality rates and length of stay.^{253,358} Mortality was the only outcome measured by one study.³⁵⁹ The remaining studies measured an additional nine different outcomes. Only one study focused on patients' perceptions of quality of care and used the Picker Commonwealth Institute Questionnaire.²⁵³

Results

The studies examining the impact of the presence or absence of a physician found inconsistent results regarding mortality rates and waiting times,^{335,355,357} and found that the practice had no effect at all on length of stay.^{356,357} These studies all used a retrospective study design.

In the group of four studies examining open versus closed ICUs, three found that the practice of closing the unit significantly reduced mortality.^{253,359,360} However, one of the two studies

TABLE 33 Substitution

Study, country	Design, sample size, duration	Intervention(s)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Lee <i>et al.</i> (2005) ³³⁸ Taiwan	Experimental 100 patients 12 months	The skill mix practice model of nursing 'the practice of using both nurses and NAs to carry out nursing activities' (p. 408) An NA is 'anyone who was qualified to assist in nursing tasks through obtaining a nursing care training certification' (p. 408)	No	Patient satisfaction	16-item questionnaire (p. 408)	Positive effect: Skill mix practice model vs non-skill mix model
Fontaine and Rositani (2000) ³³⁹ USA	Experimental 373 patients 8 months	Two different models of after-hours nursing care: nurse employees vs contract nurses	No	Cost; quality of nursing care Patient/family satisfaction	Cost: No. of hospital days Quality of nursing care: Own scale Patient/family satisfaction: Own questionnaire	Positive effect: Employee nurses produce significantly better outcomes than contract nurses
Hall <i>et al.</i> (2003) ³³⁷ Canada	Prospective with concurrent controls 2046 patients 6 weeks+	'Nurse staff mix' (p. 1099): All RN RN/RPN RN/unregulated staff	No	Patient functional health outcomes; pain; patient perceptions of nursing care	FIM; Medical Outcome Study SF-36 (acute form) BPI-SF PJHQ (nursing subscale)	Positive effect: Better FIM, social function and patient satisfaction scores with higher proportion of RNs. RNs and unregulated staff had better pain outcomes for patients than RNs/RPN mix and unregulated staff
Barkell <i>et al.</i> (2002) ³⁴⁰ USA	Prospective cohort with historical controls 96 patients 12 months	Staffing models: Low ratio vs high ratio of RNs to PCAs	No	LOS; variable cost; patient satisfaction; UTI rates; pneumonia rates; pain management	LOS: Routine data collection Variable cost: Routine data collection Patient satisfaction: Routine data collection UTI rates: Routine data collection Pneumonia rates: Routine data collection Pain management: Routine data collection	No effect: Only pain management outcome showed a significant difference

continued

TABLE 33 Substitution (continued)

Study, country	Design, sample size, duration	Intervention(s)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Bolton et al. (2001) ³⁴¹ USA	Prospective cohort with historical controls 257 units (1,253,892 patient days) 12 months	Ratio of RNs to other staff	No	Patient falls; hospital-acquired pressure ulcers	Routine data collection	No effect: Regardless of nurse grade-patient staffing ratio
Jung et al. (1994) ²³² USA	Prospective cohort with historical controls 265 nurses 21 months	Workload redistribution programme: Decrease nurse workload, increase use and productivity of nursing assistants, educate nurses to direct and supervise ancillary staff	No	Nurses ability to supervise nursing assistants; job satisfaction; coordination of care; quality of nursing care; workload; patient satisfaction; final outcomes: job satisfaction	Nurses ability to supervise nursing assistants: Own scale Job satisfaction: Price and Mueller (1986) ²⁴¹ Coordination of care: Price and Mueller (1986) ²⁴¹ Quality of nursing care: Atwood and Hinshaw (1988) ²⁹¹ Workload: Atwood and Hinshaw (1988) ²⁹¹ Patient satisfaction: Press-Ganey Survey	No effect: Work delegated increased with no significant effect on outcomes
McCausland et al. (1988) ³⁵⁰ USA	Prospective cohort with historical controls Unknown 5 years	All RN-primary nursing model vs RN overtime, as-needed nurses and part-time nurses	Yes: hours worked by nurses checked	Length of stay	Routine data collection	Positive effect: Change to all-RN primary nursing model led to decreased length of stay
Mark et al. (2005) ³⁵¹ USA	Retrospective 422 hospitals 6 years (1990-5)	RN FTE staffing/1000 inpatient-days LPN FTE staffing/1000 inpatient-days Non-nurse FTE staffing/1000 inpatient-days	No	Mortality	Mortality: risk adjusted ratio of observed/expected mortality	Positive effect: Lower mortality rates for increased RN staffing for high HMO penetration hospitals
Mark et al. (2004) ³⁵² USA	Retrospective 422 hospitals 6 years (1990-5)	Staffing (pp. 282-3): RN FTEs/1000 inpatient-days LPN FTEs/1000 inpatient-days Non-nurse FTEs/1000 inpatient-days	No	Quality of care	Mortality	Positive effect: Lower mortality rates for increased RN staffing

Study, country	Design, sample size, duration	Intervention(s)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Person <i>et al.</i> (2004) ³³⁴ USA	Retrospective 118,000+ patients 2 years	RN staffing: Ratio of FTE RNs to ADC (p. 5) LPN staffing: Ratio of FTE LPNs to average daily census (p. 5)	No	In-hospital mortality of patients with AMI	In-hospital mortality	Positive effect: Lower mortality rates for higher RN staffing levels
Potter <i>et al.</i> (2003) ³⁰⁵ USA	Retrospective Unknown 12 months	Average percentage RN and average percentage UAP hours of direct care (p. 161) Average float percentage or mean percentage of nursing care on day shift that is provided by float nurses from other units or outside the hospital (p. 161)	No	Patient satisfaction (post discharge) (p. 159)	Patient satisfaction measure (Burroughs <i>et al.</i> 1999) ³¹⁷	Positive effect: Higher percentage of hours by RNs, higher post-discharge satisfaction
Tourangeau <i>et al.</i> (2002) ²⁹⁶ Canada	Retrospective 46,941 patients 12 months	Richer RN skill mix: RN inpatient hours vs inpatient hours by other nurses Increased opportunities for continuity of care (more full-time RNs)	No	30-day mortality rates	30-day risk-adjusted mortality rates: routine data collection	Positive effect: Richer RN skill mix, more years experience on unit, larger number of shifts missed predicts lower mortality No effect: All other predictors had no significant effect
Robert <i>et al.</i> (2000) ³⁵³ USA	Retrospective 127 patients 13 months	Low regular and high-pool nurse-patient ratio vs high regular and low-pool nurse-patient ratios	No	BSI; length of stay; duration of mechanical ventilation; assisted nutrition; mortality	Routine data collection	Positive effect: Higher regular nurse-pool nurse ratio led to better outcomes
Arnow <i>et al.</i> (1982) ³⁵⁴ USA	Retrospective 101 patients 8 months	Regular burns unit nurses vs temporary nursing staff	No	Infection rates	Routine data collection	Positive effect: Use of regular nurses significantly associated with lower infection rates than temporary staff
Simmer <i>et al.</i> (1991) ³⁴³ USA	RCT 1151 patients 12 months	Resident (teaching) vs staff (non-teaching) staffing model	554	In-hospital mortality and mortality within 6 months of admission		No effect: No difference between the two models

continued

TABLE 33 Substitution (continued)

Study, country	Design, sample size, duration	Intervention(s)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Oswanski et al. (2004) ³⁴² USA	Prospective cohort with historical controls 769 patients 12 months	Resident assisted vs physician assistant only	No	Mortality; length of stay; transfer time	Routine data collection	Positive effect: Length of stay significantly reduced from ED to trauma centre (1 of 5 components of this variable) No effect: All other outcomes
Tenner et al. (2003) ³⁴⁴ USA	Retrospective 1211 patients 12 months	Hospitalist vs resident	No, but different settings	Survival	Survival rates	Positive effect: Staffing by 'hospitalists' has lower mortality rates than resident staffing
Fairchild et al. (2001) ³⁴⁶ USA	Retrospective 132 primary care physicians Unclear	Part-time vs full-time PCPs	No	Patient satisfaction; controls; staff gender; staff years in practice; staff location		No difference full-time vs part-time primary care physicians
Rudy et al. (1998) ³⁴⁹ USA	Experimental 389 patients 14 months	Residents vs acute care NPs and physician assistants	No	Length of stay; mortality; adverse drug reaction; completeness of admission notes; re-admission	Length of stay: Routine data collection Mortality: Routine data collection Adverse drug reaction: Routine data collection Completeness of admission notes: Examination by researchers Re-admission: Routine data collection	No effect
Hoffman et al. (2005) ³⁴⁷ USA	Prospective cohort with concurrent controls 526 patients 31 months	ACNP and attending physician vs critical care/pulmonary fellow and attending physician in an ICU (skill mix)	No	Mortality rates	No. of deaths of patients who did or did not have treatment limitations	No effect

ACNP, acute care nurse practitioner; BSI, bloodstream infection; FTE, full-time equivalent; PCA, patient care associate; PCP, primary care physician; RPN, registered practical nurses.

that used a superior prospective design found no such positive effect.³⁵⁸ The impact of this practice on all other outcomes was also inconsistent. For example, two studies examined length of stay and found differing results.^{253,358} The different results were not related to quality of study design as both studies employed a form of prospective design.

These eight studies covered all of the key patient outcomes, although the patient safety variables were limited.

Omissions

None of the studies reported here took the hospital or primary or community care practices as their unit of analysis, and none controlled for any staff variables or examined them as moderators or mediators of the relationships being evaluated.

Summary

This sample describes longitudinal research relating to the transfer or relocation of staff and services. Despite the apparent homogeneity of such practices or interventions, there is still a great deal of heterogeneity between these studies in terms of outcomes and units of analysis. Also, only one study²³² measured any staff psychological or behavioural outcome.

The results derived from similar interventions (such as the move to closed from open ICUs) either had a positive effect, or no effect at all, in equal measure. These findings, in combination with the small number of studies, means that no firm conclusions can be reached about the relationship between patient outcomes and the location of physicians on- or off-site, or the transfer of services to exclude certain types of physician.

Training

All of these studies consider interventions that involve some form of training or education for health staff and its impact on patient and staff outcomes. Studies have only been included if the entire practice was training or if training was a primary element of an HRM practice. A number of studies have been excluded because education or training was only one element of a multifaceted intervention in which none of the other components could be described as falling within the field of HRM.^{361,362} There are five existing systematic reviews or meta-analyses of training and development interventions in the health sector. Three examine forms of continuing medical education for physicians and their

impact on physician performance and health-care outcomes.³⁶³⁻³⁶⁵ The two other reviews examine systems of continuing professional development to enhance the recruitment and retention of specific health professionals.^{299,366} There are also three meta-analyses of training practices from the non-health sector. These focus on elements of training that are very different from those examined for health, such as altering organisational behaviour,³⁶⁷ mentoring³⁶⁸ and evaluating the effectiveness of organisational training.³⁶⁹ None of the studies reviewed below appear in any of these systematic reviews. A narrative synthesis has been undertaken due to the general heterogeneity of the studies in this sample.

Details of studies

Sixteen studies met the inclusion criteria (*Table 35*). All studies were published in English, with the earliest being published in 1988. Eight studies were conducted in the USA, two in Argentina, and one each in the UK, the Netherlands, Sweden, Pakistan, Taiwan and Macedonia. Most of the studies employed a prospective longitudinal design, but there were two RCTs^{256,370} and one experimental study.³⁷¹

The studies varied in duration, from 6 months to more than 6 years. The length of the study period was not given by one paper. The sample sizes ranged from as few as 35 patients or 76 staff to 1411 patients or 649 staff, depending on the outcomes being studied. The relevant patient sample size was not given in two studies. The unit of analysis was a hospital unit or ward in 13 of the studies. In one study the unit of analysis was a primary care practice and in two others it was a hospital.

HRM practice

Analysis of the literature reveals that seven studies all examine the same intervention and outcome: the impact of specific training on infection rates within ICUs.^{372,373} In five of these studies the education or training element was conducted in conjunction with evaluation feedback.

The remaining nine studies also examined interventions specifically to improve staff knowledge and skills in particular fields, but these studies do not form a similar homogeneous body of literature. The training in two studies aimed to improve communication and collaboration within teams,^{256,370} and two had elements specifically designed to improve communication and working with patients.^{256,371} Despite these potential

TABLE 34 Transfer

Study, country	Design, sample size, duration	Intervention(s)	FM	Outcomes	Outcome measure(s)	Results ±
O'Connor et al. (2004) ³⁵⁵ Australia	Retrospective 11,999 patients 6 months	ED with ED physician present vs ED with ED physician not present	No	Waiting time by triage category; waiting time by access block	Waiting time by triage category: Routine data collection Waiting time by access block: Routine data collection	Positive effect: For waiting time by triage category 4. Not significant for all other categories
French et al. (2002) ³⁵⁶ USA	Retrospective 22,527 patients 6 months	Two different staffing models: 1. ED was staffed with EM residents under the direct supervision of the faculty 2. ED was staffed with absent EM residents	n/a	Length of stay; decision to admit time; laboratory tests and radiographic studies ordered; specialist consultations obtained; unscheduled return visits within 72 hours; overall patient satisfaction		No effect
Porter and Ursic (2001) ³⁵⁷ USA	Retrospective 943 patients 6 months	Attending vs non-attending surgeon in a trauma centre	No	Resuscitation room time; time to operating room; time to CT scan; length of stay; complications; mortality	Resuscitation room time: Routine data collection Time to operating room: Routine data collection Time to CT scan: Routine data collection Length of stay: Routine data collection Complications: Routine data collection Mortality: Routine data collection	No effect: Except different for time to OR – attending surgeon significantly better
Li et al. (1984) ³³⁵ USA	Retrospective 954 patients 20 months	On-site vs off-site physician staffing in ICU	No	Mortality		Positive effect: Significant reduction in mortality rates post introduction of on-site staffing

Study, country	Design, sample size, duration	Intervention(s)	FM	Outcomes	Outcome measure(s)	Results ±
Multz <i>et al.</i> (1998) ³⁵⁸ USA	Prospective cohort with concurrent controls 280 patients 8 months	Change from 'open' to 'closed' ICU; mix of staff changes from non-ICU physicians (admitting physicians) having input into care, plus critical care team, to critical care team alone	No	Mortality; length of stay in ICU; length of stay in hospital; mechanical ventilation	Routine data collection	Positive effect: Significantly lower LOS and MV when closed No effect: Mortality
Carson <i>et al.</i> (1996) ²⁵³ USA	Prospective cohort with historical controls 245 patients 6 months	Change from 'open' to 'closed' ICU work team: mix of staff changes from non-ICU physicians (admitting physicians) having input into care, plus critical care team, to critical care team alone	No	Patient outcomes: Hospital mortality; duration of mechanical ventilation; length of stay; patient charges for radiology, laboratory and pharmacy departments; catheter use; interruptions of formal teaching rounds; patient, family and staff perceptions of quality of care; staff perceptions of care as a final outcome	1–6. Routine data collection 7. Adapted version of Picker Commonwealth Foundation Questionnaire	Positive effect: Significantly reduced mortality No effect: On all other outcomes Nurses show increased perceived satisfaction with the care delivered
Baldock <i>et al.</i> (2001) ³⁵⁹ UK	Retrospective 1134 patients 3 years	Change from 'open' to 'closed' ICU work team: mix of staff changes from non-ICU physicians (admitting physicians) having input into care, plus critical care team, to critical care team alone	No	Mortality	Routine data collection	Positive effect: Reduced mortality rates for 'closed' unit
Ghorra <i>et al.</i> (1999) ³⁶⁰ USA	Retrospective 274 patients 12 months	Change from 'open' to 'closed' SICU team: mix of staff changes from non-ICU physicians (admitting physicians) having input into care, plus critical care team, to critical care team alone	No	Clinical outcomes: Mortality; overall complications; rate of occurrence of renal failure; no. of consultations	Routine data collection	Positive effect: Reduced mortality, complications, consults and renal failure in closed ICU
MV, mechanical ventilation; OR, operating room.						

similarities, however, the type of training used was different for each study and ranged from leaflets to formal lectures and seminars. The majority of these studies concerned both nurses and physicians. Other than the group of training and feedback studies, no study clearly measured the fidelity with which the training programmes were implemented, although two studies did acknowledge barriers to full implementation.

Outcomes

Almost one-half of the studies focused on a single specific outcome: infection rates. Three of these studies looked at ventilator-associated pneumonia, two at bloodstream infections (BSIs), one at UTIs and one at nosocomial infections generally. In each case, the measure was the number of infections per 1000 days of the relevant device.

Unlike many of the other interventions considered by HRM studies in the health sector, several training studies did examine staff outcomes, usually knowledge or beliefs. In each case, this outcome was measured in conjunction with at least one other outcome, usually patient satisfaction. In three studies, increased staff knowledge was a specific and primary outcome of the training intervention. However, in each case the knowledge being assessed was different, so the scales used to measure this knowledge were different. In the same way, three studies measured patient satisfaction or perceptions of care, and all three studies used different measures.

Results

With a single exception – Cohran *et al.*'s study³⁷² – the training interventions designed to address the specific outcome of infection rates all had a significant positive effect on infection rates. Four of the five studies that combined training with some form of performance monitoring, such as evaluation and feedback, had positive outcomes,^{373–376} and both studies examining education alone had positive outcomes.^{377,378} All of the studies used a prospective cohort design with historical controls.

For the remaining studies, the results of those training interventions that aimed to increase staff knowledge were consistently positive.^{256,257,259} All four studies used a full range of study designs, from a RCT to a retrospective case–control study. Where staff knowledge was measured, significant improvements were found in two instances. Improved knowledge was also reported in conjunction with greater patient satisfaction by

one study,²⁵⁸ but in another study, with a superior design, the combination of improved knowledge and improved patient satisfaction was not found.²⁵⁶ The latter was a RCT.

Five studies found that training led to a significant reduction in mortality rates. This was the case not only for studies using the prospective cohort and retrospective case–control research designs,^{254,259,379} but also for high-quality longitudinal designs, such as RCTs³⁷⁰ and quasi-experimental designs.³⁷¹ Two studies examined length of stay as an outcome, with differing results. The more powerful quasi-experimental study found that the training intervention had a positive effect on length of stay,³⁷¹ whereas the more limited prospective cohort design of Lawrence *et al.*³⁷⁹ found no such positive outcome. However, the interventions and populations of the two studies were different.

Omissions

Several staff outcomes were measured by these studies, but no study controlled for any staff variables and none examined these staff psychological or behavioural variables as moderators or mediators of the relationships being evaluated. Unlike many other studies of HRM practices in the health sector, there are no longitudinal studies here looking at whether training or education can have an impact on waiting times or patient safety indicators other than infection rates.

Summary

The training interventions considered here have certain basic elements in common, but they also differ in elements of their content and delivery. The training ranged from leaflets to formal lectures and seminars. The primary outcomes examined by most of these studies were also different.

A group of seven studies all examined the impact of some form of infection control training on infection rates, and six of these studies found that training significantly reduced infection rates. However, none of these studies used a high-quality, powerful form of longitudinal study design.

Several studies also found that training had a positive effect on staff knowledge and mortality rates. These studies not only used simple prospective and retrospective designs, but also superior longitudinal study designs, such as RCTs and quasi-experimental design. The effect of training from those studies is, overall, positive.

TABLE 35 Training

Study, country	Design, sample size, duration	Intervention(s)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Cohran <i>et al.</i> (2006) ³⁷² USA	Prospective cohort with historical controls 432 patients 6 years 6 months	Training: IVSP	No	Rates of nosocomial BSIs	Routine data collection	No effect
Rosenthal <i>et al.</i> (2004) ³⁷⁴ Argentina	Prospective cohort with historical controls 1301 patients 12 months	Education Performance feedback	Yes – compliance is measured	Catheter-associated UTI rate	Catheter-associated UTI rate: Number per 1000 catheter-days (p. 49)	Positive effect: Significant decrease in infection rates (compliance is a moderator)
Salahuddin <i>et al.</i> (2004) ³⁷⁷ Pakistan	Prospective cohort with historical controls 677 patients 24 months	'Educational programme focusing on preventive practices for VAP' (p. 223) Weekly lectures, departmental presentations, reinforcement at the bedside, visual aids posted in the ICU	No	VAP infection rates	VAP infection rates per 1000 device-days: Survey of hospital infection control team (p. 224) VAP must fulfil CDCP-defined criteria for VAP (p. 224)	Positive effect: Significant reduction in infection rates
Won <i>et al.</i> (2004) ³⁷⁵ Taiwan	Prospective cohort with historical controls 1411 patients 5 years	Education: Formal lectures, written instructions, informal instruction Posting of visual reminders Performance feedback: Routine monitoring and feedback Penalties and incentives	Yes – compliance is measured	Nosocomial infection rate	Nosocomial infection rate: Report by hospital infection control team	Positive effect: Significant decrease in infection rates (compliance is a moderator)
Rosenthal <i>et al.</i> (2003) ³⁷⁶ Argentina	Prospective cohort with historical controls 840 patients 26 months	'Education and training with CVC care' (p. 406) 'Performance feedback provided on a monthly basis documenting rates of compliance with [infection control practices]' (p. 406)	Yes – active surveillance and feedback (p. 409)	Rates of IVD BSI	BSIs per 1000 IVD-days (p.408)	Positive effect: Significant decrease in infection rates after education, and further after feedback

continued

TABLE 35 Training (continued)

Study, country	Design, sample size, duration	Intervention(s)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Zack et al. (2002) ³⁷⁸ USA	Prospective cohort with historical controls Unknown 24 months	Education programme: Self-study module, in-services at staff meetings, formal lectures	No measure – but issue is acknowledged	Reduction in VAP	Reduction in VAP: Routine data collection of cases per 1000 ventilator-days	Positive effect: All
Kelleghan et al. (1993) ³⁷³ USA	Prospective cohort with historical controls Unknown 4 years	Feedback to physicians Education programme	Yes – monitoring and surveillance of compliance	Reduction in VAP	Reduction in VAP: Routine data collection of cases per 1000 ventilator-days	Positive effect
Fidler et al. (2004) ³⁷⁰ Netherlands	RCT 10,137 patients 9 months	Managerial-based intervention: Training and instruction in collaborative practice; use of protocols	No	ORMs: BP, heart rate, etc.; mortality	Routine data collection	Positive effect: Significant for all outcomes
Campbell et al. (2001) ²⁵⁶ USA	RCT 649 ED staff 123 patients 24 months	Two-day training and planning programme that addresses: System change Coalition building Attitudes and skill building Aim: To improve effectiveness of ED response to IPV	No – but does acknowledge barriers to the successful implementation of the intervention post-training	Staff knowledge of and attitude towards IPV; Culture of the ED regarding IPV Patient satisfaction; Final outcome: Staff attitudes and knowledge	Staff knowledge of and attitude towards IPV: SAS based on Saunders et al. (1987) ³⁸⁰ Culture of the ED regarding IPV: System change indicator Patient satisfaction: PSSS adapted from Soeken et al. (1998) ³⁸¹	Positive effect: Significantly improved staff knowledge of and attitude towards IPV, culture of the ED regarding IPV, and patient satisfaction
Lundstrom et al. (2005) ³⁷¹ Sweden	Experimental study 400 patients (aged 70 years+) 8 months	Staff education (training) focusing on assessment, prevention and treatment of delirium and staff-patient interaction vs no training Patient allocation vs task allocation system	No	Duration of delirium in older patients Ward length of stay Mortality	Duration of delirium in older patients: DSM IV Ward length of stay: Routine data collection Mortality: Routine data collection	Positive effect: Significantly reduced duration of delirium, length of stay and mortality

Study, country	Design, sample size, duration	Intervention(s)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Jeffery <i>et al.</i> (2004) ²⁵⁴ Australia and Macedonia	Prospective cohort with historical controls 115 doctors and nurses 4 years (1999–2002)	Educational intervention: Placements (p. 438) Formal teaching (p. 439) Workshops (p. 439)	No	Perinatal mortality rates; staff response to training programme	Perinatal mortality rates: Routine data collection	Positive effect
Lawrence <i>et al.</i> (2002) ³⁷⁹ USA	Prospective cohort with historical controls 119 patients 9 months	Multidisciplinary in-service team-based education administered to ED physicians and nurses and medicine house staff Feedback on time to antibiotic DDD	No	Time to antibiotic DDD Mortality Length of stay	Time to antibiotic door-to-drug delivery: Time from presentation on ED triage sheet to administration of antibiotics Mortality: Routine data collection Length of stay: Routine data collection	Positive effect: Reduction in DDD time No effect: Mortality and length of stay
Barnason <i>et al.</i> (1998) ²⁵⁷ USA	Prospective cohort with historical controls 47 patients 125 nurses 8 months	'Educational retooling': – Self-study pain management module – 1-hour seminar using critical thinking exercises	No	Patient perception of pain assessment and pain management effectiveness; pain management; experience evaluation Nurse cognitive; assessment of pain management; final outcome: significant improvement nurses' level of knowledge of pain management tool	Patient perception of pain assessment and pain management effectiveness: 11-item tool: PMIG Pain management experience evaluation: PMEE tool Nurse cognitive assessment of pain management: 18-item tool	Positive effect: Patient satisfaction and ability to rate pain (not reported as significant); nurse's knowledge significantly improved

continued

TABLE 35 Training (continued)

Study, country	Design, sample size, duration	Intervention(s)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Ogden and Hoppe (1998) ²⁵⁵ UK	Prospective cohort with historical controls 240 practice nurses 179 patients (T1) 35 patients (T2) 6 months	Educational packages to change PN's beliefs about obesity and behaviour towards patients: Expert educational package (leaflet only) (p. 251) VS Learner-centred educational package (leaflet and interactive seminar) (p. 251) VS No education = control group	No	Practice nurses' beliefs and behaviours Patient perceptions of the nurse consultation Practice nurse consultation style Patient reports of weight change; beliefs; behaviour; Consultation style	Practice nurses' beliefs and behaviours: Questionnaire (p. 250) Patient perceptions of the nurse consultation: Questionnaire (p. 250) Practice nurse consultation style: Questionnaire (p. 250) Patient reports of weight change: Questionnaire (p. 250)	Positive effect: Patient perception of nurses' satisfaction with consultation for learner group only; patient confidence significantly higher in expert group; no other differences
Harrison and Novak (1988) ²⁵⁸ USA	Prospective cohort with historical controls 76 nurses 63 patients Unclear	CEP for nurses on knowledge of and attitudes towards the elderly	No	Nurses' attitude and knowledge; patient satisfaction and perceptions of nursing care; final outcome only: nurses' knowledge and attitudes	Miller-Dodder revision of Palmore's Facts on Aging Quiz Kogan's Attitude Toward Old People Scale LaMonica-Oberst Patient Satisfaction Scale	Positive effect: Significant improvement in nurses' knowledge and attitudes No effect: Patient satisfaction
Birnbaum et al. (1994) ²⁵⁹ USA	Retrospective 869 patients (ischaemic heart disease) 24 months	Training in advanced cardiac life support	No	Specific medical knowledge gains Mortality rates Quality of care Enhancement of knowledge and skills	Range of specific behaviours/knowledge of staff Mortality rates from ischemic heart disease Explicit measures of quality of care (e.g. number with intravenous line in first hour post training vs pre-training)	Positive effect: Significant reduction in mortality rates

CEP, Continuing Education Program; CDCP, Centers for Disease Control and Prevention; CVC, central venous catheter; DDD, door-to-drug delivery; DSM IV, Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition; IPV, intimate partner's violence; IVD, intravascular device; IVSP, Intravascular Surveillance and Education Programme; ORM, out-of-range measurement; PMEE, pain management experience evaluation; PMIG, patient's pain management interview guide; PN, practice nurse; PSSS, Patient Safety and Satisfaction Survey; SAS, Staff Attitudinal Survey;

Compensation and payment

These studies consider payment systems, compensation and reward practices that seek to affect patient and service outcomes. A narrative synthesis is preferred because of the very small sample of studies identified. However, this topic has been the subject of seven systematic reviews. Five of these reviews have compared the impact of different types of remuneration for physicians on a range of patient and service outcomes.^{382–386} The remaining reviews consider the impact of target payments on immunisation rates and financial incentives on retention rates among rural physicians.^{387–388} No health professionals other than physicians have been considered by these reviews. None of the studies described below appears in any of these systematic reviews. There are also five reviews focusing on compensation and rewards in the non-health sector, such as financial rewards, social rewards and profit sharing.^{367,389–392}

Details of studies

Three studies met the inclusion criteria (*Table 36*). All studies were published in English, with the earliest being published in 1999. One study was a good quality prospective design undertaken in Sweden, and two studies were retrospective in design and were conducted in North America. The duration of the studies ranged from 24 to 48 months. The sample sizes ranged from 418 physicians, or 582 to 6749 patients. Two studies were undertaken in primary care practices, and one in hospitals.³⁹³

HRM practice

The studies examined different interventions. One study compared salary with fee for service (FFS) for primary care physicians; one evaluated the impact of bonuses on the number of referrals by primary care physicians to colorectal cancer screening, and one examined a broad incentive, performance-based reimbursement. Like all financial interventions examined by the review literature, these interventions were aimed only at physicians. None of these studies evaluated whether the stated intervention was being implemented in full accordance with policy.

Outcomes

The outcomes examined by the three studies varied. The first study examined the intervention's impact on multiple outcomes: mortality and length of stay, and a service delivery outcome. The second study only examined numbers of patients referred for screening. The third, like the first, examined length of stay, but also measured physician-

perceived quality of care, and physicians' cost awareness as a result of the intervention.

Results

The findings of the study on performance-based reimbursement were mixed: length of stay and physicians' cost awareness improved, but quality of care worsened.³⁹³ The results of the two retrospective studies were similarly inconsistent. In the first case, the different payment systems, fee or salary, had no effect on the measured outcomes,³⁹⁴ which included mortality and length of stay, but the second study did find that bonuses increased the likelihood of referral.³⁹⁵

Omissions

These studies examine only three types of payment system or financial incentive; others, such as personal performance-related pay, merit pay or gain-sharing schemes, were not evaluated. There were no studies of acute care wards, units or departments. Also, due to the small number of studies, many patient outcomes have not been examined in relation to this intervention, such as waiting times, patient satisfaction and patient safety. The only staff outcome measured by any of these studies was cost awareness; no study controlled for any staff variables and none examined staff psychological or behavioural variables as moderators or mediators of the relationships being evaluated.

Summary

The studies identified for this review considered several different compensation and reward interventions and three sets of very different outcomes. The literature examining the causal relationship between compensation and rewards and various patient outcomes is, therefore, extremely limited. These studies suggest that the method of payment to physicians does not always positively affect the small number of patient outcomes examined, but bonuses may affect certain other outcomes. However, the very small number and heterogeneity of the studies prevents any firm conclusions from being drawn.

Employee involvement

All of these studies consider interventions or practices that seek to involve staff in decision-making. The absence of any systematic review or meta-analysis of studies of this intervention in the health sector may be explained by difficulties in operationalising the concept of employee involvement for the purposes of systematic review.

TABLE 36 Pay

Study, country	Design, sample size, duration	Intervention(s)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Forsberg <i>et al.</i> (2001) ³⁹³ Sweden	Prospective cohort with concurrent controls 418 physicians 4 years	Performance-based reimbursement	No	Quality of care; length of stay; job satisfaction cost awareness	Own index; hospital register Own questionnaire	Positive effect: Length of stay; cost awareness Negative effect: Quality of care
Armour <i>et al.</i> (2004) ³⁹⁵ USA	Retrospective 6749 patients 24 months	Influence of bonuses on Colorectal Cancer Screening	No	Increased chance of referring patient for colorectal cancer screening	Increased chance of referring patient for colorectal cancer screening: Routine data collection	Positive effect: Bonus eligibility significantly associated with physicians asking for more colorectal screening tests for patients No effect
Lee <i>et al.</i> (1999) ³⁹⁴ Canada	Retrospective 582 patients 3 years	Primary care physician payment: Salary vs FFS	No	Number and cost of specialist diagnostic services and medicines No. of days in hospital Causes of death	Number and cost of specialist diagnostic services and medicines: Routine data collection No. of days in hospital: Routine data collection Causes of death: Routine data collection	

It may also have been prevented by the potentially limited number of relevant studies and the heterogeneity of their interventions and outcomes, as demonstrated by this sample. Tellingly, there are also no distinct meta-analyses of employee involvement in the HRM literature of the non-health sector.

Details of studies

Five studies met the inclusion criteria (*Table 37*). Three studies were published in English and two in German. The earliest was published in 1999. Two studies were conducted in the USA and three in Germany. All of the studies in this sample used a prospective design. The studies varied in duration, from 6 months to 5 years. The sample sizes ranged from 97 to 826 patients. However, in one study the sample size was not given. In all but one case, the studies focused on a similar unit of analysis, either an ICU or an equivalent ward or medical department.

HRM practice

These five studies all examined quality circles or an equivalent body, such as a continuing quality improvement committee. In four cases this was the only intervention and, in the fifth, quality circles constituted one component of a broader quality management system. All but one of the interventions was aimed at both physicians and nurses. These studies have much in common with the research examining performance management interventions because three of the five monitor or measure compliance with designated practices. In one study, the specific function of the quality circle was to monitor implementation and pursue actions to improve it.³⁹⁶

Outcomes

With the exception of mortality and length of stay, which were considered by two papers, the outcomes considered by the five studies of quality circles were all different, and ranged from co-worker satisfaction to treatment outcomes such as patient complications.

Results

These quality circles consistently led to significant positive outcomes in four of the five studies.³⁹⁶⁻³⁹⁹ In the other study, the intervention had no significant effect on the majority of the outcomes and a small positive effect on one only: satisfaction with service provided by the receptionist.²⁶¹ All of the studies used a prospective cohort design, mostly with historical controls, so there is nothing to choose between them in terms of study methodology.

Omissions

None of the studies reported here took primary or community care practices as its unit of analysis and only one staff outcome was measured by any of these studies. No study controlled for any staff variables and none examined staff psychological or behavioural variables as moderators or mediators of the relationships being evaluated. Waiting times was the only principal patient care outcome not considered by one or more of these studies.

Summary

There is a distinct grouping of employee involvement studies in the longitudinal literature relating to the health sector: quality circles. This intervention was found to have a consistently significant and positive effect on a range of different patient outcomes.

Performance management

All of these studies consider interventions or practices that evaluate and feed back on the performance of health professionals. A narrative synthesis is preferred here despite the homogeneity of some clusters of studies in this sample. No systematic reviews of performance management in the health sector were found, but there are several meta-analyses of performance management in the non-health sector HRM literature. These cover feedback,^{400,401} goal setting⁴⁰¹ and supervisor ratings.^{402,403}

Details of studies

Seven studies met the inclusion criteria (*Table 38*). All of the studies were published in English, with the earliest being published in 1991. Four studies were conducted in the USA, two in Argentina and one in Taiwan. All studies used prospective designs. The studies varied in duration, from 12 months to 5 years. The sample sizes ranged from 300 physicians or 800 to 1411 patients, with the sample population being determined by the study outcome. However, in three cases the sample size was not given. All of the studies focused on a similar unit of analysis, either an ICU or an equivalent ward or medical department.

HRM practice

The seven studies all examined feedback. Five of the seven studies examined this in combination with some form of education or training, while two concentrated solely on the practice of feedback to staff. The type of training differed between the different studies. It ranged from formal education programmes focusing on technical skills, such as catheter care, to informal

TABLE 37 Employee involvement

Study, country	Design, sample size, duration	Intervention(s)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Forster et al. (2000) ³⁹⁷ Germany	Prospective cohort with concurrent controls Unknown 20 months	Continuous quality improvement strategy: Quality circles	Reports on partial or full implementation but no details of measure Yes, gives percentage implementation of quality measures decided at quality circles, but no details about the measurement	Infection rates Patient satisfaction (p. 362); co-worker satisfaction with waiting times but not significant	Routine data collection	Positive effect: Infection rates reduced No effect: In three or four measures, only difference in care by receptionist
Fischer et al. (2002) ²⁶¹ Germany	Prospective cohort with historical controls 200 patients 6 months	Quality circles		Time needed for radiological and sonographic check-up Duration until performance of cranial computerised tomography Delayed diagnoses Times for transfusion, emergency operations and, haemorrhagic shock, craniotomies Mortality: No details	Patient satisfaction (p. 362): Survey, ordinal scale: Care at reception, acceptability of waiting time, care by investigating health personnel, overall impression of stay in the department Co-worker satisfaction (p. 362): Survey, ordinal scale: Acceptability of appointment allocation, waiting time of patients in department, waiting time for written results	Significant reductions in waiting times for processes and in mortality rates
Ruchholtz et al. (2001) ³⁹⁶ Germany	Prospective cohort with historical controls 447 patients 16 months	Ongoing quality management system comprising: Protocol for documentation Criteria for assessment of teaching quality Regular analysis of teaching quality Quality circles	Yes – no formal measure but quality circles meet at four points during study to evaluate and suggest improvements – a form of fidelity implementation monitoring for routine practices	Time needed for radiological and sonographic check-up Duration until performance of cranial computerised tomography Delayed diagnoses Times for transfusion, emergency operations and, haemorrhagic shock, craniotomies Mortality	Time needed for radiological and sonographic check-up: No details Duration until performance of cranial computerised tomography: No details Delayed diagnoses: No details Times for transfusion, emergency operations and, haemorrhagic shock, craniotomies: No details Mortality: No details	Positive effect: Significant reductions in waiting times for processes and in mortality rates

Study, country	Design, sample size, duration	Intervention(s)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Kyriacou et al. (1999) ³⁹⁸ USA	Prospective cohort with historical controls 826 patients 5 years	Administrative interventions implemented by a special interdepartmental continuous quality improvement committee	No	Patient care efficiency (length of stay)	On-site data collection	Positive effect: Administrative interventions significantly reduce length of stay
Leiniger (1999) ³⁹⁹ USA	Prospective cohort with historical controls 97 patients 12 months	Quality circles: Multidisciplinary team meeting to discuss patients and address problems	No	No. of consultations; mortality; length of stay; no. of days from admission to operating room; discharge status; re-admissions; complications; comorbidities	No. of consultations: Routine data collection Mortality: Routine data collection Length of stay: Routine data collection No. of days from admission to operating room: Routine data collection Discharge status: Routine data collection Re-admissions: Routine data collection Complications: Routine data collection Comorbidities: Routine data collection None	Positive effect: Reduced mortality, LOS, appropriate use of consulting services, increase in numbers returning home
LOS, length of stay.						

instruction, handouts or monthly presentations. Each of these studies viewed this combination of interventions as additive rather than synergistic, and therefore not a bundle as understood by current HRM research.^{20,404,405} In only one study did the intervention have additional components, which included the posting of visual reminders and the use of penalties and incentives.³⁷⁵ However, the interventions were not all aimed at the same population of health staff: physicians and nurses were the target of the intervention in three studies, and either nurses or physicians alone were affected by the intervention in the two remaining studies. Of the two studies that examined the practice of feedback alone, one examined the outcome of infection rates, just like the education and feedback studies, but the other examined the impact on patient satisfaction of feedback to physicians. This is the only study of this type.

These studies are unusual because only one does not measure compliance with the practices described by the educational component of the intervention. The majority, therefore, seek to measure the fidelity with which at least part of the intervention or practice is being implemented. This is because this monitoring or surveillance is also part of the intervention: the feedback component is informed by the measurement of compliance. This is not a requirement for most HRM interventions.

Outcomes

In all cases, these studies measure only a single outcome. Six of the seven studies all examine in-hospital infection rates.^{373–376,406,407} However, only two studies examine the same type of infection, catheter-related UTIs.^{374,406} The types of infection studied by the remaining papers are all different, although measurement rates are usually the same or very similar. The one study that looks at a different outcome examined patient satisfaction.⁴⁰⁸

Results

In all cases, the interventions were found to have a significant positive impact on infection rates. All of these studies used a prospective cohort design with historical controls.

Omissions

These studies only focused on the performance management practice of feedback; other practices such as staff appraisals and goal setting were not evaluated. None of the studies were in emergency departments, primary or community care, or the local hospital. Also, other possible patient

outcomes have not been considered by the research in relation to this type of HRM intervention or practice, such as waiting times, mortality and length of stay, as well as patient safety indicators other than nosocomial infection rates. No staff outcome was measured by any of these studies, no study controlled for any staff variables, and none examined staff psychological or behavioural variables as moderators or mediators of the relationships being evaluated.

Summary

The interventions and outcomes considered by these studies were quite homogeneous and, even though the number of outcomes researched in relation to this intervention was extremely limited, this sample does suggest that the practice of feedback, both alone and in conjunction with education or instruction, can have a significant positive effect on infection rates, as well as patient satisfaction.

Conclusions

Longitudinal studies identified by the broad HRM and patient care outcomes literature search conducted for this review focus on a small number of distinct HRM practices.

These are:

- work design
- staffing
- compensation and rewards
- training
- employee involvement
- performance management.

Practices relating to staffing, especially the introduction, substitution or transfer of staff, as well as staff–patient ratios and working hours, account for more than one-half of the retrieved longitudinal studies of HRM and patient outcomes in the health sector. The systematic review and meta-analysis literature on the health sector reflects this balance, with the vast majority of such reviews examining research covering these practices.

There are several possible reasons for this focus on staffing and hours. It may be because a very high proportion of expenditure in health goes on staff, so policy-makers and researchers want to see how this resource is performing²⁹⁵ and, related to this, because the increasing pressure to contain costs generates interest in reducing staff expenditure,

TABLE 38 Performance management

Study, country	Design, sample size, duration	Intervention(s)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Rosenthal <i>et al.</i> (2004) ³⁷⁴ Argentina	Prospective cohort with historical controls 1301 patients 12 months	Education Performance feedback	Yes – compliance is measured	Catheter-associated UTI rate	Catheter-associated UTI rate: Number per 1000 catheter-days (p. 49)	Positive effect: Significant decrease in infection rates (compliance is a moderator)
Won <i>et al.</i> (2004) ³⁷⁵ Taiwan	Prospective cohort with historical controls 1411 patients 5 years	Education: Formal lectures, written instructions, informal instruction Posting of visual reminders Performance feedback: Routine monitoring and feedback Penalties and incentives	Yes – compliance is measured	Nosocomial infection rate	Nosocomial infection rate: Report by hospital infection control team	Positive effect: Significant decrease in infection rates (compliance is a moderator)
Rosenthal <i>et al.</i> (2003) ³⁷⁶ Argentina	Prospective cohort with historical controls 840 patients 26 months	'Education and training with CVC care' (p. 406) 'Performance feedback provided on a monthly basis documenting rates of compliance with [infection control practices]' (p. 406)	Yes – active surveillance and feedback (p. 409)	Rates of IVD BSI	BSIs per 1000 IVD-days (p. 408)	Positive effect: Significant decrease in infection rates after education, and further after feedback
Goetz <i>et al.</i> (1999) ⁴⁰⁶ USA	Prospective cohort with historical controls Unknown (number of catheter patient-days) 24 months	Feedback: 'quarterly report of catheter-related UTI rates' monitored by an infection control professional; nurse manager reviews results with staff (p. 402)	Yes – active surveillance and feedback (p. 402)	Catheter-related UTIs	UTIs per catheter patient-days	Positive effect: Significant decrease in number of UTIs

continued

TABLE 38 Performance management (continued)

Study, country	Design, sample size, duration	Intervention(s)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Speirer <i>et al.</i> (1994) ⁴⁰⁸ USA	Prospective cohort with historical controls 14,519 patients (T1) 5259 patients (T2) 24 months	Patient satisfaction survey (feedback) as a part of physician evaluation process	No	Improvement in patient satisfaction with participating doctors The overall quality of care The likeliness of the patient to recommend the physician to others	Patient satisfaction survey: Fallon Survey	Positive effect: Significant improvement in patient satisfaction across all departments
Kelleghan <i>et al.</i> (1993) ³⁷³ USA	Prospective cohort with historical controls Unknown 4 years	Feedback to physicians Education programme	Yes – monitoring and surveillance of compliance	Reduction in VAP	Reduction in VAP: Routine data collection of cases per 1000 ventilator-days	Positive effect
Nettleman <i>et al.</i> (1991) ⁴⁰⁷ USA	Prospective cohort with historical controls Unknown 27 months	Feedback to physicians Handouts Monitoring Monthly presentations	Yes – monitoring of compliance	MRSA rates	MRSA rates per 1000 patient-days	Positive effect

CVC, central venous catheter; IVD, intravascular device; VAP, ventilator-associated pneumonia.

(for example by replacing one type of worker with another who costs less).³²¹ Alternatively, this focus may be because the increasing numbers of patients using UK health services have an impact on staff workload, which may, in turn, affect the quality of patient care.³²⁰

This differs markedly from the non-health sector HRM review and meta-analysis literature, which has almost no meta-analyses at all on the skill mix of teams, staffing ratios or working hours. Instead, it focuses principally on practices that are covered much less by literature on the health sector, such as employee involvement^{391,401,409} and recruitment and selection.^{281,410,411} This review found only a small number of longitudinal studies looking at quality circles (employee involvement) in relation to patient outcomes. HRM practices or interventions relating to communication, family friendly working and harmonisation are other major categories for which no longitudinal studies from the health sector were identified by this review.

There is a great deal of heterogeneity among the studies reviewed in all of the categories. For example, the studies placed within the categories of pay, employee involvement and training are all very different in terms of both practices and outcomes, and this prevents anything but the most basic narrative synthesis. There is a greater degree of homogeneity among the studies under the categories of work design, performance management and staffing. Within these categories, some of the studies examine the same or very similar practices and may be grouped together. Once again, this probably reflects the greater

interest among health sector researchers in a small number of practices relating to staff skill mix and working hours. In some cases, these small groupings also measure the same outcomes (albeit rarely using the same or equivalent measures). However, with the exception of practices relating to skill enhancement, or the skill mix variables involving the introduction or substitution of staff, the number of studies contained in these groupings is often small, rarely larger than four or five. There are also often differences between these studies in terms of location, unit of analysis and study length. Such heterogeneity precludes the pooling of data for quantitative synthesis and means we must add a strong caveat to the drawing of conclusions from any narrative synthesis of these studies.

Interestingly, almost all of the studies identified in this review report neither negative nor adverse effects for any of the practices evaluated, which may suggest a degree of publication bias affecting the results. The interventions that appear to report the most consistent positive impact on patient and staff outcomes are training, performance management (feedback) and employee involvement (quality circles). Beneficial effects were found on infection rates, mortality, length of stay, patient satisfaction and staff knowledge. The many work design variables, such as the substitution or introduction of staff, skill enhancement, reduced working hours and the relocation of staff or services, produced more inconsistent results. In some studies these interventions had no effect (or no adverse effect), and only in a few cases were the effects positive, such as for the addition of new nurses or physicians.

Chapter 8

Impact of HRM practices in non-health settings

Introduction

This chapter reports on findings from a systematic review of the impact of HRM practices on intermediate and final outcomes in non-health sector settings. The findings address research questions under Objectives 5 and 6 of the review, specifically:

- *Objective 5:* 5.1 What is the evidence for the impact of HRM practices on the intermediate outcomes identified for this review?
- *Objective 6:* 6.1 Which HRM practices have an impact on performance outcomes?

This chapter gives details of the aspects of the review methodology specific to this review. Narrative syntheses for each of the HRM categories and data tables are then presented.

Review methodology

The broad approach to systematic review methodology adopted to identify the evidence presented in Chapters 6–8 is described in Chapter 2. This section describes aspects of the review methodology specific to this search.

Protocol development

Simple protocols were developed to guide the search, although some parameters were left open due to the lack of consistent definition/use of HRM terms in the literature. The population for the searches was identified as working adults and the intervention was determined as any HRM or personnel management practice. No comparison was specified, but a longitudinal filter was developed and used in the search. This ensured that the search was focused on causal relationships. No specific outcomes were stipulated.

The data extraction and synthesis was left open at this stage to allow development of a synthesis framework most fitting to the data retrieved. This approach is consistent with the latest developments in applying systematic review methodology to complex literatures.^{52,56,58,60,63}

Search strategy

Literature search strategies were developed and performed on Business Source Premier and PsycINFO; these two electronic databases have the most comprehensive coverage of peer-reviewed journals in the field of psychology and management. Search strings were modified for the different databases to take account of the different keywords and thesauri they use. Examples of the search filters and strategies can be found in Appendix 8.

The searching of electronic databases using pre-designed search filters was supplemented by reference tracking of selected studies. The titles, abstracts and full papers of studies identified by both electronic database searching and reference tracking were sifted using the following inclusion criteria.

Study selection

Sift criteria were developed by the team and piloted on a sample of titles and abstracts. Adjustments were made to improve specificity, and all titles and abstracts identified by the electronic searches and reference tracking were sifted by one team member, with 50% being sifted by a second reviewer. The inter-rater reliability, using κ -statistic, for the double-sifted articles was 0.92.

Unclear articles went to another team member for a second opinion. If still unclear, the full paper was retrieved for sifting.

The criteria identified papers as relevant to the review on the basis that they:

- were longitudinal in design
- included an intervention which could be described as some form of HRM practice, and
- evaluated the intervention on some form of outcome measure.

Studies were excluded if they were unpublished theses.

This not only acknowledged potential difficulties in obtaining these materials, but also, more

importantly, recognised that as these are not subject to peer review prior to publication they are likely to be small-scale and of generally poorer quality than those conducted by research teams.

Data extraction

A data extraction form was developed by the team and piloted on a sample of papers. Due to the heterogeneity of the literature the form focused on key data [e.g. study design, HRM practice, fidelity measure, outcome(s), specific outcome(s) measure(s)] and any additional references to be included in the sifting process. Data extraction was then completed by one reviewer. The first round of data extraction allowed the team to build a clear overview of the evidence base and assess its suitability for synthesis.

Data synthesis

As anticipated, there was much heterogeneity across the studies. However, it was concluded that narrative synthesis could be performed for most of the broad categories of HRM identified in Chapter 3. In some cases, the studies identified in a category clearly fell into distinct subthemes. Where this was the case, syntheses were performed on the smaller, more homogeneous group of studies.

The broad categories of HRM and subthemes are presented in *Table 39*.

Further data extraction was undertaken to support this synthesis including: sample size; study duration; moderators or mediators; and results.

Papers included in the review were assigned different categories based on the HRM practices that they investigated. Some papers have researched on more than one HRM practice and therefore such studies occur across different categories. Outcomes in these papers are both intermediate and final outcomes.

Results

A total of 1622 citations were identified from searches of electronic databases after de-duplication. Following screening for relevance, 1374 citations were rejected on the basis that they did not meet the sift criteria. Full papers were obtained for the remaining 248 citations. These 248 full papers were again subjected to inclusion criteria by three reviewers, which led to a further

TABLE 39 HRM categories and subclusters of studies in the non-health literature

	HRM category	No. of studies
1	Work design: Teamwork Job complexity Job demands and control Job rotation, enlargement and enrichment Role conflict/clarity	52
2	Staffing: Recruitment/selection Socialisation Working schedule	23
3	Training and development: Performance and skill enhancement training Career or employee development training Cultural sensitivity training Socialisation training to understand organisational culture TQM training	25
4	Compensation and rewards	29
5	Communication	5
6	Family friendly	9
7	Single status/status harmonisation/status differential	0
8	Employee representation/involvement/participation	8
9	Appraisal/performance management	25
10	Bundles/HPWPs	10

rejection of 119 papers. Data was extracted from the remaining 129 papers and these papers were also scanned for any potentially relevant references. This process of reference tracking led to the identification of 105 more papers of which 70 were rejected as they failed to meet the inclusion criteria. Data was extracted from the remaining 35 research papers and added to the data obtained from the 129 papers obtained through electronic database searches. Thus, the final synthesis is based on these 164 research papers.

Table 39 provides a summary of the studies included in the review. The QUOROM flow chart²⁸⁰ in *Figure 4* explains how many studies were rejected and at which stage, and the means by which included studies were identified.

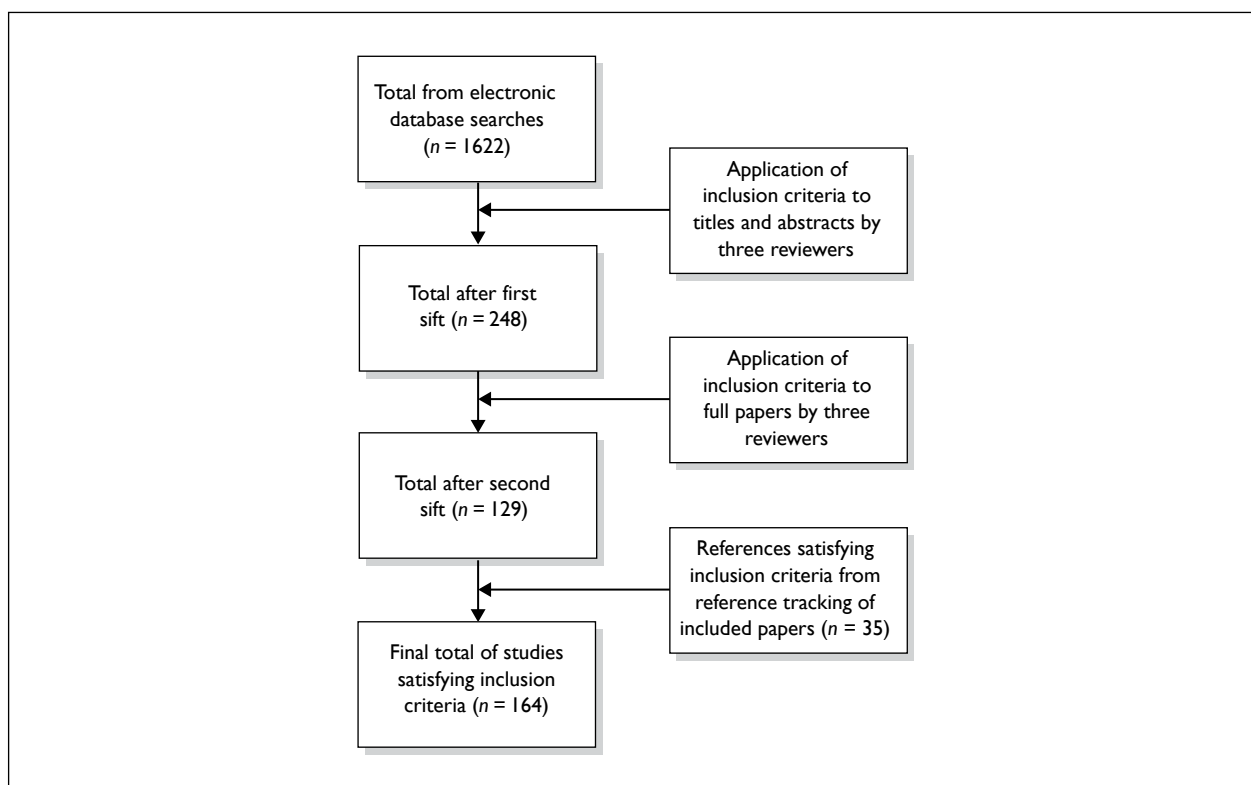


FIGURE 4 QUOROM flow chart for the review.

The remainder of the chapter presents the narrative synthesis of findings for each of the main HRM categories (or subclusters).

Work design

A total of 49 studies were identified under the broad HRM category of work design. The studies fell into distinct, heterogeneous clusters and syntheses under work design are presented as follows:

- teamwork
- job complexity
- job demands and control
- job rotation, enlargement and enrichment
- role conflict/clarity.

Teamwork

Studies on teamwork largely look at how autonomous or semi-autonomous teams can have a significant impact on certain work-related outcomes. Autonomous teamwork approaches propose that increases in work factors (e.g. variety, identity, significance, autonomy and feedback) are causally linked to work-related outcomes, such as motivation, job satisfaction and productivity. It

is conceptually similar to the job characteristics approach to job design proposed by Hackman and Oldham.⁴¹² The difference in the two approaches is the level at which the concepts of variety, identity, significance, autonomy and feedback are applied. The job characteristic model proposes the application of these principles at the individual work level; the autonomous teamwork model tries to implement the same variables at a group or team level in a bid to influence work-related outcomes.

Details of studies

Eight studies met the inclusion criteria (*Table 40*). All the studies were published in English, with three conducted in UK, two each in Australia and Canada, and one in USA. There were five studies with quasi-experimental methods, and three studies with a prospective longitudinal research design. The shortest time duration for a study was just 2 months, whereas the longest study was carried out over a period of 8 years. The sample size of these eight studies varied from 34 to 545 employees.

HRM practice/intervention

Four research papers investigated the impact of semi-autonomous or autonomous work groups.

TABLE 40 Work design (teamwork)

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Wall and Clegg (1981) ⁴¹³ UK	Quasi-experimental 34 employees 18 months	Practices: Semi-autonomous work groups Moderators/mediators: None	Yes	Performance Work motivation; job satisfaction; mental health; labour turnover	JDS for work motivation and job satisfaction (Hackman and Oldham 1975) ¹⁹⁵ GHQ, for mental health (Goldberg 1972) ⁴²⁰ Company records for performance and turnover data	Positive effect: All positive
Wall et al. (1986) ⁴¹⁵ UK	Quasi-experimental 545 employees 2.5 years	Practices: Autonomous work group Moderators/mediators: None	Yes	Group performance Work motivation; job satisfaction; organisational commitment; labour turnover; mental health	Work attitudes (Clegg and Wall 1981) ⁴²¹ GHQ (Goldberg 1972) ⁴²⁰ Labour turnover and performance: Factory records	Positive effect: Job satisfaction (Intrinsic) No effect: Work motivation Organisational commitment; Performance; Mental health Negative effect: Labour turnover
Cordery et al. (1991) ⁴¹⁸ Australia	Quasi-experimental 302 employees 20 months	Practices: Work design: Autonomous group working Multiskilling and appropriate training for additional skill acquisition Job rotation Compensation and rewards: A payment system based on number of multiple skills possessed rather than work performed Moderators/mediators: None	No	Job satisfaction; organisational commitment; trust in management; absenteeism; employee turnover		

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Pearson (1992) ⁴¹⁶ Australia	Quasi-experimental 327 employees 2 months	Practices: Semi-autonomous group working Moderators/mediators: None	No	Productivity Job motivation; job satisfaction; accidents Employee turnover; absenteeism	JDS for work motivation and Job satisfaction (Hackman and Oldham 1975) ¹⁹⁵ Productivity, accidents and absenteeism: Company data	Positive effect: Substantial impact of semi-autonomous working group practices on all the outcomes
Banker et al. (1996) ⁴¹⁷ USA	Quasi-experimental 41 employees 21 months	Practices: (as a result of relocation) High-performance work teams (characterised by decision-making authority, mandated team membership, information rich and expanded problem-solving domain) Moderators/mediators: Managerial policies: Workforce policies (overtime, headcount additions, headcount deletions) Policies affecting confusion in the factory (product diversity, product complexity, capacity utilisation, engineering change orders, adhesive experiment period on the gear train line)	No	Quality; labour productivity	Quality: Percentage of total units produced that were defective labour Productivity: Ratio of the number of units produced to total production hours	Positive effect: Both, quality and labour productivity improved
Kirchmeyer (1995) ⁴¹⁹ Canada	Prospective longitudinal 141 employees 14 months	Practices: Demographic (gender, age, minority status) similarity to work group Work group fit Supervisor support Mentor Moderators/mediators: None	No	Organisational commitment; turnover; promotion	OCQ (Mowday et al. 1982) ¹⁷³	Positive effect: A better work group fit had a positive impact on organisational commitment and led to reduced turnover Negative effect: Dissimilarity in terms of age, education, and lifestyle led to poor integration with the work group, which in turn led to poor organisational commitment and high job turnover

continued

TABLE 40 Work design (teamwork) (continued)

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Armstrong-Stassen <i>et al.</i> (2004) ⁴¹⁴ Canada	Prospective longitudinal 159 employees 2 years	Practices: Work group membership stability Downsizing Moderators/mediators: None	No	Job performance Job satisfaction; job security; job involvement; perceived justice; employee morale	Job satisfaction: Part developed from Hackman and Oldham (1974), ⁴²² JDS Job security: Jick's Job Security Index (1979) ⁴²³ Job involvement: Lodahl and Kejner (1965) ⁴²⁴ Perceived Justice: Moorman <i>et al.</i> (1998) ⁴²⁵ Perceived Justice Scale Employee morale: Scale devised by the authors for the study	Positive effect: Survivors in the moderate change group reported a significant increase in job satisfaction, job performance, and employee morale at the completion of downsizing Negative effect: Survivors in the intact work-groups (stable) reported lowest levels of job satisfaction, and perceived job security
Coupland <i>et al.</i> (2005) ⁴²⁶ UK	Prospective longitudinal 401 employees 8 years	Practices: Team working Moderators/mediators: None	No	Change of attitude (us-and-them work relationship)	Discourse analysis	Positive effect: New working role did undermine traditional 'then' and 'us' loyalties to some extent Negative effect: Despite of the observed positive effects, overall the whole team working initiative was looked upon with cynicism as the workers felt that little substantial had been done in reality

GHQ, General Health Questionnaire; OCQ, Organisational Commitment Questionnaire; JDS, Job Diagnostic Survey.

Other practices investigated in this section were the impact of work group fit, high-performance work teams, work group stability, and team working, as opposed to individual work arrangements.

Outcomes

A range of outcome variables was measured in these studies. The most frequently studied type of outcome variable in relation to teamwork was some form of performance measure (e.g. individual/team performance, quality or productivity), with five of the eight studies investigating at least one of these.

All other outcome variables in the studies included here were employee centric, such as motivation, job satisfaction, organisational commitment, employee turnover, absenteeism, morale, change in employee attitude and mental health.

Job satisfaction was the most studied employee-centric outcome, with five of the eight studies measuring how it changed with the implementation of one form of teamwork or another. Job turnover was the next most commonly studied outcome, with four studies investigating it as an outcome of group work. Other variables were studied by one or two papers.

Results

There was some support for improved team and individual performance under autonomous or semi-autonomous teamwork, with two out of three studies arriving at this conclusion.^{413,414} One study failed to find any such significant relationship.⁴¹⁵ Both quality and labour productivity were also found to have improved as a result of introducing high-performance work teams, characterised by decision-making authority, mandated team membership, and an expanded, information rich, problem-solving domain.^{416,417}

There was very strong support for the positive impact of work teams on job satisfaction, with all five studies coming to this conclusion.^{413–415,418}

Five studies investigated the impact of work teams on job turnover and the results were equivocal, with three studies finding support for the positive impact of team working on job turnover,^{413,416,419} whereas two other studies found team working to have a negative impact on employee turnover.^{415,418} Kirchmeyer⁴¹⁹ found that a better work group fit had a positive impact on organisational commitment and led to reduced turnover, whereas dissimilarity in terms of age, education and lifestyle led to poor integration with the work group, which,

in turn, led to poor organisational commitment and high job turnover. A similar finding was reported for the link between organisational commitment and work teams, with employees showing high commitment if they worked in teams with similar demographics.⁴¹⁹

Mixed results were found for the relationship between team working and absenteeism. One study found work teams to exert a positive impact on absenteeism,⁴¹⁶ but the study by Cordery *et al.*⁴¹⁸ found a negative impact of teamwork on absenteeism.

Omissions

The longitudinal studies on work teams largely concentrated on performance outcomes or employee-centric outcomes. There were virtually no longitudinal studies that investigated how, or if, team working can lead to learning outcomes for employees. There are also no longitudinal studies included here that explore the impact of working in teams on the financial bottom line of a firm or business unit.

Summary

There were eight studies on teamwork and its impact on various work-related outcomes, with one-half of the papers concentrating on semi-autonomous or autonomous teams. Most of these studies have explored the impact of autonomous team working on performance, quality or productivity issues. Almost all the studies found these two variables to be positively linked.

The relationships of work teams with job turnover and absenteeism were not so straightforward. Some studies found teamwork to have a positive impact on both factors, whereas others found them to have a negative impact. There was some evidence of this relationship being moderated by group and demographic fit.

The studies in this area mostly focused on performance and employee-centric outcomes and there were no longitudinal studies investigating the impact of work groups on learning and growth of employees.

Job/task complexity

Studies of job/task complexity focused on two aspects of complexity:

- *Psychological* complexity refers to the psychological dimensions of tasks, for example variety and perceived job scope. It is a more

subjective measure of job complexity and has been measured using tools such as the JDS developed by Hackman and Oldham.¹⁹⁵ Such an approach to job/task complexity has often been equated with the concept of job enrichment.⁴²⁷

- *Task-person* job complexity refers to tasks that can be objectively classified as simple or complex, based on the mental demands that a given job places on the person and the extent of education, skill or training required on the part of the person to do that job.⁴²⁸

Details of studies

Three studies met the inclusion criteria (Table 41). All of the studies were published in English, with two being conducted in the USA and the one in Finland. The first study was quasi-experimental, with retrospective analysis of the impact of certain HRM practices on the given outcome. The remaining two studies used a prospective longitudinal design. The quasi-experimental study was conducted over 10 years, whereas the other two studies were conducted over 7 and 4 years, respectively. The sample sizes of the three studies were 174, 110 and 672 employees, respectively.

HRM practice/intervention

The three studies in this synthesis had distinct concepts of job/task complexity. However, the studies can be broadly classified as using either psychological or task-person complexity as a variable in their investigations. One study examined only task-person complexity, one study used only psychological complexity, and one study looked at both task-person and psychological complexity.

In the first study, by Kalimo *et al.*⁴²⁹ psychological task complexity was studied as one of the many variables, measured using the Occupational Stress Questionnaire (OSQ).⁴³⁰ This study used personal resources (sense of coherence, self-esteem and sense of competence) as moderators of the impact of task complexity and other predictors on employee burnout.

The second study, by Schaubroeck *et al.*,⁴²⁸ investigated the impact of both psychological task and task-person complexity, as moderated by the impact of an individual's personality (type A or type B) on his/her cardiovascular health. The third study in this analysis, Blau,²³⁶ investigated the impact of task complexity – varying on a scale from

routine or simple tasks to complex tasks – on job satisfaction. Other than task complexity, this study also included wages and performance appraisal satisfaction as predictors for the given outcome.

Outcomes

All three studies used different employee-centric outcomes, for example employee burnout, employee cardiovascular health, and employee job satisfaction, as dependent variables.

Results

None of the three studies investigated the impact of job/task complexity directly. The studies all examined the interaction of job/task complexity with other variables, or study job/task complexity as a moderator in the analysis.

The studies by Kalimo *et al.*⁴²⁹ and Schaubroeck *et al.*⁴²⁸ concluded that the impact of job complexity was moderated by, or interacted with, the personal resources and personality type of an individual to determine how it would impact on an individual's health. The study by Kalimo *et al.*⁴²⁹ found that higher job complexity was associated with lower burnout. The other variables that helped prevent burnout were appreciation of work, feedback and role clarity. They concluded that sense of coherence (SOC) was the most important personal determinant of burnout and individuals with high SOC were significantly more resistant to burnout than those with low SOC. Schaubroeck *et al.*⁴²⁸ found that job complexity (both types) interacted with employee personality type (types A and B) to impact on cardiovascular health. They concluded that high job complexity for type B individuals leads to low cardiovascular disorders, whereas high job complexity for type A individuals leads to high cardiovascular disorders.

The study by Blau²³⁶ used task responsibility as a construct and measured it as a continuum ranging from routine to complex tasks. He concluded that task complexity was significantly positively related to job satisfaction. Besides task complexity, he found both higher wages and satisfaction with supervisory performance appraisal to be significant determinants of employee job satisfaction.

Omissions

All studies have focused on employee-centric health-related outcomes, for example burnout and cardiovascular health, or on psychological outcomes, such as job satisfaction.

TABLE 41 Work design (job complexity)

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Kalimo et al. (2003) ⁴²⁹ Finland	Quasi-experimental 174 employees 10 years	The following work characteristics were studied using the OSQ ³ : Job complexity Autonomy; role clarity; support from supervisor; organisational climate; cooperation; work appreciation; work hazards; feedback; time pressure Moderators/mediators: Personal resources: SOC; self-esteem; sense of competence	No	Employee burnout	MBI-GS; Schaufeli et al. (1996) ⁴⁸⁸	<i>Positive effect:</i> Higher job complexity was found to be associated with lower burnout Other variables that helped prevent burnout were appreciation of work, feedback and role clarity <i>Negative effect:</i> Best predictors of burnout were: Changes in support from superior Changes in cooperation Changes in work appreciation
Schaubroeck et al. (1994) ⁴²⁸ USA	Prospective longitudinal 110 employees of fire and police departments 7 years	<i>Practices:</i> Job complexity Psychological complexity Task-person job complexity (DOT complexity) <i>Moderators/mediators:</i> Personality (type A vs type B)	No	Cardiovascular disorder	Cardiovascular disorder was measured using the cardiovascular system subscale of the medical history instrument developed by House (1980) ⁴³²	Job complexity (both types) interacted with employee personality type (type A and B) to have an impact on his/her cardiovascular health <i>Positive effect:</i> High job complexity for type B individuals leads to low cardiovascular disorders <i>Negative effect:</i> High job complexity for type A individuals leads to high cardiovascular disorders
Blau (1999) ²³⁶ USA	Prospective longitudinal 672 medical technologists 4 years	<i>Practices:</i> Task responsibility (measured as a continuum ranging from routine/simple to complex tasks) Wages Performance appraisal satisfaction <i>Moderators/mediators:</i> None	No	Job satisfaction	Job satisfaction: JDS (Hackman and Oldham 1975) ⁴⁹⁵	<i>Positive effect:</i> Task complexity had a significantly positive impact on job satisfaction Higher wages and satisfaction with performance appraisal also had positive impact on job satisfaction <i>Negative effect:</i> Routine task had a significantly negative impact on job satisfaction

DOT, Dictionary of Occupational Titles; MBI, Maslach Burnout Inventory – General Scale.

a Elo A-L, Leppanen A, Lindstrom K, Ropponen T. OSQ. *Occupational Stress Questionnaire: User's Instructions*. Helsinki: Institute of Occupational Health; 1992.

Summary

These studies used the concept of job/task complexity in two ways: psychological complexity of jobs, i.e. jobs higher or lower on the five dimensions of job scope, as defined by Hackman and Oldham,⁴³¹ or jobs higher or lower on task–person complexity, as determined by some objective criteria of a job being simple or complex. Overall, the studies seem to suggest that either:

- Task complexity interacts with other variables, for example, individual personality factors, to have impact on given outcomes; or,
- The effects of task complexity are moderated by variables, such as an individual's personal resources including SOC, self-esteem and sense of competence.

Job demands and control

The studies in this section investigated how demands and control at work can have important consequences for various work-related outcomes. Most of these studies have tested Karasek's demand–control model⁴³³ in one form or another. Studies examined various aspects of job demands: physical, psychological, workload, monitoring and complexity. Control has been studied as decision control, skill discretion, degree of autonomy and predictability.

Details of studies

Thirteen studies met the inclusion criteria (*Table 42*). All of the studies were published in English. Five were conducted in the Netherlands, four in the UK, two in Denmark and one each in Sweden and Hong Kong. Five of the 13 studies had a quasi-experimental design and the remaining eight studies were of prospective longitudinal design. The majority of studies (8 out of 13) were conducted over a 12-month period or less. The shortest time duration for a study was just 1 month, whereas the longest was carried out over 5 years. Sample size varied from 144 to 11,799 employees.

HRM practice/intervention

All of the studies in this section investigated the impact of work demands and individual levels of control. The majority of studies (8 out of 13) measured some form of social support at work as a potential moderator of the demand–control relationship. Locus of control (LOC)/personality was used as moderator by two studies, and one study each used work values (traditional versus modern) and extent of predictability (being informed of future events at work) as moderating variables.

Outcomes

All 13 studies have used employee-centric outcomes (e.g. job satisfaction, absenteeism, turnover and work motivation) as dependent variables. The majority of studies also measured employee health-related outcomes, including mental health, occupational stress, psychological well-being, self-rated health, perceived strain, emotional exhaustion, anxiety, depression, immune functions and cardiovascular health.

Job satisfaction was the most frequently studied outcome, with five studies investigating how demands and control have an impact on employee job or work satisfaction.

Two studies investigated the impact of demands and control on employee learning outcomes, such as skill utilisation, self-efficacy and motivation to learn.

Results

The studies on job demands and control have used Karasek's⁴³³ demand–control model as a starting point to investigate how various combinations of demand and control impact on given outcomes.

Of the five studies that investigated the impacts of demands and control on job satisfaction, two concluded that high demands and low control lead to poor job satisfaction,^{233,434} two studies found that high control led to higher job satisfaction,^{435,436} and one study failed to find any impact for high control on job satisfaction.²²⁹

Absence was another outcome that was found to respond well to high job control. Three studies concluded that high job control leads to lower absence.^{229,437,438} The study by Smulders and Nijhuis⁴³⁷ concluded that high job demands, when coupled with high control, can lead to low absence.

Job turnover was found to be negatively associated with high demands, but high control was not found to have any significant relationship with employee turnover.^{229,439}

All of the health and psychophysiological outcomes were found to be negatively related to high job demands with low control, and to respond well to enhanced job control.

Two studies that explored the relationship of demands and control on employee learning and self-efficacy concluded that increased control leads

TABLE 42 Work design (job demands and control)

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Johnson <i>et al.</i> (1996) ⁴⁴² Sweden	Quasi-experimental 11,799 employees 4 years	<i>Practices:</i> Work control (a 12-item scale measuring decision authority and skill discretion on the job) Psychological demands (time pressure and extent to which the job was mentally strenuous) Physical job demands: job hazards; work social support <i>Moderators/mediators:</i> None	No	Cardiovascular disease mortality or risk	Mortality data were obtained from National Death Registry	<i>Positive effect:</i> Higher psychological demands were found to be associated with lower cardiovascular disease mortality or risk of it <i>Negative effect:</i> Men exposed to lower control jobs had a substantially elevated risk for cardiovascular disease mortality relative to men with a work history of high-control jobs
Moyle and Parkes (1999) ⁴³⁶ UK	Quasi-experimental 175 employees 7 months	<i>Practices:</i> (as a result of relocation) Demand and control (an adaptation from Karasek (1979), ⁴³³ the scale had seven items concerning pace and challenge of work demands and eight items concerning decision latitude and discretion at work Managerial support <i>Moderators/mediators:</i> Extraversion, neuroticism and social desirability; personality (type A/B); LOC	No	Strain indicators: 1. Job satisfaction 2. Psychological distress 3. Physical symptoms of strain	Job satisfaction: 10-item measure Psychological distress: 12-item GHQ-12 (Goldberg 1978) ²³⁹ Physical symptoms: Seven-item symptom scale	<i>Positive effect:</i> Perceived control and high managerial support buffered the negative impact of work relocation <i>No effect:</i> Job demand had no effect on perceived strain
Holman and Wall (2002) ⁴⁴⁰ UK	Quasi-experimental 144 employees 12 months	<i>Practices:</i> Work characteristics: job control; job demands <i>Moderators/mediators:</i> None	No	Learning-related outcomes: Skill utilisation; self efficacy Strain: Anxiety; depression	Skill utilisation: O'Brien (1986) ⁴⁴³ Self-efficacy: Axtell <i>et al.</i> (2000) ⁴⁴⁴ Strain: Warr (1990) ⁴⁴⁵	<i>Positive effect:</i> An increase in control is associated with decrease in depression; this effect is mediated through skill utilisation such that higher control leads to better skill utilisation, which, in turn, reduces depression

continued

TABLE 42 Work design (job demands and control) (continued)

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Nielsen <i>et al.</i> (2002) ²²⁹ Denmark	Quasi-experimental 2068 employees 5 years	<i>Practices:</i> Psychological demands Control (decision authority and skill discretion) Social support; meaning of work; predictability <i>Moderators/mediators:</i> None	No	Self-rated health; perceived stress; absence from work; job satisfaction; labour turnover	Job satisfaction: Marmot <i>et al.</i> (1991) ²⁴² Health: Setterlind and Larsson (1995) ⁴⁴⁶ Absence: Company data	<i>Positive effect:</i> Decision authority had positive impact on self-rated health, perceived stress and absence. Skill discretion had positive impact on health and absence but no impact on perceived stress <i>Negative effect:</i> Psychological demands had a negative impact on self-rated health
Nielsen <i>et al.</i> (2004) ⁴³⁸ Denmark	Quasi-experimental 1919 employees 2 years	<i>Practices:</i> Psychosocial workplace factors: (psychological demands; decision authority; predictability of work; skills; support from colleagues; supervisory support; meaning of work) <i>Moderators/mediators:</i> None	No	Absence	Company records	<i>Positive effect:</i> High level of decision authority and high predictability (being informed on future events at work) predicted lower absence rate
Daniels and Guppy (1994) ⁴⁴⁷ UK	Prospective longitudinal 244 employees 1 month	<i>Practices:</i> Job control (job autonomy and participative decision-making) Social support <i>Moderators/mediators:</i> LOC	No	Occupational stress; psychological well-being	Occupational stress was measured using a 18-item questionnaire, designed for the study by the authors Psychological well-being (Warr 1990, ⁴⁴⁵ and GHQ12 by Goldberg and Williams 1988 ⁴⁴⁸)	<i>Positive effect:</i> High job control and high social support had a positive impact on psychological well-being <i>Interaction effect:</i> LOC moderated the impact of job control and social support on psychological well-being in such a way that persons with internal LOC benefited more from high job control than persons with external LOC
Moyle (1998) ⁴³⁵ UK	Prospective longitudinal 148 employees 12 months	<i>Practices:</i> Demand and control Managerial support Role ambiguity <i>Moderators/mediators:</i> None	No	Mental health and job satisfaction (used as indices of strain)	Mental health: GHQ (Goldberg 1978) ²³⁹ Job satisfaction: 10-item scale adapted from Parikes (1993) ⁴⁴⁹	<i>Positive effect:</i> High control had a direct positive impact on job satisfaction Managerial support has a positive impact on job satisfaction and mental health <i>Negative effect:</i> High demand and low control had a negative impact on both concurrent and future mental health

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Smulders and Nijhuis (1999) ⁴³⁷ Netherlands	Prospective longitudinal 1755 employees 11 months	Practices: Job demands Job control Physical working conditions Moderators/mediators: None	No	Absence	Two measures of absence were used: 1. Absence rate: Days absent/100 calendar days 2. Absence frequency: No. of spells of absence/per year per person (irrespective of their duration)	Positive effect: Job control was significantly associated with low absence rate Job demands was also associated with low absence rate No effect: Neither job control nor job demand was associated with absence frequency
Jia et al. (2000) ⁴⁵⁰ Hong Kong	Prospective longitudinal 492 employees 12 months	Practices: Worker control: Includes job control and decision control; Measures: Smith et al. (1997) ⁴⁵¹ Job complexity; House (1980) ⁴³² Job demands; Includes job complexity, responsibility for others, workload and monetary pressure Moderators/mediators:	No	Immune functions; symptoms of respiratory illness	Blood test	Interaction effect: The relationship between decision control and poor health was stronger for more traditional employees than for less traditional employees. Also, job control interacted with job demands and job self-efficacy to predict health outcomes
de Jonge et al. (2001) ²³³ Netherlands	Prospective longitudinal 261 employees 12 months	Practices: Job demand Job autonomy Workplace social support Moderators/mediators: None	No	Psychological well-being: Emotional exhaustion; job satisfaction; work motivation	MBI (Dutch version 1993) ³ Scales for job satisfaction and work motivation were constructed by the authors	Positive effect: Workplace social support was positively related to job satisfaction Negative effect: Job demand was found to be negatively related to job satisfaction There was some weak but significant reverse causality between time 1 emotional exhaustion and time 2 perception of job demands such that higher exhaustion was related to perception of higher job demands No effect: Autonomy was not found to be related to the outcome variables

continued

TABLE 42 Work design (job demands and control) (continued)

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Taris <i>et al.</i> (2003) ⁴⁴¹ Netherlands	Prospective longitudinal 876 employees 12 months	<i>Practices:</i> Work characteristics: Perceptions of job control and job demands <i>Moderators/mediators:</i> None	No	Active learning: 1. Self-efficacy 2. Motivation to learn	Self-efficacy scale: Dutch adaptation of Personal Accomplishment scale by Maslach <i>et al.</i> (1996) ⁴⁵² Learning motivation scale was developed by the authors for this study	<i>Positive effect:</i> Job control had a lagged positive impact on active learning <i>Negative effect:</i> Job demand had a lagged negative impact on active learning
de Croon <i>et al.</i> (2004) ⁴³⁹ Netherlands	Prospective longitudinal 564 employees 2 years	<i>Practices:</i> Job demands and control (with jobs high on demands and low on controls being defined as 'stressful work') <i>Moderators/mediators:</i> Strain (defined in this study as 'need for recovery after work' and 'fatigue')	No	Voluntary turnover	Voluntary turnover data taken from company records	<i>Negative effect:</i> Jobs high on demands and low on controls (defined in the study as stressful work) had a negative impact on voluntary turnover Mediation analysis revealed that this relationship between stressful work and turnover was mediated through psychological fatigue
de Langeff <i>et al.</i> (2004) ⁴³⁴ Netherlands	Prospective longitudinal 668 employees 4 years	<i>Practices:</i> Job demands and job control Social support from supervisors <i>Moderators/mediators:</i> None	No	Mental health: Defined in the current study as comprising three variables: 1. Depression 2. Job satisfaction 3. Emotional exhaustion	Mental health Depression: 11-item version of the CES-D scale Job satisfaction: New single-item measure; Burnout: Seven-item dichotomous subscale of the MBI	<i>Negative effect:</i> High level of demand with low job control and poor social support led to poor mental health (higher depression, low job satisfaction and high emotional exhaustion) Also, there was a reciprocal relationship between job demands, social support and emotional exhaustion

CES-D, Center for Epidemiologic Studies Depression Scale; LOC, locus of control; MBI, Maslach Burnout Inventory.

a Schaufeli WB, Van Dierendonck D. The construct validity of two burnout measures. *Journal of Organizational Behavior* 1993;14:631–47.

to better skill utilisation and also has a positive impact on active learning.^{440,441}

Later adaptations of Karasek's⁴³³ model of demands and control include support as a third strand. This is reflected in the use of managerial support or social support measures in eight of the 13 studies. There was clear evidence in this set of studies for the positive impact of social support on all given outcomes when used in conditions of high job control.

Omissions

These 13 studies have covered a wide variety of health and employee-centric outcomes. However, there were no studies exploring how job demands and job control, in their various combinations, influence job performance, productivity or customer/client outcomes.

Summary

The results of the 13 studies meeting the criteria for inclusion in this review provided consistent evidence for the positive impact of increased job control and the negative impact of high demands on the given outcomes. Job satisfaction, absence behaviour and health outcomes in particular were positively influenced by higher control. A large proportion of these studies (5 out of 13) were quasi-experimental in design. Over one-half of the studies investigated the influence of managerial or social support as a variable alongside demands and control.

The studies in this area mostly focused on health and employee-centric outcomes and there were no longitudinal studies investigating the impact of demand and control on performance or productivity.

Job rotation, enlargement and enrichment

The concepts of job rotation, enlargement and enrichment are all suggested answers to the problems posed by job simplification.

- Job rotation involves doing more than a single type of repetitive task. The inherent logic of job rotation is to help break the monotony arising out of doing the same task repeatedly, also making the employee more versatile as he/she learns various other tasks. It does not, however, change the content of the job.⁴⁵³
- Job enlargement is intended to increase the breadth of activities that employees are

engaged in.⁴⁵⁴ It refers to horizontal expansion of the jobs, increasing the role responsibilities and range of activities being carried out by an employee.⁴⁵³

- Job enrichment leads to more holistic changes in job roles and responsibilities. In contrast with the horizontal expansion involved in job enlargement, job enrichment involves vertical expansion.⁴¹² An enriched work design means that employees have discretion to take on broader and more proactive tasks as and when required. It can be done by increasing employee responsibility, autonomy and regular feedback.

Details of studies

Twenty-one studies met the inclusion criteria (*Table 43*). All the studies were published in English, with eleven being conducted in USA, three in the UK, three in Canada, two in the Netherlands, and one each in Sweden and Israel. There were four studies with RCT designs, six studies used quasi-experimental methods, and eleven studies had a prospective longitudinal research design. There was huge variation in the duration of the studies in this section, with the shortest being just 2 months and the longest being 4.5 years. The sample size of these 21 studies varied from 31 employees to 80 manufacturing firms with between 60 and 1150 employees.

HRM practice/intervention

Authors used the terms job enlargement and job enrichment in their own distinct ways. Champion and McClelland⁴⁵⁵ used the terms 'task enlargement' and 'knowledge enlargement' as two types of job enlargement, with knowledge enlargement being conceptually similar to job enrichment. Therefore, the Champion and McClelland⁴⁵⁵ study has been included as a study of both job enlargement and enrichment. Parker⁴⁵⁴ used job enlargement as horizontal enlargement and job enrichment for jobs that were high on autonomy and control. Other variations of the use of the term job enrichment included high job stimulation, high motivating potential score (MPS), high authority and control, high job quality, high job scope, and high intrinsic motivating properties of the job.

There were two studies on job rotation: one analysed the impact of job rotation on psychophysiological stress reactions and musculoskeletal symptoms⁴⁵⁶ and one explored the impact on performance.⁴⁵⁷

TABLE 43 Work design (job rotation, enlargement and enrichment)

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Rissen <i>et al.</i> (2002) ⁴⁵⁶ Sweden	Experimental design 31 women employees 3–4.5 years	Practices: Job rotation Moderators/mediators: None	No	Psychophysiological stress reactions; muscle activity of the trapezius muscle; musculoskeletal symptoms in the neck and shoulders	SBP and DBP; heart rate; subjective experience questionnaire (self-report) – positive and negative arousal; urine samples EMG Use of surface electrodes	Positive effect: Job rotation had positive effects on muscle activity in the neck and shoulders; DBP was also significantly lowered; and self-report questionnaire indicated that job rotation was positively experienced by the employees No effect: Job rotation has no effect on several psychophysiological variables for example SBP, heart-rate, perceived negative arousal, and epinephrine; pain was only partially affected Positive effect: Knowledge enlargement (akin to job enrichment) had positive impact on satisfaction, mental workload, errors and led to better customer service Negative effect: Task enlargement led to more mental overload, greater chance of making errors, and lower job efficiency Positive effect: Job enrichment was positively associated with RBSE
Campion and McClelland (1993) ⁴⁵⁵ USA	Quasi-experimental 515 employees 2 years	Practices: Task enlargement; knowledge enlargement Moderators/mediators: None	No	Customer service Errors (as a measure of performance); job efficiency Satisfaction; mental load		
Parker (1998) ⁴⁵⁴ UK	Prospective longitudinal 459 employees 18 months	Practices: Job enlargement (measured as the horizontal range of the jobs) Job enrichment (measured as jobs high on autonomy and control) Communication; training (on quality management) Moderators/mediators: None	No	RBSE	RBSE scale was designed by the author	
Axtell and Parker (2003) ⁴⁵⁸ UK	Prospective longitudinal 94 employees 18 months	Practices: Job enlargement (measured as the horizontal range of the jobs) Job enrichment (measured as jobs high on autonomy and control) Communication; training (on quality management) Moderators/mediators: None	No	RBSE	RBSE scale was designed by the author	Positive effect: Job enrichment was positively associated with RBSE Negative effect: Job enlargement had a lagged negative impact on RBSE

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Locke <i>et al.</i> (1976) ⁴⁶⁶ USA	Experimental design 95 employees 14 months	Practices: Job enrichment Moderators/mediators: None	No	Productivity; absenteeism; turnover; complaints and disciplinary actions; attitudes	Outcomes for example absenteeism, turnover, complaints and disciplinary actions and productivity were taken from company records. Attitudes were measured using a 134-item questionnaire, which was designed for the study by the authors	Positive effect: Absenteeism, turnover and productivity were positively influenced by job enrichment No effect: No changes were observed in attitudes of the workers toward the work or the workplace
Orpen (1979) ⁴⁶⁰ USA	Experimental design 72 employees 6 months	Practices: Job enrichment Moderators/mediators: GNS; contextual satisfaction	No	Performance; productivity; work satisfaction; employee motivation; employee involvement; absenteeism; turnover	Performance and productivity: Supervisory ratings and actual company records Work satisfaction: Work subscales of Smith <i>et al.</i> 1969 ⁴⁴³ JDI Employee motivation: Six items of JDS: Hackman and Oldham (1975) ¹⁹⁵ Job involvement: Short six-item scale (Lodahl and Keijner 1965) ⁴²⁴ Absenteeism and turnover: Company records	Positive effect: Job enrichment had significant positive impact on each of the personal outcomes of job satisfaction, job involvement, and intrinsic motivation Rates of absenteeism and turnover also were significantly reduced following job enrichment Both, GNS and contextual satisfaction significantly moderated the relationship between job enrichment and personal outcomes. These two variables, however, were not significant moderators between job characteristics and work outcomes, i.e. job performance No effect: The results did not indicate significant effects for enrichment on work outcomes of performance and productivity
Hall <i>et al.</i> (1978) ⁴⁶¹ Canada	Quasi-experimental 153 employees 10 months	Practices: Change in job characteristics (job stimulation: a cumulative score for variety, identity, autonomy and feedback) due to organisational change Moderators/mediators: None	No	Perceived performance; perceived effort; psychological success; work satisfaction; job involvement; higher order need strength	Perceived effort, perceived performance and psychological success were measured using scales constructed by the authors for this study; work satisfaction was measured using JDI (Smith <i>et al.</i> 1969); ⁴⁴³ job involvement was measured using scales developed by Lodahl and Keijner (1965) ⁴²⁴ Higher order need strength was measured using the scale devised by Hackman and Lawler (1971) ¹⁹²	Negative effect: A decrease in job stimulation leads to decreased job involvement Organisational change (irrespective of it being perceived as resulting in high or low job stimulation) had negative impact on all outcomes No effect: Change in job stimulation has no effect on perceived effort, perceived performance, psychological success, work satisfaction or higher order need strength

continued

TABLE 43 Work design (job rotation, enlargement and enrichment) (continued)

Study, country	Design, sample size, duration	Practice(s)/interventions/moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Bhagat and Chassie (1980) ⁴⁶² USA	Quasi-experimental 65 employees 2 months	Practices: Change in work week from 5 days to 4 days a week to induce changes in perceived job characteristics as measured by the MPS of the job Moderators/mediators: Individual GNS	No	Attitudinal outcomes: Experienced meaningfulness of work; experienced responsibility for work outcomes; knowledge of results Affective responses: General satisfaction; intend work motivation; growth satisfaction; context satisfaction	Psychological states: JDS (Hackman and Oldham 1975) ¹⁹⁵ Affective responses: JDS	Positive effect: Enrichment (higher MPS) led to higher general satisfaction, growth satisfaction, internal work motivation, increased meaningfulness and responsibility for work No effect: Context satisfaction was unaffected by changes in MPS Interaction effect: High GNS employees responded more sensitively to changes in MPS
Griffin (1983) ⁴⁶³ USA	Experimental design 274 employees 3 years	Practices: Objective changes in task attributes to enhance job enrichment (task redesign); informational cues from supervisors: Feedback, variety, autonomy and identity Moderators/mediators: None	No	Productivity: Core task attributes; interpersonal task attributes; affective reactions: Intrinsic satisfaction; extrinsic satisfaction; overall satisfaction	Core task attributes and interpersonal task attributes: Job Characteristic Inventory (Sims et al. 1976) ⁴⁷² Affective reactions: Minnesota Satisfaction Questionnaire (Weiss et al. 1967) ⁴⁷³ Productivity: Average daily output	Positive effect: Both objective task attributes and supervisory cues influenced perception of core task attributes; interpersonal task attributes, and affective reactions to task attributes Objective task changes (towards enriched jobs) had a positive impact on productivity No effect: Supervisory cues had no effect on productivity
Bateman and Scrasser (1984) ²³⁵ USA	Prospective longitudinal 129 employees 5 months	Practices: MPS: Measured as a cumulative score from administration of JDS Job tension: Measured as comprising role conflict/ambiguity/overload Centralisation: A measure of participation/autonomy in decision-making Moderators/mediators: None	No	Job satisfaction and organisational commitment	Job satisfaction: JDI (Smith et al. 1969) ²⁴³ Organisational commitment: Porter et al. (1974) ²⁴⁴	Positive effect: MPS has a positive impact on job satisfaction No effect: MPS (enrichment) has no significant effect on organisational commitment

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Griffin (1991) ⁴⁶⁴ USA	Quasi-experimental 564 employees 4 years	Practices: Job enrichment (through enhancement of responsibility, authority and accountability; increased feedback) Moderators/mediators: None	No	Performance: Task perceptions (MPS score); job satisfaction; organisational commitment; absenteeism; propensity to quit	JDS (Hackman and Oldham, 1975) ¹⁹⁵ Minnesota Satisfaction Questionnaire (Weiss et al. 1967) ⁴⁷³ Organisational commitment (Porter et al. 1974) ²⁴⁴ Propensity to quit (Seashore et al. 1982) ⁴⁷⁴ Performance was assessed through supervisor scores Absenteeism was taken from company records	Positive effect: Time 3 and 4 measures of performance were significantly (positive) related with the time 1 and 2 MPS of the job There was a significant increase in MPS, satisfaction, commitment, and performance over time No effect: There was no significant change in absenteeism and propensity to quit as a result of increased job enrichment
Morgeson and Campion (2002) ⁴⁶⁵ USA	Quasi-experimental 96 employees 2 years	Practices: Motivational job redesign (through increasing the identity and feedback properties of the job) Mechanistic job redesign (simple, uncomplicated, and repetitive) Moderators/mediators: None	No	Overall job satisfaction; training requirement; work simplicity		Positive effect: Motivational job design was positively related with job satisfaction and training requirements and negatively correlated with work simplicity Higher mechanistic job design led to less training requirement and made the work simpler Negative effect: Higher motivational design led to more training requirement and decreased work simplicity
Houkes et al. (2003) ⁴⁶⁷ Netherlands	Quasi-experimental 148 employees 12 months	Practices: Task characteristics (MPS of the job) Workload; social support; career expectations Moderators/mediators: None	No	Intrinsic work motivation; emotional exhaustion; turnover intention	Intrinsic work motivation: Warr et al. (1979) ⁴⁷⁵ Emotional exhaustion: MBI (Schaufeli et al. 1996) ¹⁸⁸ Turnover intention – four-item scale (Van Veldhoven and Meijman 1994) ⁴⁷⁶	Positive effect: MPS was found to have a positive impact on intrinsic work motivation

continued

TABLE 43 Work design (job rotation, enlargement and enrichment) (continued)

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Hammer <i>et al.</i> (1981) ⁴⁶⁹ USA	Prospective longitudinal 112 employees 2.5 years	Practices: Various job situation characteristics for example: Job involvement (high score indicating interest and involvement in job and a sense of pride and accomplishment: a concept, as per the authors, theoretically similar to enrichment); change of the financial ownership of the plant from private hands to the employees Moderators/mediators: None	No	Absenteeism (voluntary and involuntary)	Company records	No effect: There was no significant impact of job involvement on any form of absenteeism
Meyer <i>et al.</i> (1991) ⁴⁶⁸ Canada	Prospective longitudinal 104 employees 11 months	Practices: Job quality: Comprising a composite score from the following variables: Job challenge, participation, self-expression, personal importance, role clarity, feedback, confirmation of expectations Moderators/mediators: None	No	Organisational commitment (affective and continuance commitment)	Organisational commitment: Meyer and Allen (1984) ⁴⁷⁷	Positive effect: Job quality had a significant effect on affective commitment No effect: Job quality had no effect on continuance commitment
Barnett <i>et al.</i> (1995) ⁴⁷⁰ USA	Prospective longitudinal 210 employees 2 years	Practices: Job role quality Moderators/mediators: Gender	No	Psychological distress	Used items from 2 scales on psychological distress: Derogatis, (1975), ⁴⁷⁸ Barnett <i>et al.</i> (1993) ⁴⁷⁹	Negative effect: A decrease in job quality over time was related with an increase in psychological distress but this relationship was not affected by the gender
Krausz <i>et al.</i> (1995) ²⁵² Israel	Prospective longitudinal 146 employees 12 months	Practices: Job scope [measured using a -tem scale based on Hackman and Oldham's (1975) ⁹⁵ JDS scale] Moderators/mediators: None	No	Intention to leave	Self-made scale	Positive effect: High job scope led to low intention to leave

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Taris <i>et al.</i> (1998) ⁴⁷¹ Netherlands	Prospective longitudinal 593 employees 4 years	<i>Practices:</i> Intrinsic job characteristics (comprising jobs high on variety, autonomy, opportunity to engage in meaningful tasks, and feedback) <i>Moderators/mediators:</i> Job change	No	Depression	Translation of Depression Adjective Checklist (Rooijen 1979) ⁴⁸⁰ and Lubin (1965) ⁴⁸¹	<i>Negative effect:</i> Intrinsic job characteristics and depression had a significant reciprocal negative effect on each other Job change did moderate the effect between time 1 depression and time 2 job characteristics
Blocher (1979) ⁴⁵⁷ USA	Prospective longitudinal 58 employees 5 years	<i>Practices:</i> Job rotation <i>Moderators/mediators:</i> None	No	Performance	Reviewer's overall evaluation of workers' performance, rated on an ordinal scale from 'superior' to 'needs improvement'	<i>Negative effect:</i> A lapse in performance in consecutive assignments was observed for employees within the same industry <i>No effect:</i> No change in performance was observed for employees who rotated between assignments in different industries
Patterson <i>et al.</i> (2004) ³⁴ UK	Prospective longitudinal 80 firms (varying in size between 60 and 1150 employees) 2 years	<i>Practices:</i> Integrated manufacturing and empowerment (job enrichment, skill enhancement advanced manufacturing technology, total quality management, JIT inventory control) <i>Moderators/mediators:</i> Productivity	Yes	Performance (productivity and profitability)	Audited government records Productivity – measured as the logarithm of the financial value of net sales per employee (see Huselid 1995) ¹⁸ Profit: Measured as the financial value of sales less costs per employee, before profits tax	<i>Positive effect:</i> Job enrichment and skill enhancement have a positive impact on both productivity and profitability Productivity is a mediator of the relationship between job enrichment and profitability and skill enhancement and profitability
Laschinger <i>et al.</i> (2004) ⁴⁵⁹ Canada	Prospective longitudinal 185 employees 4 years	<i>Practices:</i> Structural empowerment <i>Moderators/mediators:</i> Psychological empowerment	No	Satisfaction	Four-item global measure of job satisfaction adapted from Hackman and Oldham's (1975) ¹⁹⁵ JDS	<i>Positive effect:</i> Perceptions of increased structural empowerment resulted in improved job satisfaction and increased perceptions of psychological empowerment Psychological empowerment did not mediate the relationship between structural empowerment and job satisfaction

DBP, diastolic blood pressure; GNS, growth need strength; MBI, Maslach Burnout Inventory; SBP, systolic blood pressure.

Three studies investigated the combined effect of job enlargement and job enrichment.^{454,455,458} Sixteen studies investigated the sole impact of job enrichment on various outcomes.

Outcomes

All of the studies on job rotation, enlargement and enrichment studied outcomes that can be broadly classified in three categories: outcomes related to customer service/satisfaction, outcomes related to both individual and organisational performance/productivity, and employee-centric outcomes, including absenteeism, turnover, motivation, involvement, organisational commitment, job satisfaction, effort, depression, role breadth self-efficacy (RBSE) and other employee attitudes.

- The studies on job rotation had physiological, psychophysiological and performance outcomes as their predicted variables.^{456,457}
- There was only one study that investigated the impact of job enlargement (knowledge enlargement) on customer service.⁴⁵⁵
- The studies on job enrichment looked at a relatively large number of outcome variables. Job satisfaction was the most frequently studied, with nine studies investigating it as a predicted outcome.^{235,450,459–465}
- Employee turnover or intention to leave was investigated by four studies.^{252,460,464,466}
- Individual performance, productivity, motivation, absenteeism and commitment were studied by five studies each.^{34,235,455,460–464,466–469} One study³⁴ examined the impact of job enrichment on organisational performance (company productivity and profitability).
- Two studies studied the impact of job enlargement and job enrichment on RBSE.^{454,458}
- Two studies explored the impact of job enrichment on job involvement and positive employee attitudes.^{461,462}
- Effort, psychological distress and depression were investigated by one study each.^{461,470,471}

Results

Job rotation was found to have a clearly beneficial impact on certain psychophysiological stress reactions, for example diastolic blood pressure and self-reported positive experience of the job. It also had a positive impact on muscle activities in the neck and shoulder. However, job rotation had no impact on other psychophysiological reactions of systolic blood pressure, heart rate and perceived negative arousal.⁴⁵⁶ Blocher⁴⁵⁷ found a lapse in performance over time for audit staff at senior

level if the seniors were assigned consecutively within a particular industry, whereas no lapse in performance was observed for those seniors who rotated between assignments in different industries.

Studies investigating job enlargement and enrichment found a positive impact on RBSE^{454,458} but a negative impact on workload, i.e. workload increased.⁴⁵⁵

Knowledge enlargement was found to have a positive relationship with customer services.⁴⁵⁵

Researchers investigating the impact of job enrichment on various outcomes were unanimous in their conclusion that it is a desirable intervention, which works quite well for some outcomes but has less straightforward results for others. Of the nine studies that investigated job satisfaction, eight found it to be positively influenced by job enrichment^{235,455,459,460,462–465} and only one study had a no-effect result.⁴⁶¹ Job enrichment was also found to enhance employee motivation and involvement by all the studies that investigated these links.^{460,462,467}

Lack of enriched job has also been found to lead to increased levels of psychological distress and depression.^{470,471}

Two studies found employee performance to be positively influenced by job enrichment,^{455,464} whereas two other studies failed to reach any such conclusion.^{460,461} With regards employee productivity, two research papers concluded that it is positively related with job enrichment^{463,466} whereas Orpen⁴⁶⁰ found productivity to be unaffected by job enrichment. The study by Patterson *et al.*³⁴ concluded that the extent of empowerment within companies predicted the subsequent level of company performance (both productivity and profitability) controlling for prior performance, the association between enrichment and profitability was mediated by productivity, suggesting that enrichment affected profitability through its effects on productivity.

More definitive results were obtained for the relationship between job enrichment and turnover, with three studies favouring a positive impact^{252,460,466} and one study failing to come to any such conclusion.⁴⁶¹

Of the three studies on absenteeism and job enrichment, two found a positive impact of

enriched jobs on absenteeism^{460,466} but one study failed to find any definitive relationship.⁴⁶⁹

Omissions

The studies on job rotation, enlargement and enrichment covered multiple outcome variables. The only significant omissions were the impact of job enrichment on outcomes related to learning and growth of employees. One would expect more research on these variables given both job enlargement and enrichment are conceptually proposed to enhance the skills and abilities of employees. However, no longitudinal research explored such tasks.

Summary

The 21 studies in this review investigated the impact of job rotation, enlargement and enrichment on various outcomes. There were two studies on job rotation, both of which find it to be beneficial. The three studies on job enlargement were consistent in their conclusion that job enlargement by itself has a negative impact on employees. The 16 studies on job enrichment and three on job enrichment and job enlargement indicated that job enrichment largely has a positive impact on all the outcomes, especially on job satisfaction, employee motivation, involvement and commitment. Some studies also found job enrichment to have a positive impact on other outcomes, for example, individual performance, customer service, job turnover or intention to leave, and depression. The impact of job enrichment on absenteeism was found to be positive by two studies but one study failed to find any such link. The role of job enrichment on job turnover or intention to quit was clearer, with three out of four studies indicating that enriched jobs lead to lower job turnover. One study found job enrichment to predict company productivity and profitability.

Overall, research in this field is dominated by investigation of the impact of job enrichment. There is comparatively little longitudinal research on job rotation or job enlargement per se.

Role ambiguity, role conflict and role clarity

Studies of role conflict and role ambiguity have typically treated these variables as dimensions of role stress, focusing on whether, for example, increased levels of role conflict or role ambiguity lead to increased role stress and, conversely, whether higher levels of role clarity lead to decreased role stress.

Details of studies

Seven studies met the inclusion criteria (*Table 44*). All studies were published in English. Four were conducted in the USA and the other three were conducted in the UK, Israel and Finland, respectively. The first six studies used a prospective longitudinal design and the seventh study was a quasi-experimental study using retrospective longitudinal analysis. Five of the studies in this category were conducted over a period of 1 year or less, one was carried out over 2 years, and one over a period of 10 years. The sample size of the studies varied from 111 to 661 employees.

HRM practice/intervention

Most studies in this synthesis treated role ambiguity as a stressor, with some even labelling it as such. Bateman and Strasser²³⁵ used a measure of role conflict and role ambiguity (along with role overload) as a measure of job tension, whereas Saks and Ashforth⁴⁸² and Kalimo *et al.*⁴²⁹ used it as a measure of an occupational stressor. None of the seven studies investigated the impact of role conflict or role clarity per se. Most of the studies considered it as one of a range of occupational role characteristics. Three studies investigated role conflict or role clarity in conjunction with other key characteristics of the job, for example the MPS for the job (as measured by JDS) or some components of MPS, such as autonomy or task significance. Other studies explored the impact of role conflict in conjunction with colleagues' or supervisors' support. Though these studies attempted some form of statistical control to understand the unique effects of role clarity or role ambiguity, only two studies presented moderated analysis of role conflict and role clarity with other variables. The study by Saks and Ashforth⁴⁸² investigated the moderating role of predispositions in the form of general self-efficacy (GSE) on role conflict, whereas the study by Fried *et al.*⁴⁸³ studied the role of job security as a moderator of role clarity.

Outcomes

Job satisfaction was the most commonly measured outcome variable, used in four out of seven studies. Two studies investigated organisational commitment and two studies used individual employee performance as the predicted variable. The other outcome variables studied in relation to role conflict or role clarity were mental health, intention to quit, frustration, stress symptoms and employee burnout.

TABLE 44 Work design (role conflict/clarity)

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Bateman and Strasser (1984) ²³⁵ USA	Prospective longitudinal 129 employees 5 months	Practices: Job tension: Measured as comprising role conflict/ambiguity/overload Motivating potential score: Measured as a cumulative score from administration JDS Centralisation: A measure of participation/autonomy in decision-making Moderators/mediators: None	No	Job satisfaction and organisational commitment	Job satisfaction: Job Descriptive Index (JDI); Smith et al. (1969) ²⁴³ Organisational commitment: Porter et al. (1974) ²⁴⁴	Negative effect: Job tension has a negative impact on job satisfaction No effect: Job tension has no significant effect on organisational commitment
Agho et al. (1993) ²³⁴ USA	Prospective longitudinal 405 employees 3 months	Practices: Role ambiguity; role conflict; role overload; autonomy; supervisory support; task significance; routinisation; pay Moderators/mediators: None	No	Job satisfaction	Job satisfaction: 6 items selected from 18 item index developed by Brayfield and Rothe (1951) ²⁴⁵	No effect: After controlling for effects of other variables, role ambiguity, role conflict and role overload had no effect on job satisfaction
Moyle (1998) ⁴³⁵ UK	Prospective longitudinal 148 employees 12 months	Practices: Role ambiguity; demand and control; managerial support Moderators/mediators: None	No	Mental health and job satisfaction	Mental health: GHQ (Goldberg, 1978) ²³⁹ Job satisfaction: 10-item scale adapted from Parke (1993) ⁴⁴⁹	Negative effect: Role ambiguity had a direct negative impact on job satisfaction No effect: Role ambiguity had no effect on mental health
Saks and Ashforth (2000) ⁴⁸² USA	Prospective longitudinal 231 employees 10 months	Practices: Stressors: Role conflict, role ambiguity and role overload Moderators/mediators: Predispositions (GSE)	No details	Individual job performance Adjustment to work: Measured by the following components: Job satisfaction Organisational commitment Organisational identification Intentions to quit Frustration Stress symptoms Performance	Job satisfaction: Cammann et al. (1983) ⁴⁸⁵ Organisational commitment: Allen and Meyer (1990) ⁴⁸⁶ Organisational identification: Mael and Ashforth (1992) ⁴⁸⁷ Intentions to quit: Colarelli (1984) ⁴⁸⁸ Frustration: Ashforth (1989) ⁴⁸⁹ Stress symptoms: Patchen (1970) ⁴⁹⁰ Performance: House et al. (1982) ⁴⁹¹	Positive effect: Stressors significantly predicted all outcomes Interaction effect: Role conflict interacted with GSE in a manner that person with high GSE had higher organisational commitment and organisational identification under conditions of high role conflict, whereas the opposite was true for persons with low GSE

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Bravo et al. (2003) ⁴⁹² USA	Prospective longitudinal 661 employees 24 months	Practices: Role conflict and role ambiguity; institutional socialisation tactics; co-worker relations; superior relations Moderators/mediators: None	No	Immediate and intermediate adaptive strategies	Used items from two scales: Bachman et al. (1978) ⁴⁹³ Career strategies inventory: Penley and Gould (1981) ⁴⁹⁴	Positive effect: Role conflict had a positive impact on immediate career-enhancing strategies Negative effect: Role conflict and role ambiguity were negatively related with intermediate career-enhancing strategies
Fried et al. (2003) ⁴⁸³ Israel	Prospective longitudinal 111 employees 10 months	Practices: Role clarity Moderators/mediators: Job security	No	Individual job performance	Supervisor ratings	Positive effect: Role clarity had a positive impact on employee job performance Interaction effect: Role clarity and job security interacted in a manner that increase in performance was maximised when both role clarity and job security were high, whereas deterioration in performance was maximum under conditions of high job security and low clarity
Kalimo et al. (2003) ⁴²⁹ Finland	Quasi-experimental design (retrospective analysis) 174 employees 10 years	The following work characteristics were studied using the OSQ ^a Role clarity; job complexity; autonomy; support from supervisor; Organisational climate; cooperation; work appreciation; work hazards; feedback; time pressure Moderators/mediators: None	No	Employee burnout	MBI-GS; Schaufeli et al. (1996) ¹⁸⁸	Positive effect: Increase in role clarity had a positive impact on employee burnout. Other variables that helped prevent burnout were appreciation of work, feedback, and task complexity

OSQ, general self-efficacy; MBI-GS, Maslach-Burnout Inventory – General Scale.
a Elo et al. 1992.

Results

Three out of the four studies measuring job satisfaction reported role ambiguity to act as a stressor and decrease job satisfaction. However, one study²³⁴ concluded that after controlling for the effects of other factors (e.g. autonomy, supervisory support, task significance, task routinisation and pay) there was no unique predictive power in role conflict or ambiguity in accounting for levels of job satisfaction.

Two studies used individual job performance as a predicted variable.^{483,484} Both found that role conflict reduced job performance, whereas role clarity increased it.

Studies on the impact of role conflict/ambiguity on organisational commitment reported mixed results. Saks and Ashforth⁴⁸² found role conflict to be a significant predictor of poor organisational commitment. In contrast, Bateman and Strasser²³⁵ found no significant impact of job tension (measured as a combination of role conflict, role ambiguity and role overload) on organisational commitment. There were also mixed findings in relation to the impact of role conflict on mental health. Saks and Ashforth⁴⁸² found a negative impact of role conflict, ambiguity and overload on stress symptoms, whereas Moyle⁴³⁵ found no significant relationship between role ambiguity and mental health.

The interaction effect of two moderators of role conflict was investigated by two studies, both of which reported significant findings. Role conflict interacted with GSE such that those with high GSE reported higher organisational commitment and identification under conditions of high role conflict, whereas the opposite was true for individuals with low GSE.⁴⁸² Role clarity was found to significantly interact with job security;⁴⁸³ increases in performance were maximised when both role clarity and job security were high, while deterioration in performance was greatest under conditions of high job security and low clarity. Role clarity was also found to be instrumental in preventing job burnout.

Omissions

Only two studies investigated the impact of role clarity or role conflict/ambiguity on variables other than employee-centric outcomes, for example individual job performance. Most of the studies only focused on employee-centric psychological outcomes, such as job satisfaction. Outcomes including the impact of role clarity or role

ambiguity on clients, customer-centric outcomes or outcomes related to learning and growth of employees seem to have been largely omitted.

Summary

The seven studies on role conflict/ambiguity or role conflict were fairly homogeneous in their definitions and use of terminology. Most of the studies investigated the impact of role conflict or role clarity on employee-centric psychological outcomes, with job satisfaction again being the most studied variable. Overall, the studies concurred that role conflict reduced job satisfaction and increased burnout but its impact on organisational commitment was unclear. The studies also highlighted that role clarity may interact significantly with some dispositional or job environment variables (e.g. self-efficacy or workplace support) to influence key outcome variables. The majority of studies considered role conflict or role clarity in combination with other work design variables, especially those that constitute the Hackman and Oldham⁴¹² JDS, such as task autonomy and task significance.

Staffing

Twenty-three papers were categorised under the broad HRM area of staffing. The studies fell into three distinct areas of focus and syntheses are presented for each area as follows:

- recruitment and selection
- induction/orientation
- work scheduling.

Recruitment/selection

Employee selection is a two-way interaction, where applicants and organisations gather information about one another and react to this information while making employment decisions.⁴⁹⁵ The longitudinal studies in this section looked at a range of factors in the recruitment and selection process, and considered how they have an impact on various employee and organisational outcomes.

Details of studies

Seven studies met the inclusion criteria (*Table 45*), all of which were conducted in the USA. One study used experimental design with full randomisation, two studies used quasi-experimental methods, and four had a prospective longitudinal research design. The duration of the studies varied from 1 hour to 8 years. The sample size of these seven studies varied from 30 to 533 employees.

HRM practice/intervention

The HRM practices investigated in these seven studies focus on two broad areas:

- the tools and techniques of employee selection
- the impact of an applicant's perception of the selection process on his/her decision to accept the employment offer.

Five of the seven studies examined selection. They explored the usefulness of realistic job previews, the predictive validity of assessment centres, person–organisation fit measures as a selection tool, employee referrals as a hiring practice, and the use of weighted application blanks (WABs) for screening potentially successful candidates.

Two further studies explored how perceptions of procedural justice in the selection process could have important consequences for both the applicant and the organisation.

Outcomes

One study⁴⁹⁶ investigated the effectiveness of a recruitment strategy on employee productivity and turnover. Castilla⁴⁹⁶ looked at the relationship between the productivity and turnover of employees hired through referrals from current employees, and the productivity and turnover of employees hired without such references. Another study looked at the predictive validity of the screening process.

All other studies investigated the impact of various hiring and selection practices on the employee-centric outcomes of turnover, trust and honesty, attitudes towards other employees and the organisation, commitment, job satisfaction, role ambiguity, organisational attractiveness, intention towards the organisation, achievements of the selected employees later in their career, person–organisation fit achieved at a later time, and intention to leave.

Results

The five studies that investigated the relationship between specific recruitment and selection techniques all reported broadly positive impacts of these tools. The study by Meglino *et al.*⁴⁹⁷ on army recruits found that trainees exposed to combined previews had significantly lower turnover. Trainees' exposure to combined previews was also found to be positively related to their perceptions of the army as more caring, trustworthy and honest; they were more committed to the army, more satisfied with their jobs, and experienced less

role ambiguity. Previews were more effective in reducing turnover among more intelligent trainees and among those initially more committed to army. These results were based on a randomised experimental design.

The other four studies on selection tools and techniques, using prospective longitudinal designs, also reported positive outcomes from the use of their respective methods.

Management assessment centre scores attained 8 years previously (at the time of recruitment) were found to predict the level or position attained by employees later in their careers.⁴⁹⁸

Person–organisation fit measures, when used as a selection tool, reliably predicted the person–organisation fit of employees 2.5 years after the recruitment process and were positively related to their job satisfaction. High person–organisation fit also reduced intention to leave the organisation.⁴⁹⁹

Castilla⁴⁹⁶ found that using referrals from existing employees for hiring new workers was an effective recruitment strategy, as workers hired in this way were found to be more productive and to have lower turnover than workers hired without such referrals.

Browne *et al.*⁵⁰⁰ reported that use of WABs improved the screening process used in hiring police recruits. WABs were effective predictors of the successful applicants. However, the authors gave no time period over which the study was carried out. Given that the study did not have an experimental design and was carried out over a single recruitment process, it would require further studies on a similar sample with similar tools to arrive at any definitive conclusion.

The remaining two studies explored how applicants' perceptions of procedural justice of the selection process and the treatment they received at the test site influenced their attraction toward the organisation and their intention to accept or reject the offer.^{495,501} The study of Bauer *et al.*⁴⁹⁵ was conducted on white-collar workers, whereas the study by Maertz *et al.*⁵⁰¹ was conducted on blue-collar workers. However, both studies used the same intervention, studied the same outcomes and found similar results. They concluded that applicants' perceptions of procedural justice after selection tests had been taken but before pass–fail feedback was given, predicted organisational-related outcomes, but had marginal or no effect on

TABLE 45 Staffing (recruitment/selection)

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Meglino <i>et al.</i> (1988) ⁴⁹⁷ USA	Experimental 533 army personnel trainees 5 weeks	Practices: Realistic job preview: (enhancement preview vs reduction preview) Moderators/mediators: Intelligence; initial commitment to army	No	Turnover; trust and honesty; caring; commitment; satisfaction; role ambiguity	Commitment: Porter and Smith (1970) ⁵⁰² Satisfaction: JDI (Hackman and Oldham, 1974) ⁴²³ Ambiguity: Rizzo <i>et al.</i> (1970) ⁵⁰³ Other variables were measured by scales developed by the authors	Positive effect: Trainees exposed to combined previews (enhancement + reduction preview) had significantly lower turnover Trainees exposed to combined previews were found to be positively related to the trainees perceiving the army as more caring, trustworthy and honest; they were more committed to the army and more satisfied with their jobs; and they experienced less role ambiguity It was also found that the previews were more effective in reducing turnover among more intelligent trainees and those initially more committed to army
Bauer <i>et al.</i> (1998) ⁴⁹⁵ USA	Quasi-experimental design 144 applicants 3 weeks	Practices: Perception of procedural justice in selection process Moderators/mediators: Feedback on passing or failing the test	No	Organisational attractiveness; intention toward the organisation	Organisational attractiveness was measured using the Macan <i>et al.</i> (1994) ⁵⁰⁴ four-item scale Intentions toward the organisation was measured using the Smither <i>et al.</i> (1993) ⁵⁰⁵ three-item scale	Positive effect: Procedural justice did explain incremental variance in the outcomes studied but it was the pass-fail feedback that explained most of the variance
Maertz <i>et al.</i> (2004) ⁵⁰¹ USA	Quasi-experimental 170 blue-collar workers 1 hour	Practices: Perception of procedural justice in selection process Moderators/mediators: Feedback on passing or failing the test	No	Organisational attractiveness; intention toward the organisation	Organisational attractiveness was measured using Macan <i>et al.</i> (1994) ⁵⁰⁴ four-item scale Intentions toward the organisation was measured using Smither <i>et al.</i> (1993) ⁵⁰⁵ three-item scale	Positive effect: The general pattern of findings is that procedural justice perceptions predict organisational-related outcomes before pass-fail feedback is given; but procedural justice perceptions have marginal or no effect on applicant attraction and intention after the pass-fail outcome is controlled

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Hirrichs (1978) ⁴⁹⁸ USA	Prospective longitudinal 30 employees 8 years	Practices: Management assessment centres used as method of employee selection Moderators/mediators: None	No	Achievements of the selected employees later in their career measured by the position/level they attain within their organisation	Position or level attained was taken from company records	Positive effect: Assessment centre scores at the time of selection were good predictors of later personal achievements of the employees
Chatman (1991) ⁴⁹⁹ USA	Prospective longitudinal 171 auditors 10–12 months	Practices: Measure of person–organisation fit used as a selection method; socialisation Moderators/mediators: None	No	Person–organisation fit; intention to leave; job satisfaction	Person–organisation fit: Organisational culture profile (O'Reilly <i>et al.</i> 1991) ⁵⁰⁶ Satisfaction: Faces Scale (Kunin 1955) ⁵⁰⁷	Positive effect: A higher person–organisation fit at the time of joining resulted in better person–organisation fit at a later stage in the organisation, which led to low intention to quit and more job satisfaction
Castilla (2005) ⁴⁹⁶ USA	Prospective longitudinal 290 new hires 2 years	Practices: Employee referrals as a hiring practice Moderators/mediators: None	No	Productivity; job turnover	Both data were taken from company records	Positive effect: New workers hired using references from current employees were more productive and had lower job turnover than other hires
Browne <i>et al.</i> (2005) ⁵⁰⁰ USA	Prospective longitudinal 229 police recruits 2 years	Practices: Use of WABs for screening potentially successful applicants for final selection Moderators/mediators: None	No	Improvement in predictive validity of the screening process	Screening records	Positive effect: WABs scores successfully predicted whether an applicant will be finally selected for the police training programme

applicant attraction and intention once pass–fail feedback had been given. This suggests that test outcome favourability (passing or failing) predicts organisational outcomes more consistently than do perceptions of procedural justice. The studies used quasi-experimental design and the findings were replicated across both time and different samples.

Omissions

One study used employee performance (productivity) as an outcome measure of the recruitment and selection techniques. All other studies concentrated on employee-centric outcomes. As most selection tools and techniques are designed for, and aim to, select employees who are best suited for a given job, it was expected that more longitudinal studies would be available on this theme. However, this review found a paucity of longitudinal research on such relationships.

Summary

There are seven studies in this review that investigated how various recruitment and selection techniques impact on a range of employee and organisational outcomes. All but one of the studies used employee-centric variables as outcomes; only one study investigated the impact of using referrals from existing employees on the productivity of new employees. The results from three of these seven studies were particularly strong as they were based on experimental and quasi-experimental research designs.

Induction/Orientation

Most organisations provide some form of induction, orientation, or socialisation programme to new recruits. These programmes may be conducted in various ways, depending on the requirements of the position and the organisation. Van Maanen and Schein⁵⁰⁸ propose that different socialisation tactics produce different results in newcomers' adjustments to their new roles. They identify six dimensions of socialisation tactics, with each dimension consisting of a bipolar continuum: collective–individual, formal–informal, sequential–random, fixed–variable, serial–disjunctive, and investiture–divestiture.

Other authors have used this classification and have proposed different combinations of these six dimensions. Jones⁵⁰⁹ grouped the six dimensions in two sets and classified them as 'Institutionalized socialisation tactics' and 'Individualized socialisation tactics'. Organisations that scored high on institutionalised tactics use orientation programmes that emphasise a collective, formal, sequential, fixed, serial and investiture form of

socialisation (as opposed to individual, informal, random, variable, disjunctive and divestiture socialisation, which characterise individualised socialisation tactics).

Details of studies

Nine studies met the inclusion criteria (Table 46). All of the studies were published in English. Eight studies were conducted in the USA and one in the UK. Three studies used quasi-experimental methods and six had a prospective longitudinal research design. Most of the studies were conducted over a relatively short duration, with the shortest time period being 4 weeks and the longest being 2 years. The sample size of these studies varied from 61 to 661.

HRM practice/intervention

All of the studies investigated the benefits of some form of induction or orientation programme implemented by various organisations to initiate their new employees.

All but one study⁵¹⁰ used the classifications of either Van Maanen and Schein⁵⁰⁸ or Jones,⁵⁰⁹ as described above. Cooper-Thomas *et al.*⁵¹⁰ investigated the efficacy of a computer-based orientation programme to impact on later socialisation of employees, their job satisfaction and organisational commitment.

Outcomes

All but one study⁵¹¹ investigated the impact of various socialisation tactics on employee-centric outcomes, including level of later socialisation, job satisfaction, organisational commitment, newcomer adjustment, stress, intention to quit, intention to remain and achievement of person–organisation fit. Ashforth and Saks⁵¹¹ investigated the impact of socialisation practices on self-appraised performance.

Results

The results of the studies in this section largely supported the conclusion that socialisation practices achieve their intended effects.

- Five studies found a positive impact of institutionalised socialisation tactics on job satisfaction.^{499,509–512}
- Institutional socialisation tactics were also found to have a positive impact on organisational commitment.^{492,509,510,512,513}
- Wesson and Gogus⁵¹⁴ found that a computer-based orientation programme had a negative impact on job satisfaction, organisational commitment and levels of later socialisation.

- Studies by Waung,⁵¹² Jones⁵⁰⁹ and Chatman⁴⁹⁹ concluded that institutionalised socialisation tactics had a positive impact on intention to remain with the organisation and, thus, reduced turnover. However, Waung⁵¹² found that providing relevant and potentially negative information about the job during the process of orientation did adversely affect some new recruits, who left the organisation in the first few weeks. Those who successfully coped with the initial problems, and who used the help provided during the orientation programme, were more likely to remain with the organisation.
- Person–organisation fit is another variable that is related to socialisation tactics. Three studies found vigorous socialisation, characterised by sequential, fixed, serial and investiture characteristics, leads to better person–organisation fit.^{499,510,515}
- Two studies researched the impact of institutionalised socialisation tactics on later socialisation with other employees in the organisation. Both found a positive relationship between the two.^{493,512} The study by Bravo *et al.*⁴⁹² found that institutionalised socialisation significantly improved the relationship between new and old employees, leading to enhanced role clarity, and had a positive impact on workers' career-enhancing strategies.
- One study⁵¹¹ investigated the impact of socialisation tactics on employee performance using self-rated performance as the dependent variable rather than objective criteria. Ashforth and Saks⁵¹¹ found that although individualised socialisation tactics were not related to several employee-centric outcomes, when contrasted with institutionalised socialisation tactics they did have a positive impact on self-perceived performance.

Omissions

The studies on induction and socialisation largely concentrated on employee-centric outcomes. There were no longitudinal studies that researched the impact of socialisation tactics on employee learning and growth behaviour. There is also a dearth of research on the impact of socialisation tactics on performance, with this review finding only one study based on self-rated employee performance that met the inclusion criteria.

Summary

There are nine studies in this review investigating the impact of various socialisation tactics and

orientation programmes on given outcomes. Most of the studies had employee-centric outcomes (e.g. job satisfaction, organisational commitment, person–organisation fit, and intention to remain) as the predicted variables of these socialisation practices. Most of the research in this field centred on the classification of socialisation tactics proposed by Van Maanen and Schein⁵⁰⁸ and Jones.⁵⁰⁹ There was overwhelming support for the positive impact of institutionalised socialisation tactics over individualised tactics on various employee-centric outcomes.

Work scheduling

Organisations use various forms of work scheduling to carry out their day to day activities. Some work schedules are driven by function, for example round-the-clock running of hospitals and factories, necessitating the use of shifts. Other forms of work scheduling are intended to enhance the work experience of employees by, for example, making a more family friendly environment through HRM practices, such as flexitime and compressed work weeks.

Details of studies

Six studies met the inclusion criteria (*Table 47*). Five studies were conducted in the USA and one was conducted in the UK. Three studies used quasi-experimental methods, and three had a prospective longitudinal research design. The duration of the studies varied from 2 weeks to 2 years. Sample sizes varied from 68 to 1325 employees.

HRM practice/intervention

All six studies focused on HRM practices that govern employee work schedules. Practices covered in this section were the impact of flexitime, compressed work week, monitoring the time of employees on job, temporary versus permanent employment and perception of procedural justice of work schedule on various outcomes.

Outcomes

The various outcomes measured by the studies in this synthesis can be grouped into four categories:

- financial outcomes, including organisational effectiveness and overtime costs
- customer or client outcomes, with one study researching quality of client service
- employee performance, for example two studies on work performance and one each on productivity and error rates
- employee outcomes, for example affective states of employees, sickness absence, personal

TABLE 46 Staffing (induction/orientation)

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Wang (1995) ⁵¹² USA	Quasi-experimental design 61 new hires 4 weeks	Practices: Orientation programme (experimental group received information warning of negative aspects of job and information about specific coping behaviours plus training in cognitive restructuring and positive self-talk and statements to bolster self-efficacy as a part of the orientation programme) Moderators/mediators: None	No	Intention to remain; job satisfaction; organisational commitment	Intentions to remain and job satisfaction were measured using scales constructed by the authors Organisational commitment: Mowday <i>et al.</i> (1979) ⁵¹⁶	Positive effect: The orientation programme had a positive impact on all the outcomes in the long run
Klein and Weaver (2000) ⁵¹³ USA	Quasi-experimental 116 new hires 3 months	Practices: Orientation programme Moderators/mediators: None	No	Level of later socialisation; organisational commitment	Level of socialisation: Chao <i>et al.</i> (1994) ⁵¹⁷ Organisational commitment: Allen and Meyer (1990) ⁴⁸⁶	Positive effect: Orientation programme had a positive impact on both level of later socialisation and organisational commitment
Wesson and Gogus (2005) ⁵¹⁴ USA	Quasi-experimental 261 new hires 5 months	Practices: Computer-based orientation programme Moderators/mediators: None	No	Level of later socialisation; organisational commitment; job satisfaction	Measure of socialisation: Chao <i>et al.</i> (1994) ⁵¹⁷ Job satisfaction: Hackman and Oldham (1975) ¹⁹⁵ Organisational commitment: Allen and Meyer (1990) ⁴⁸⁶	Negative effect: Computer based orientation programme led was negatively related to all of the three outcomes
Jones (1986) ⁵⁰⁹ USA	Prospective longitudinal 102 new hires 5 months	Practices: Socialisation tactics (institutionalised socialisation vs individualised socialisation) Moderators/mediators: Self-efficacy	No	Custodial role orientation; organisational commitment; job satisfaction; intention to quit	Scales for custodial role orientation and intention to quit were devised by the authors Organisational commitment: Porter <i>et al.</i> (1974) ²⁴⁴ Job satisfaction: Dunham and Herman (1975) ⁵¹⁸	Positive effect: Institutionalised socialisation has a positive impact on all four outcomes Moderation effect: The effects are more pronounced for individuals with lower self-efficacy
Chatman (1991) ⁴⁹⁹ USA	Prospective longitudinal 171 auditors 14 months	Practices: Socialisation Moderators/mediators: None	No	Person-organisation fit; intention to leave; job satisfaction	Person-organisation fit: Organisational culture profile (O'Reilly <i>et al.</i> 1991) ⁵⁰⁶ Satisfaction: Faces Scale (Kunin 1955) ⁵⁰⁷	Positive effect: Vigorous socialisation resulted in better person-organisation fit, low intention to quit and more job satisfaction

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Ashforth and Saks (1996) ⁵¹¹ USA	Prospective longitudinal 222 new employees 10 months	Practices: Socialisation tactics (institutionalised socialisation vs individualised socialisation) Moderators/mediators: None	No	Self appraised performance; role innovation; role ambiguity; role conflict; stress; intention to quit; job satisfaction	Role innovation: West (1987) ⁵¹⁹ Role ambiguity and role conflict: Rizzo et al. (1970) ⁵⁰³ Stress: Patchen (1970) ⁴⁹⁰ Intention to quit: Colarelli (1984) ⁴⁸⁸ Job satisfaction: Cammann et al. (1983) ⁴⁸⁵	Positive effect: Institutionalised socialisation had a positive impact on all the outcomes investigated in the study However, self-appraised performance was more influenced by Individualistic socialisation tactics rather than with the institutionalised socialisation tactics
Cable and Parsons (2001) ⁵¹⁵ USA	Prospective longitudinal 101 new hires 2 years	Practices: Socialisation tactics: 1. Content tactics (sequential and fixed rather than variable and random) 2. Social aspects (serial and investiture rather than disjunctive and divestiture) Moderators/mediators: None	No	Perceived person-organisation fit; organisation and individual values congruence	Single-item scale (Cable and Judge 1997) ⁵²⁰ Reduced version of Organisational Culture Profile (Chatman 1991, ⁴⁹⁹ O'Reilly et al. 1991, ⁵⁰⁶ Cable and Judge 1997) ⁵²⁰	Positive effect: Both person-organisation fit and value congruence were positively influenced by the content and social aspect socialisation tactics
Bravo et al. (2003) ⁴⁹² USA	Prospective longitudinal 661 new hires 2 years	Practices: Socialisation tactics (institutionalised socialisation vs individualised socialisation) Moderators/mediators: Relations with superiors; relations with co-workers; role clarity	No	Career-enhancing strategies; immediate and intermediate adaptive strategies	Bachman et al. (1978) ⁴⁹³ Career strategies inventory (CSI; Penley and Gould 1981) ⁴⁹⁴	Positive effect: Institutional socialisation had a positive impact on relations with superiors, co-workers and enhanced role clarity; this, in turn, had a positive impact on the workers' career enhancing strategies
Cooper-Thomas et al. (2004) ⁵¹⁰ UK	Prospective longitudinal 129 employees 5 months	Practices: Socially orientated socialisation tactics (investiture, serial and mentoring) Moderators/mediators: None	No	Actual person-organisation fit; perceived person-organisation fit; job satisfaction; organisational commitment	Single-item scale (Chatman 1991) ⁴⁹⁹ Single-item scale (Cable and Judge 1997, ⁵²⁰ Saks and Ashforth 1997) ⁵²¹ Job satisfaction: Single-item scale Nine-item scale from OCQ (Mowday et al. 1979) ⁵¹⁶	Positive effect: The socialisation tactics positively influenced perceived person-organisation fit, job satisfaction, and organisational climate No effect: There was no impact of socialisation tactics on actual fit

leave and job satisfaction. Of the employee-centric outcomes, there are three studies each on absence and job satisfaction.

Results

Two studies of flexitime used quasi-experimental design. A study by Narayanan and Nath⁵²² reported that the effects of flexitime and introduction of time monitoring devices on employees were moderated by the hierarchical position of employees in the organisation. For employees at lower levels (non-exempt employees), flexitime had a beneficial impact on their social relationships and enhanced their flexibility. However, there was no impact of flexitime on professionals, except a trend towards deterioration in superior–subordinate relationships. The professionals resented the introduction of punch cards and preferred to negotiate work schedules with colleagues and managers on an informal basis. For managers, the introduction of flexitime had no impact on any of the outcomes. Job satisfaction was found to be unrelated to the use or non-use of flexitime in the organisation. In contrast, the study by Dunham *et al.*⁵²³ found that use of flexitime along with compressed work week led to reports of greater organisational effectiveness, with employees exhibiting positive reactions towards both practices.

Latack and Foster⁵²⁴ using quasi-experimental design, suggested substantial organisational gains including reduced sickness–absence costs, overtime costs, and personal leave time, as a result of using compressed work weeks. However, use of a compressed work week had no effect on either job satisfaction or error rates. The study also investigated the interaction of participative decision-making in the adoption of a compressed work week, and concluded that such participation has a positive impact on satisfaction with the work schedule but not on other outcomes, such as sickness–absence costs, overtime costs and personal leave.

Markham *et al.*⁵²⁵ investigated the impact of shift work on the absence behaviour of employees, concluding that all four factors (the shift and three temporal factors of year, season and day of the week) combine to account for 17% of the variance in absenteeism. Though no main effects were found for the impact of shift time on absenteeism, there were significant temporal effects on absenteeism. Also, temporal effects of year, season and day of the week interacted with shift timings to have significant effects on employee absenteeism.

The other scheduling and staffing issue investigated in studies was the perceived procedural justice of work schedule. Posthuma and Campion⁵²⁶ found that perceived procedural justice in work assignments and work schedule was positively related to employees giving their permission for their names to be used in recruitment advertisements.

Omissions

Although there were no notable omissions, it is difficult in this synthesis to draw any evidence-based conclusions about the impact of a given practice on a given outcome because the papers considered are heterogeneous, focusing on different aspects of the work schedule and on different outcomes. Therefore, the evidence cannot be synthesised into a single bottom-line conclusion. Given the prevalence of the organisational use of flexitime, compressed work week, and shift work, it was anticipated that there would be more longitudinal research on these variables. However, this review found relatively few longitudinal studies in this area.

Summary

The six studies in this review researched how different forms of work schedules (flexitime, compressed work week, shift work and perceived procedural justice of assigning work schedule) impact on various employee and organisational outcomes. Only flexitime and compressed work week were studied by two papers; all other practices were examined by only one study. A wide range of outcomes was investigated, including financial outcomes in the form of overtime costs, customer outcomes such as quality of client service, performance outcomes (e.g. error rates, productivity and work performance) and employee outcomes in the form of affective employee states, job satisfaction and sickness–absence rates. The results of this section cannot be presented in an additive manner as the practices and outcomes studied are varied. Hence, each study needs to be considered in isolation. More longitudinal research needs to be undertaken to arrive at a firm conclusion as to how each of these practices can be reliably linked to achieving a given outcome.

Training and development

Studies in this section provide evidence on the various forms of training and development practices in organisations. This review found the following subclusters in the longitudinal studies conducted on these variables:

TABLE 47 Staffing (work scheduling)

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Narayanan and Nath (1982) ⁵²² USA	Quasi-experimental design 68 employees at the three levels of management 9 months	Practices: Introduction of flexitime at three levels of management (non-exempt employees, i.e. lower-level employees; professionals; and managers); introduction of time-keeping devices (punch card) Moderators/mediators: Hierarchical level of the employees	No	Productivity; flexibility; social relations at workplace; job satisfaction	IJS (Brayfield and Rothe 1951) ²⁴⁵	Hierarchical level moderates the impact of flexitime on given outcomes For non-exempt employees: 1. In case of non-exempt employees, flexitime had the intended effect of enhancing flexibility, improvements in social relationships at workplace 2. There was no effect of flexitime on job satisfaction of non-exempt employees For professionals: 1. There was no impact of flexitime on professionals, except a trend towards deterioration in superior-subordinate relationship. The professionals resented against introduction of punch cards and preferred to negotiate work schedule with colleagues and managers on an informal basis For managers: 1. Introduction of flexitime had no impact on any of the outcomes Positive effect: The data suggests substantial organisational pay-offs, including reduction in sick time costs overtime costs and personal leave time Those involved in decision to adopt compressed work week expressed greater satisfaction with the work schedule No effect: There was no effect of compressed work week on either their job satisfaction or error rates
Latack and Foster (1985) ⁵²⁴ USA	Quasi-experimental 84 Information systems professionals 18 months	Practices: Compressed work week (work schedule: 3 days, 38 hours) Participation in decision to adopt the compressed work week Moderators/mediators: None	No	Overtime costs; error rates; job satisfaction; satisfaction with the work schedule; absenteeism; personal leave time	JDI (Smith et al. 1969) ²⁴³	

continued

TABLE 47 Staffing (working schedule) (continued)

Study, country	Design, sample size, duration	Practice(s)/interventions; moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Dunham et al. (1987) ⁵²³ USA	Two quasi-experimental studies First study, 84 employees; second study, 102 employees First study, 4 months; second study, 6 months	Practices: First Study: Compressed work week (change from 5/40 to 4/40 work week schedule) Second Study: Flexible work schedule Moderators/mediators: None	No	Organisational effectiveness: work performance; work coordination; quality of client service General worker reaction: general job satisfaction; leisure time satisfaction; organisational commitment; job involvement; intrinsic motivation; fatigue; physiological stress; and psychological stress	Dunham and Pierce (1986); ⁵²⁷ Work schedule scales Pierce and Newstrom (1982); ⁵²⁸ Work schedule attitudes Kunin (1955); ⁵⁰⁷ Dunham and Herman (1975); ⁵¹⁸ Work satisfaction faces scale Minnesota Satisfaction Questionnaire (Weiss et al. 1967) ⁴⁷³	Positive effect: Non-parametric tests showed that compressed work week (4/40 schedule) led to improvement in organisational effectiveness measures; flexible work schedule also had similar results. The workers under compressed work week and flexible work schedule also exhibited positive worker reactions to the changed schedule However, both studies reported a statistically insignificant reduction in work coordination as a result of compressed work week and flexible work schedule
Markham et al. (1982) ⁵²⁵ USA	Prospective longitudinal 1325 hourly paid workers 2 years	Practices: Shift work (day, afternoon, and night); temporal effects: year; season (winter, spring, summer and fall); day of the week Moderators/mediators: None	No	Absenteeism	Absenteeism data were taken from company records	Positive effect: All four factors (the shift and three temporal factors) combine to account for 17% of the variance in absenteeism Temporal effect: Temporal effects of year, season and day of the week interact with shift timings to have significant effects on employee absenteeism No effect: No main effects were found for the impact of shift time on absenteeism

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Posthuma and Campion (2005) ⁵²⁶ USA	Prospective longitudinal 198 nurses 2 weeks	Practices: Perceived procedural justice of: work assignment; work schedule; pay raises Moderators/mediators: None	No	Permission to use employees name in recruitment advertisements	Survey of employees who took part in the study	Positive effect: Perceived procedural justice in work assignments and work schedule was positively related to giving permission by the employees to use their names in recruitment advertisements
Parker et al. (2002) ⁵²⁹ UK	Prospective longitudinal 458 employees 18 months	Practices: Temporary vs permanent employment Moderators/mediators: None	No	Perceived work characteristics by the employees; job strain	Perceived work characteristics: Role overload: Caplan et al. (1975) ⁵³⁰ Role conflict: Rizzo et al. (1970) ⁵⁰³ Job strain: Warr (1990) ⁴⁴⁵	Temporary employment had both negative and positive consequences: Positive effect: Temporary workers had fewer strain-inducing role demands (in particular lower work overload) Negative effect: Temporary status reduced perceptions of job security and participative decision-making
IJS. Index of Job Satisfaction.						

- performance and skill enhancement training
- career or employee development training
- cultural sensitivity training
- socialisation training to understand organisational culture
- total quality management training.

Details of studies

Twenty-five studies met the inclusion criteria (Table 48). Thirteen of these studies were conducted in the USA: seven in the UK, and one each in Sweden, France, Israel, Finland, and Canada. Two studies used a complete RCT experimental design, 11 studies used quasi-experimental methods, 10 had a prospective longitudinal research design, and three studies used a retrospective longitudinal design. The duration of the studies varied from 4 weeks to 20 years. The sample size of these studies varied from 20 to 1091 employees.

HRM practice/intervention

Studies on the impact of training to enhance employees' performance or skill set were the single largest subcategory within the training and development category. There were 13 studies that looked at how various forms of training, for example training on psychometric errors in ratings, competency-based HRD counsellor training, teacher training programme, training in reflective communication, time management training and skill enhancement in general.

Four longitudinal studies assessed the impact of career enhancement training for employees. The specific practices investigated were career self-management training, management support for self-development initiative (career workshops, development workbooks and guides, and PDPs), and lifelong learning and training programmes.

There were two studies of training to increase employees' awareness of cultural issues in a culturally diverse work environment.

Three studies considered training employees to better understand the existing organisational culture and integrate well with the rest of the workforce.

Four studies looked at training employees in preparation for TQM being implemented at the organisation.

Outcomes

Studies under the subcategory of performance and skill enhancement measured improvement

in performance or relevant skills as outcome variables. The outcomes studied in this subcategory were rating efficiency, leadership and its impact on subordinates' self-efficacy, interpersonal discrimination and communication skills, housekeeping skills and time management.

Six studies^{34,149,531-534} examined training and development alongside various other practices. These studies had multiple outcomes and ranged from investigation of the impact of HRM practices on organisational performance at large to employee outcomes, for example employee satisfaction and labour turnover.

Studies on career or employee development training programmes had the following variables as outcomes: career self-management activity, employee career satisfaction, participation in self-development training programmes, and perceptions of employee psychological contract.

The impact of cultural sensitivity training programmes was measured by the extent of differential treatment of culturally different individuals and effective employee mindset towards acquisition.

Research in training for organisational socialisation looked at the following outcomes: intention to remain, job satisfaction, organisational commitment, academic self-efficacy, intention to quit the organisation and the profession, ability to cope and job performance.

Studies of TQM training measured outcomes such as teamwork, quality level, financial performance and RBSE.

Results

Performance and skill enhancement training

Of the 13 studies in this category, 10 found that training helped to improve the targeted skill sets and employee performance. Ivancevich⁵³⁵ used a full experimental design to show that intense training compared with mere discussion or no training, helped reduce errors. Similarly, studies by Cash and Vellema,⁵³⁶ Rautalinko and Lisper,⁵³⁷ Leivo,⁵³⁸ Green and Skinner,⁵³⁹ Adam,⁵³¹ and Price and Mueller⁵³² concluded that training leads to a range of positive results, for example improvement in communication skills, job performance, planning and prioritising. At the organisational level, general skill enhancement was associated with reduced labour turnover; in organisational

performance (e.g. productivity and profitability) and reduced long-term costs.^{149,533,534}

However, two studies reported non-effects of training. A study by Eden *et al.*⁵⁴⁰ consisting of seven field experiments, failed to find any evidence of the efficacy of a specific form of leadership training and concluded that such training had no effect on either leaders or their followers. Similarly, Jacob and Lefgren⁵⁴¹ found that marginal increases in the in-service training of teachers had no statistically or academically significant effect on the reading or mathematical achievements of elementary school children in high-poverty schools.

Career or employee development training

Providing training to employees for their own career development led to positive employee reactions and better outcomes, for example employee career satisfaction, participation in self-development training programmes, and perceptions of employee psychological contract.⁵⁴²⁻⁵⁴⁴

Kossek *et al.*,⁵⁴⁵ however, found that such training efforts were not successful in increasing employees' tendencies to engage in career self-management activities.

Cultural sensitivity training

Studies on the impact of training employees with the intention of improving their sensitivity to other cultures have mixed results. The study by Sanchez and Medkik⁵⁴⁶ concluded that providing cultural diversity training did not result in a straightforward improvement in employees' cultural sensitivity; the ethnicity of the co-worker interacted with the training received, such that trainees received higher ratings of differential treatment from non-white co-workers than did matched controls. Schweiger and Goulet⁵⁴⁷ reported positive training outcomes leading to change in employee mindset by using a 'deep-level cultural learning' intervention, characterised by creating an ongoing dialogue between partners on cultural awareness and cultural introspection.

Socialisation training to understand organisational culture

There were three longitudinal studies in this section, all of which found positive impacts of socialisation training on employee outcomes, including intention to remain, organisational commitment, professional commitment, job

satisfaction, ability to cope with the new place and job performance.^{512,548,549}

TQM training

Four studies looked at TQM training, two of which looked directly at training prior to the introduction to TQM practices. The way in which TQM was implemented and the purpose of its introduction varied greatly between the studies. The study by Coyle-Shapiro⁵⁵⁰ concluded that TQM intervention does not have a significant direct effect on changes in teamwork; employees' perceptions of the training are more important than actual participation in the intervention. Thus, if employees perceive the intervention to be beneficial and appropriate, and their supervisors reinforce its importance, positive changes to intermediate variables such as trust in colleagues, supervisory satisfaction, and improvement in general commitment to quality, are more likely. Of these hypothesised mediating variables, it was only trust in colleagues that was found to be further predictive of teamwork. Other than trust in colleagues, the intermediate variables that were found to influence teamwork were satisfaction with colleagues, and quality awareness.

The study by Murray and Raffaele⁵⁵¹ found good support for the impact of TQM training and implementation on both quality level and dollar utility value of the training programme.

When these two studies are viewed together, they provide valuable information on the mechanism through which TQM can influence a final outcome, for example quality improvement.

The other two studies in this category did not use TQM per se but explored the impact of training in quality management and the impact of participation in improvement groups on an individual's RBSE.^{454,458} Both studies concluded that membership of improvement groups had a positive impact on an individual's RBSE.

Omissions

Training and development of employees has always been a much investigated area of research. However, the present review finds that there is still a very limited number of studies with longitudinal design on the efficacy of these training programmes. For example, organisations expend considerable resources on programmes such as executive MBA qualifications; however, the review did not find any research on how such

an investment leads to better organisational or employee performance.

Summary

There are 26 studies in this review on training and development. Two studies used a RCT method, 10 used a quasi-experimental design, 12 used a prospective longitudinal design and two used a retrospective longitudinal design. The studies in this section can be grouped in five major categories; performance and skill enhancement training, career or employee development training, cultural sensitivity training, socialisation training to understand organisational culture, and TQM training. Each study used a distinct outcome relevant to the training being provided. Overall, the results indicated that training predicted desired impacts, both at the individual and organisational level, and provides worthwhile return on investment. However, the review found a lack of longitudinal research on the efficacy of the high expenditure training programmes, for example executive MBA, used by organisations to up-skill their employees.

Compensation and rewards

Organisations use various types of compensation and reward plans as instruments for influencing numerous objectives of vital organisational interest. In this review, the types of compensation and reward systems that have been investigated by the researchers using longitudinal design are:

- various types of incentive plans, bonuses, employee stock option plans (ESOPs) and gain-sharing
- merit-based pay, performance-related pay, earnings-at-risk plans and perceptions of pay fairness.

Promotions

Combinations of compensation and rewards with various other HRM practices.

Details of studies

Twenty-nine studies met the inclusion criteria (Table 49). Twenty-three of these studies were conducted in the USA and one each in France, Hong Kong, Ireland, India, Israel and the UK. One study used experimental design with full randomisation, eight studies used quasi-experimental methods, thirteen had a prospective longitudinal research design and seven used a retrospective analysis of longitudinal data sets.

The duration of the studies varied from 2 weeks to 20 years. The sample size of these 29 studies varied from 38 to 3355 employees. Six studies reported data from organisations as a whole; one investigated four plants, one had data from five federal offices of the USA, one had data from 20 local and regional federal offices of the USA, two investigated five units of a single organisation, and one used organisational data from 42 different firms.

HRM practice/intervention

All studies used one of the four types of compensation and reward systems intended to achieve various types of outcomes mentioned above.

- Eight studies on incentive plans investigated how various types of financial incentives, bonuses, ESOPs and gain-sharing could achieve the desired outcomes.
- Nine longitudinal studies were found on merit pay, performance-related pay, earnings-at-risk pay plans and employees' perceptions of fair pay. These studies focused on the use of pay or rewards based on employee performance, and showed the relative merits and demerits of the various plan types.
- There were four studies on the impact of promotion as an incentive for achieving the desired outcomes.
- Finally, this section also contains eight studies that used a combination of various HRM practices along with an incentive plan to achieve given outcomes.

Outcomes

A wide range of outcomes were measured in these 29 studies. Employee performance in one form or the other was the most studied outcome, with 14 studies investigating job performance and three studies concentrating on productivity gains as a result of compensation and incentive plans. Job turnover or intention turnover was the other major outcome of interest in this area. Five studies had job turnover as an outcome and two had intent to turnover as the dependent variable. Absenteeism was studied in three research papers.

Other dependent variables investigated were bonus or pay satisfaction, organisational commitment, occupational commitment, intrinsic motivation, job involvement, job satisfaction, job anxiety, physical health and mental health.

TABLE 48 Training and development

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Ivancevich (1979) ⁵³⁵ USA	Experimental design 66 supervisory engineers 18 months	Training on psychometric errors in ratings (three groups: intense training, discussion group and no training group)	No	Rating efficiency (minimise halo and leniency errors in ratings)	Rating efficiency measure devised by the authors	Positive effect: Intense training helped reduce errors. Results were more pronounced after 6–12 months of training
Eden et al. (2000) ⁵⁴⁰ Israel	Seven field experiments: six using experimental design and one using quasi-experimental; sample of each experiment was different and were very diverse, for example army personnel, youth training camps, blue collar supervisors, school principles, banking staff, and service managers in a large government hospital Each experiment had a different time duration	Pygmalion Leadership Training Workshop (Pygmalion effect being a special case of self-fulfilling prophecy in which raising leader expectations regarding subordinate achievement produces an improvement in performance)	No	Improvement in leadership such that it will augment subordinates self-efficacy	Trainees rating of their leader	No effect: There was little evidence that leadership training workshops influenced either the leaders or their followers
Cash and Vellema (1979) ⁵³⁶ USA	Quasi-experimental 79 graduate and undergraduate students 14 weeks	Different types of training techniques: Competency based HRD counsellor training vs conceptual-based HRD counsellor training	No	Interpersonal discrimination and communication skills	Communication and discrimination indices (Carkhuff 1971) ⁵⁵²	Positive effect: Competency-based training was better at improving interpersonal discrimination and communication skills
Jacob and Leifgren (2004) ⁵⁴¹ USA	Quasi-experimental 461 schools 3 years	In-service teacher training programme	No	Maths and reading performance of elementary students	Maths and reading: Iowa Tests of Basic Skills (ITBS)	No effect: Marginal increase in in-service training of teachers has no statistically or academically significant effect on reading or math achievement of elementary school children in high-poverty schools

continued

TABLE 48 Training and development (continued)

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Rautalinko and Lisper (2004) ⁵²⁷ Sweden	Quasi-experimental 21 insurance agents 5 months	Training in reflective communication	No	Reflective learning	Observation of responses	Positive effect: The training recipients' exhibited better reflective learning, i.e. feeling or what his message means; then he puts his understanding into his own words and feeds it back for the sender's verification; the learning was transferred to real-life setting
Leivo (2005) ⁵³⁸ Finland	Quasi-experimental Three road maintenance areas and one garage 3–4 years	1. Feedback 2. Training	No	Improvement in housekeeping	Objective measures of house-keeping	Positive effect: The house-keeping performance improved in all units and was maintained over 3- to 4-year period even after gradual termination of feedback
Green and Skinner (2005) ⁵³⁹ UK	Prospective longitudinal 134 employees 7 months	Time management training	No	Improvement in relevant skill areas of the trainee	Key Skill Questionnaire (KSQ) developed by the authors	Positive effect: Significant improvement in the key skill areas for example planning, prioritising and assertiveness
Adam (1981) ⁵³¹ USA	Quasi-experimental 153 pick-up and delivery truck drivers of a single company 18 months	Behavioural and attitudinal change procedures introduced: 1. operations changes, 2. feedback sessions	No	Change in attitudes (job satisfaction) Customers attitude toward the driver and drivers attitude towards the customer Labour turnover Absenteeism Operating efficiency Profitability Labour turnover	Attitude: Job satisfaction with various facets of the organisation, modification of JDI (Smith 1967) ⁵⁵³ Operating efficiency: Costs and net Profit	Mixed results: The training intervention led to improvement in work outcomes. For example lowered labour turnover; operating efficiency and profitability; however, the intervention failed to change the employees' negative attitude toward the company
Price and Mueller (1981) ⁵³² USA	Prospective longitudinal 1091 non-supervisory RNs 14 months	HR practice: Training; pay; promotional opportunity	No	Labour turnover	Company data	Positive effects: Promotional and training opportunities had a positive impact on labour turnover No effect: Pay itself had no direct effect on job turnover

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
D'Arcimoles (1997) ⁵³³ France	Retrospective longitudinal 42 firms 5 years	Various HR Practices: Compensation; training; recruitment and dismissals; social climate Source: Social data set ERMES	No	Economic performance	Return on assets Productivity	Positive effect: Training had a lagged positive effect on a firm's economic performance No effect: Compensation by itself had no effect on a firm's economic performance
Cappelli and Neumark (2001) ¹⁴⁹ USA	Retrospective longitudinal Survey data from different periods: 1977–93 panel: n = 433 1993–6 panel: n = 205 1977–96 panel: n = 666 20 years	Various HRM practices: TQM; self-managed or autonomous teams; regular meetings to discuss work-related problems (quality circles); teamwork training; job rotation; cross-training; pay-for-skill programmes; gain-sharing/profit-sharing; benchmarking; computer use by employees	No	Sales per worker; total labour costs per worker; inverse of unit labour costs (ratio of sales per worker and total labour costs per worker)	National Employees Survey (NES) data Census Bureau's LRD data	Positive effect: The study concludes that HPWPs raise labour costs per employee, suggesting that they may raise employee compensation. The study reports statistically weak evidence between the use of these practices and productivity. The authors concluded that HPWPs have little effect on overall labour efficiency
Vogus and Welbourne (2003) ⁵³⁴ USA	Prospective longitudinal 184 firms 3 years	Employment of skilled temporary employees Positive employee relations Emphasis on training to innovate (the authors describe the combination of these three practices as High Reliability Organisations: HROs)	No	Financial performance Intensity of innovation	Financial performance: Stock price Innovation: No. of patents	Positive effect: HRO firms (characterised by employing skilled temporary workers, positive employee relations, and an emphasis on training to innovate) innovated more frequently and had higher stock prices over time
Patterson et al. (2004) ³⁴ UK	Prospective longitudinal 80 firms (varying in size between 60 and 1150 employees) 2 years	Practices: Integrated manufacturing and empowerment (job enrichment, skill enhancement advanced manufacturing technology, total quality management, JIT inventory control) Moderators/mediators: Productivity	Yes	Performance (productivity and profitability)	Audited government records Productivity – measured as the logarithm of the financial value of net sales per employee (see Huselid 1995) ¹⁸ Profit – measured as the financial value of sales less costs per employee, before profits tax	Positive effect: Job enrichment and skill enhancement have a positive impact on both productivity and profitability Productivity is a mediator of the relationship between job enrichment/profitability and skill enhancement/profitability

continued

TABLE 48 Training and development (continued)

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Yarnall (1998) ⁵⁴² UK	Prospective longitudinal 281 employees 20 months	Management support for self-development initiative (career workshops, development workbooks and guides and PDPs)	No	Employee career satisfaction; participation in self-development training programme	Career satisfaction: six-item measure devised by the authors	Positive effect: Employee career satisfaction was positively influenced by the training programme, but the programme had no impact on their participation in this programme
Sturges <i>et al.</i> (2001) ⁵⁴³ UK	Prospective longitudinal 212 graduate employees 12 months	Career management: Self-management and management by the organisation	No	Organisational commitment is outcome of organisational career management but also determinants of career self-management	Organisational commitment (Cook and Wall 1980) ⁵⁵⁴	Positive effect: Formal career management activities, for example training and development are associated with increased organisational commitment
Martin <i>et al.</i> (1999) ⁵⁴⁴ UK	Retrospective longitudinal 20 employees 4 years	Lifelong learning and training programme	No	Perceptions of employee psychological contract	Questionnaire developed by the authors	Positive effect: There is a positive relationship between lifelong learning programme and employee perceptions of careers, fairness and certain other key elements of psychological contract
Sanchez and Medkik (2004) ⁵⁴⁶ USA	Quasi-experimental 125 managers and supervisors 12 months	Cultural diversity awareness training	No	Extent of differential treatment of culturally different individuals	Co-workers appraisals of differential treatment, measured with a revised version of the discrimination scale (Sanchez and Brock 1996) ⁵⁵⁵	Interaction effects: There was an interaction between training and co-worker's ethnicity, such that trainees received higher ratings of differential treatment from non-white co-workers than did matched controls
Schweiger and Goulet (2005) ⁵⁴⁷ USA	Quasi-experimental Six plants (236 employees) 10 weeks	Deep-level cultural learning interventions as compared with surface and non-cultural learning interventions	No	Effective employee mindset towards acquisition (attitudes): 1. Trust in combination management 2. Commitment to combined organisation 3. Understanding of combining partner's culture 4. Cultural differences between combining firms 5. Communication between combining firms	1. Ashford <i>et al.</i> (1989) ⁵⁵⁶ 2. Mowday <i>et al.</i> (1979) ⁵¹⁶ 3. Created by the author 4. Chatterjee <i>et al.</i> (1992) ⁵⁵⁷ and Lubatkin <i>et al.</i> (1999) ⁵⁵⁸ 5. Created by the author 6. Devised by the authors	Positive effect: DCL interventions were found to develop constructive employee perceptions and attitudes

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Wuang (1995) ⁵¹² USA	Quasi-experimental design 61 new hires 4 weeks	Practices: Orientation programme (experimental group received information warning of negative aspects of job and information about specific coping behaviours plus training in cognitive restructuring and positive self-talk and statements to bolster self-efficacy as a part of the orientation programme) Moderators/mediators: None	No	6. Acceptance of combining partner's culture 7. Cooperation between combining firms Intention to remain; job satisfaction; organisational commitment	7. Devised by the authors Intentions to remain and job satisfaction were measured using scales constructed by the authors Organisational commitment: Mowday <i>et al.</i> (1979) ⁵¹⁶	Positive effect: The orientation programme had a positive impact on all the outcomes in the long run
Tannenbaum <i>et al.</i> (1991) ⁵⁴⁸ USA	Prospective longitudinal 666 military trainees 8 weeks	Socialisation type training	No	Organisational commitment; academic self-efficacy; physical self-efficacy; training motivation	Mowday scale (1982); ¹⁷³ McIntire and Levine (1984); ⁵⁵⁹ McIntire and Levine (1984); ⁵⁵⁹ scale adapted from Lawler (1981) ⁵⁶⁰	Positive effect: Training fulfilment was positively related to post-training attitudes
Saks (1996) ⁵⁴⁹ Canada	Prospective longitudinal 152 newly hired entry-level accountants 10 months	Amount of training; perceived helpfulness of the training Mediator: Anxiety	No	Job satisfaction; organisational and professional commitment; intention to quit the organisation and profession; ability to cope; job performance	JS: Hackman and Oldham (1980); ⁴³¹ commitment: Mowday, <i>et al.</i> (1979); ⁵¹⁶ intention to quit: Colarelli (1984); ⁴⁸⁸ ability to cope: House <i>et al.</i> (1982); ⁵⁶¹ job performance: supervisor ratings	Positive and mediation effects: The amount of training received by newcomers was significantly related to job satisfaction, commitment, intention to quit, ability to cope and job performance. In addition, anxiety was found to mediate the relationship between training and ability to cope, and partially mediate training relationships with job satisfaction, commitment and intention to quit

continued

TABLE 48 Training and development (continued)

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Coyle-Shapiro (1995) ⁵⁵⁰ UK	Prospective longitudinal 165 employees 16 months	TQM: Participation in the intervention Perceived benefit of the intervention Perceived appropriateness of the intervention Reinforcement of intervention by the supervisor	No	Outcomes measured using questionnaires: teamwork; other intervening variables: Trust in colleagues Perceived colleague's and management's commitment to quality Satisfaction with colleagues Supervisory participatory style Improvement in commitment to quality Participation in TQM intervention Perceived benefit and appropriateness of intervention	Teamwork: own scale; trust in colleagues (Cook and Wall 1980), ⁵⁵⁴ perceived colleague's and management's commitment to quality; own scale; satisfaction with colleagues (Warr et al. 1979) ⁴⁷⁵ – job satisfaction scale); supervisory participatory style: own scale; improvement in commitment to quality: own scale; participation in TQM intervention: own scale; perceived benefit and appropriateness of intervention: own scale; supervisor reinforcement of intervention: own scale	Positive effect: Assessment/perception of intervention by the employees has positive impact on certain intervening variables, for example supervisory participation, and improvement in general commitment to quality Reinforcement of the intervention by the supervisor has positive impact on trust in colleagues, which, in turn, has positive impact on teamwork No effect: Participation in the intervention has no effect on any of the intervening variables or the final outcome of teamwork
Murray and Raffaele (1997) ⁵⁵¹ USA	Quasi-experimental (interrupted times series design) Plant-level study 5 years	Quality-awareness training (Crosby quality training programme)	No	Quality level; dollar utility	Percentage of good pieces following a production process; reduction in dollar value of the scrap material	Positive effect: TQM training had a positive impact on quality level and also led to education in waste

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Parker (1998) ⁴⁵⁴ UK	Prospective longitudinal 459 employees 18 months	Practices: Communication; job enlargement (measured as the horizontal range of the jobs); job enrichment (measured as jobs high on autonomy and control); training (on quality management) Moderators/mediators: None	No	RBSE	RBSE scale was designed by the author	Positive effect: Membership of improvement groups had a positive impact on RBSE
Axtell and Parker (2003) ⁴⁵⁸ UK	Prospective longitudinal 94 employees 18 months	Practices: Communication briefs (frequency with which communication briefs were given to the employees); job enlargement (measured as the horizontal range of the jobs); job enrichment (measured as jobs high on autonomy and control); training (on quality management) Moderators/mediators: None	No	RBSE	RBSE scale was designed by the author	Positive effect: Membership of improvement groups had a positive impact on RBSE

HRO, High Reliability Organisation; LRD, Longitudinal Research Database.
For National Employees Survey (NES) data, see Cappelli P. The National Employer Survey: employer data on employment practices. *Industrial Relations* 2001;**40**:635–47.

TABLE 49 Compensation and rewards

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Fairbrother et al. (1999) ⁵⁶² USA	Experimental design 60 paediatricians 12 months	Incentives: Financial bonus; enhanced fees for immunisation Feedback: Feedback on immunisation coverage rates in New York city compared with peers	No	Immunisation performance among physicians	Up-to-date immunisation status as reflected in the patients' medical charts Percentage of visits in the previous 4 months that were missed opportunities to immunise Percentage of vaccinations received outside the practice	Positive effect: Bonuses sharply and rapidly increased immunisation coverage
Petty et al. (1992) ⁵⁶³ USA	Quasi-experimental 1205 employees 8 months	Organisational incentive plan	No	Productivity; performance; employee perceptions of behaviour for example teamwork, trust and credibility, performance and goals, and organisational functioning	Company records survey designed for the authors	Positive effect: Organisational incentives led to better performance on all dependent parameters
Welbourne and Cable (1995) ⁵⁷⁹ USA	Quasi-experimental 360 bank tellers 18 months	Gainsharing: (bonus formula for the two firms differed; in firm A, bonus was conditional on achieving a critical level of customer satisfaction and the firm employed equal distribution rule; in firm B, bonus was conditional on meeting a given level of safety standard and it used an equity-based distribution rule, i.e. employees received bonus as some percentage of their basic pay rather than an equal bonus)	No	Pay satisfaction	Four-factor scale (Heneman 1985) ⁵⁸⁰	Interaction effect (gain-sharing x distribution rule): In firm A, where bonus was based on equal distribution rule, gain-sharing was viewed as a benefit and in this firm gain-sharing was unrelated to pay satisfaction In firm B, where bonus was based on equity rule and individual performance, thought of gain-sharing as a part of their pay and their pay satisfaction was affected by the gain-sharing programme
Rusbult and Fairrell (1983) ⁵⁸¹ USA	Prospective longitudinal 88 newly hired accountants 12 months	Rewards (high vs low)	No	Job satisfaction; job commitment; turnover	Job satisfaction: Quinn and Shephard (1974); ⁵⁸² commitment (Rusbult 1980) ⁵⁸³	Positive effect: Greater rewards induce greater employee satisfaction and greater commitment

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Asch (1990) ⁵⁸⁴ USA	Prospective longitudinal 125 Navy recruiters 5 months	Incentives	No	No. of recruits enlisted	Organisational data	<i>Positive effect:</i> Recruiters generally enlisted more recruits as the date of their eligibility for incentives approached and the number fell once the incentives had been obtained
Buchko (1992) ⁵⁶⁴ USA	Prospective longitudinal 218 employees 3 years	ESOPs	No	Employee attitudes; employee turnover behaviour	Employee satisfaction questionnaire (Rosen <i>et al.</i> 1986) ⁵⁸⁵ – 15-item scale OCQ (Mowday <i>et al.</i> 1979) ⁵¹⁶ Two of the three items of the Michigan Organisational Questionnaire (Cammann <i>et al.</i> 1983) ⁴⁸⁵	<i>Positive effect:</i> Employees with greater perceived influence in the organisation as a result of the ownership programme and those with greater financial value in the programme were more satisfied with the programme, more committed to the organisation, and had lower turnover intention
Arthur and Jelf (1999) ⁵⁶⁵ USA	Retrospective longitudinal 1600 employees 7.5 years	Gainsharing: (combining of plant-wide bonuses with a comprehensive employee involvement programme)	No	Grievance rates Absenteeism	Company records	<i>Positive effect:</i> Adoption of Scanlon type gain-sharing plan led to improved union-management relationship as measured by reduction in both grievance rates and employee absenteeism
Bhattacharjee (2005) ⁵⁶⁶ India	Retrospective longitudinal Four Plants 10 years	Group incentives (plant level vs departmental level incentive schemes)	No	Productivity	Company records	<i>Interaction effects:</i> Productivity returns to incentives are non-linear and concave in shape Department level incentive scheme is associated with significant productivity returns, whereas plant level incentive scheme is associated with negative effects on worker productivity
Yuki and Latham (1975) ⁵⁶⁷ USA	Quasi-experimental 38 marginal workers 6 month	Reinforcement schedules with incentive magnitudes (various contingent bonuses: continues reinforcement, variable ratio)	No	Performance	Piecework	<i>Positive effect:</i> Productivity was highest in the continuous reinforcement condition

continued

TABLE 49 Compensation and rewards (continued)

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Pearce and Perry (1983) ⁵⁸⁶ USA	Prospective longitudinal Five federal government agencies 18 months	Merit pay	No	Employee attitudes	Semi-structured interviews	No effect: Federal managers do not appear to be more motivated under merit pay than under the previous time-in-grade compensation policies. The reasons for this, as reported by the authors, are the lack of belief by the managers in the performance appraisal system on which the merit pay is based
Pearce et al. (1985) ⁵⁸⁷ USA	Prospective longitudinal 20 local federal offices 4 years and 5 months	Merit pay for managers	No	Performance	Four objective performance measures	No effect: Merit pay programme had no effect on organisational performance
Kahn and Sherer (1990) ⁵⁸⁸ USA	Prospective longitudinal 92 middle- to upper-level managers 12 months	Contingent pay: Bonuses; merit pay	No	Performance	Organisation's own six-point rating scale	Mixed effect: Bonuses: Differences across workers in the impact they expect their performance to have on bonus payments led to differences in subsequent performance levels. Specifically, managers for whom the impact of performance on bonus is high have higher future performance, even controlling for past performance levels No effect: Merit pay: In contrast to bonuses, merit pay had no relationship with employee performance
Brown and Huber (1992) ⁵⁷⁰ USA	Prospective longitudinal 101 bank employees 6 months	Earnings at risk	No	Pay outcome satisfaction; pay process satisfaction	PSQ (Heneman and Schwab 1985) ⁵⁸⁹	Negative effect: Pay outcome satisfaction and pay process satisfaction both declined significantly over time

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Begley and Lee (2005) ⁵⁶⁸ Ireland	Prospective longitudinal 99 employees 12 months	Change of compensation system: Introduction of Pay at Risk (7%); bonus plan (0%, 4%, 7%, 10% and 15%) Moderators: Personality (high/low on negative affectivity)	No	Bonus satisfaction Distributive justice (perceived fairness of the bonus percentage)	Scales devised by the authors	<i>Moderated effects:</i> Employees with low negative affectivity are more sensitive to changes in bonus awards than employees with high negative affectivity
Brown (1994) ⁵⁷¹ UK	Retrospective longitudinal 1263 employees 12 months	Experience-rated sick pay scheme	No	Absenteeism	Company records	<i>Positive effect:</i> Sick pay scheme does exert a significant control over absenteeism and it is more effective when the sick pay is linked with loss of current earnings rather than loss of future sick pay entitlement
Lazear (2000) ⁵⁶⁹ USA	Retrospective longitudinal 2755 employees 19 months	Performance pay: Shift from hourly wages to piece rate compensation	No	Productivity	Charts per worker per day	<i>Positive effect:</i> Productivity effects associated with switch from hourly wages to piece rates are quite large and there are significant productivity gains
Shaw and Gupta (2001) ⁵⁹⁰ USA	Prospective longitudinal 272 employees 2 years	Pay fairness (moderated by the financial needs of the employees)	No	Physical health; psychological health; work-related behaviour; job performance, absenteeism, turnover	10-item life satisfaction scale; 10-item depression scale; 14-item somatic complaints; One-item job search intent; supervisory rating of job performance; absenteeism from company records; voluntary turnover from company records	<i>Moderated effects:</i> When employees are economically dependent, they are more likely to experience life dissatisfaction, depression, and somatic complaints as a consequence of unfair pay The relationship between pay perceptions and job performance is strongly negative among people high on financial need
Schwarzwalder et al. (1992) ⁵⁷³ Israel	Quasi-experimental 191 employees 6 months	Promotion	No	Equity; commitment; behavioural outcomes	Commitment and OCS by Porter et al. (1974) ²⁴⁴	<i>Positive effect:</i> Positive promotion decisions increased commitment <i>Negative effect:</i> Failure to get promotion was associated with feeling of inequity, a decrease in commitment and increase in absenteeism

continued

TABLE 49 Compensation and rewards (continued)

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Johnston et al. (1993) ⁵⁷² USA	Quasi-experimental 157 sales people 6 months	Promotion	No	Organisational commitment Intrinsic motivation Job involvement Propensity to leave Satisfaction with pay Turnover Job anxiety	OCQ; (Porter et al. 1974; ²⁴⁴ Lawler and Hall 1970, ¹⁹⁰ Lodahl and Kejner 1965, ⁴²⁴ Blueborn 1982, ⁵⁹¹ staying/leaving index; Smith et al. 1969, ²⁴³ JDI; company records; House and Rizzo 1972) ⁵⁹²	Positive effect: Promoted stayers exhibited an increase in satisfaction over time; they were significantly more satisfied than non-promoted leavers However, job attitudes decline over time, even for promoted employees
Lam and Schaubroeck (2000) ⁵⁷⁴ Hong Kong	Quasi-experimental 360 bank tellers 18 months	Promotion Moderators: Personality LOC	No	Organisational commitment Job involvement Job satisfaction Intentions to quit Performance rating Absence frequency	OCQ; Mowday et al. (1979) ⁵¹⁶ JI: Kanungo (1982), ⁵⁹³ JS: Hoppock (1935) ⁵⁹⁴ ITQ: Blueborn (1982) ⁵⁹¹ Performance: Organisational records	Moderated effects: Promoted tellers who had more internal LOC maintained improved attitudes across 3–18 months post test intervals For external LOC individuals, attitudes returned to baseline after 6 months Mixed effects: Absenteeism and job performance both decreased among promotees
Pergamit and Veum (1999) ⁵⁷⁵ USA	Retrospective longitudinal 3355 young men and women working in private sector 12 months	Promotion	No	Job attachment; job satisfaction	Source: National Longitudinal Survey of Youth	Mixed effects: Promotion led to increased job satisfaction There is no evidence that promotion can lead to higher job attachment
Pritchard et al. (1988) ⁵⁷⁶ USA	Quasi-experimental Five organisational units 2 years	ProMES: A system that developed productivity measurement in order to provide feedback to measure productivity; comprising feedback, goal setting, and incentives based on achieved goals	No	Productivity Job satisfaction Turnover intentions Morale Role clarity	ProMES Job satisfaction: Seven items adapted from Minnesota Satisfaction Questionnaire (Weiss et al. 1967) ⁴⁷³ Turnover intention: Own questionnaire Morale: Adapted from ISR instruments (Seashore et al. 1983) ⁵⁹⁵ Role clarity: Adapted from Rizzo et al. (1970) ⁵⁰³	Positive and interaction effect: Results indicated that group-level feedback increased productivity on average by 50%, which was raised to 76% when goal setting and incentives were added to it Work attitudes for example job satisfaction, turnover intentions, and morale were good or better following intervention No such changes were observed in the control group

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Pritchard <i>et al.</i> (1989) ⁵⁷⁷ USA	Prospective longitudinal Five organisational units 2 years	ProMES: A system that developed productivity measurement in order to provide feedback to measure productivity; comprising feedback, goal setting, and incentives based on achieved goals	No	Productivity	ProMES scale was used to measure productivity	<i>Positive and Interactions effects:</i> Feedback alone improved productivity by 50%; when goal setting and incentives were added to it, productivity improved by 76%
Knight <i>et al.</i> (2001) ⁵⁷⁸ USA	Quasi-experimental 264 students Repeated measures taken during a single experimental sitting	<i>Practices:</i> Monetary incentives; goal difficulty	No	Strategic risk; tactical implementation; team performance	Objective measured devised for the experiment	<i>Interaction effect:</i> Teams with both difficult goals and incentives achieved the highest performance
Price and Mueller (1981) ⁵⁸² USA	Prospective longitudinal 1091 non-supervisory RNs 14 months	HR practice: Training; pay; promotional opportunity	No	Labour turnover	Company data	<i>Positive effect:</i> Promotional and training opportunities had a positive impact on labour turnover <i>No effect:</i> Pay itself had no direct effect on job turnover
Blau (1999) ²³⁶ USA	Prospective longitudinal 672 medical technologists 4 years	<i>Practices:</i> Task responsibility (measured as a continuum ranging from routine/simple to complex tasks); wages; performance appraisal satisfaction <i>Moderators/mediators:</i> None	No	Job satisfaction	Job satisfaction: JDS (Hackman and Oldham 1975) ⁹⁵	<i>Positive effect:</i> Task complexity had a significantly positive impact on job satisfaction Higher wages and satisfaction with performance appraisal also had positive impact on job satisfaction <i>Negative effect:</i> Routine task had a significantly negative impact on job satisfaction

continued

TABLE 49 Compensation and rewards (continued)

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Posthuma and Campion (2005) ⁵²⁶ USA	Prospective longitudinal 198 nurses 2 weeks	Practices: Perceived procedural justice of: work assignment; work schedule; pay raises Moderators/mediators: None	No	Permission to use employees name in recruitment advertisements	Survey of employees who took part in the study	Positive effect: Perceived procedural justice in pay raise, work assignments and work schedule was positively related to giving permission by the employees to use their names in recruitment advertisements
D'Arcimoles (1997) ⁵³³ France	Retrospective longitudinal 42 firms 5 years	Various HR practices: Compensation; training; recruitment and dismissals; social climate Source: Social data set ERMES	No	Economic performance	Return on assets Productivity	Positive effect: Training had a lagged positive effect on a firm's economic performance No effect: Compensation by itself had no effect on a firm's economic performance
Cappelli and Neumark (2001) ⁵⁴⁹ USA	Retrospective longitudinal Survey data from different periods: 1977-93 panel: n = 433 1993-6 panel: n = 205 1977-96 panel: n = 666 20 years	Various HR practices: TQM; self-managed or autonomous teams; regular meetings to discuss work-related problems (quality circles); teamwork training; job rotation; cross-training; pay-for-skill programmes; gain-sharing/profit-sharing; benchmarking; computer use by employees	No	Sales per worker; total labour costs per worker; inverse of unit labour costs (ratio of sales per worker and total labour costs per worker)	National Employees Survey (NES) data Census Bureau's LRD data	The study concludes that HPWP raises labour costs per employee, suggesting that they may raise employee compensation. The study reports statistically weak evidence between the use of these practices and productivity. The authors concluded that HPWP have little effect on overall labour efficiency

ISR, Institute of Social Research; ITQ, intention to quit; JI, job involvement; JS, job satisfaction; LRD, Longitudinal Research Database; OCQ, Organizational Commitment Questionnaire; ProMES, Productivity Measurement and Enhancement System; PSQ, Pay Satisfaction Questionnaire.

For National Longitudinal Survey of Youth, see Pergamit MR, Pierret CR, Rothstein DS, Veum JR. Data watch: the national longitudinal surveys. *Journal of Economic Perspectives* 2001;15:239-53.

For National Employees Survey (NES) data, see Cappelli P. The National Employer Survey: employer data on employment practices. *Industrial Relations* 2001;40:635-47.

Results

Incentive plans, bonuses, ESOPs and gain-sharing

The major focus of studies in this subcategory of compensation and rewards was the use of monetary incentives to influence employee behaviour. The main distinction between this subcategory and the next (merit pay, pay at risk, etc.) was that incentives did not affect salary. The focus was rather to encourage employees to perform better for gaining monetary awards over and above their base pay. Largely, all studies in this category concluded that incentives had a positive effect on the desired outcome.

There was only one study that used complete randomisation and conducted RCTs to understand how three interventions (financial bonus, enhanced fees for immunisation services, and feedback on their performance) helped improve immunisation performance among paediatricians.⁵⁶² The authors reported that of the three schemes, cash bonus resulted in the maximum positive impact on the immunisation service. The quasi-experimental study by Petty *et al.*⁵⁶³ also found that an incentive plan targeted at the division as a whole led to better performance of that division compared with a control group without an incentive plan. There was a significant increase in employee productivity and other measures of job performance along with improvement in employee attitudes toward the organisation. The other three studies on the use of financial rewards and bonuses, employing prospective longitudinal designs, also found a positive relationship between use of rewards and incentives and the desired outcomes, for example productivity, job satisfaction, job commitment and employee turnover. The study by Buchko⁵⁶⁴ reported that employees with greater perceived influence as a result of an ESOP programme and those with greater financial value in the programme were more satisfied with the pay plan, more committed to the organisation, had lower turnover intention and were less likely to leave the organisation.

Use of a gain-sharing plan, characterised by combining a system of plant-wide bonuses with a comprehensive employee involvement programme, was reported by one study which found that it had a positive impact on long-term grievance rates as well as employee absenteeism.⁵⁶⁵

Bhattacharjee⁵⁶⁶ found that group incentives were more effective in increasing productivity when used with smaller groups than when applied to large groups, for example whole departments.

Merit-based pay, performance-related pay, earnings-at-risk plans and perceptions of pay fairness

The studies on merit or performance-related pay differed from those on incentives and bonuses in that there was some component of an employee's salary that was at risk of being reduced unless a particular level of performance was achieved. The performance-related-pay papers invariably found that merit-based pay was not liked by the employees.⁵⁶⁷ The major point of contention in performance-related pay was the perceived fairness in the performance appraisal system on which the whole scheme rests. Though there was a general dissatisfaction among workers where performance-related pay or some form of earning-at-risk plans were used, studies reported an improvement in performance indicators and desired outcomes, for example reduced absence, when these pay plans are implemented.⁵⁶⁸⁻⁵⁷¹

Promotions:

Use of promotion as an incentive to reward higher performers was quite widely used in organisations. However, the results from the studies reviewed here found that use of promotions as an incentive can lead to mixed outcomes.

Studies by Johnston *et al.*⁵⁷² and Schwarzwald *et al.*⁵⁷³ reported that the impact of promotions on given outcomes was moderated by promotion decisions. Those who were promoted as a reward for good performance showed better future performance and were more likely to stay with the organisation than those who were not promoted.

However, some studies pointed out that the negative consequences of employees not being promoted when they feel entitled. The study by Schwarzwald *et al.*⁵⁷³ found failure to get promotion was associated with feelings of inequity, decreased commitment and increased absenteeism. Johnston *et al.*⁵⁷² found that the initial positive effects of promotion were unsustainable in the long run and that job attitudes declined over time, even for promoted employees. Similar results were found by Lam and Schaubroeck⁵⁷⁴ and Pergamit and Veum.⁵⁷⁵

Combination of compensation and rewards with various other HRM practices

The eight studies in this category used rewards along with other HRM practices for achieving desired employee or organisational outcomes. Five of these studies showed that compensation and rewards in interaction with various other HRM

practices had a positive effect. Studies by Pritchard *et al.*^{576,577} found that although feedback alone was instrumental in improving the performance of employees by 50%, when feedback was used with goal setting and incentives, productivity improved by 76%. Similarly, a study by Knight *et al.*⁵⁷⁸ found that combining incentives with difficult goals achieved best results.

However, studies by Price and Mueller⁵³² and D'Arcimoles⁵³³ found that pay and compensation by itself failed to have any direct effect on labour turnover and the firm's overall economic performance. The compensation and pay system need to be combined with practices such as training to achieve the desired impact.

Omissions

There were no significant omissions in the longitudinal literature on the relationship between compensation and rewards and desirable outcomes. However, given the popularity of incentive plans, for example ESOPs, it was surprising to find only one study on how ESOPs can impact on employee behaviour. There seems to be a paucity of longitudinal research on the impact of ESOPs on employee performance and turnover.

Summary

In this review there were 29 studies that explored the impact of compensation and rewards systems on given employee and organisational outcomes, for example job performance, productivity, job turnover, absence and various other employee attitude variables. Nine out of the 29 studies were experimental or quasi-experimental in design, with 13 studies using prospective longitudinal design and seven using retrospective analysis on pre-existing longitudinal data sets. The studies in this section can be grouped in four broad categories depending on the type of compensation and reward plan under investigation; incentive and bonus plans, gain-sharing schemes; merit- or performance-related pay and employee pay fairness perceptions; promotions; and studies using compensation and rewards in combination with other HRM interventions. Largely, the impact of incentives and bonuses was positive whereas that of merit-based pay was negative. Promotions had both positive and negative impacts depending on the promotion decision. Studies researching combinations of compensation and rewards with other HRM practices found positive and interaction effects with these other practices. Overall, there seems to be a paucity of longitudinal research on the impact of ESOPs on organisational and employee outcomes.

Communication

Through communication, organisations and their members exchange information, form understandings, coordinate activities, exercise influence, socialise, and generate and maintain systems of beliefs, symbols, and values. Organisations have two distinct communication systems; formal and informal. The formal communications system is a part of the organisational structure and includes supervisory relationships, work groups, permanent and *ad hoc* committees, and management information systems. The informal communication system emerges from day-to-day interaction among organisational members. In this section we review longitudinal studies on how various forms of communication have an impact on given or desired outcomes.

Details of studies

Five studies met the inclusion criteria (*Table 50*). Two studies were conducted in the USA, two were conducted in the UK, and one was conducted in Finland. One study had a quasi-experimental design and four studies had a prospective longitudinal design. The duration of the studies varied from 3 to 18 months, with sample sizes ranging between 94 and 459 employees.

HRM practice/intervention

The five studies in this section can be grouped in two categories:

- communication by the organisation to create awareness of a given programme or any impending changes
- quality and quantity of communication briefs given to employees and the impact on their RBSE.

In the first category, three studies⁵⁹⁶⁻⁵⁹⁸ explored how creating an effective communication plan can be useful in achieving the desired outcomes.

The second category includes the studies of Parker⁴⁵⁴ and Axtell and Parker,⁴⁵⁸ which explored the effects of the quality and quantity of communication briefs on employees.

Outcomes

The three studies in the first category focused on the decreased dysfunctional impact of mergers on employees as a result of realistic merger previews, satisfaction with various aspects of the workplace as a result of an organisational benefit awareness programme, and how job insecurity and its related consequences (e.g. relationship with colleagues and organisational efficiency) can be positively dealt

TABLE 50 Communication

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Schweiger and DeNisi (1991) ⁵⁹⁶ USA	Quasi-experimental 147 employees 3 months	Practices: Realistic merger preview before the merger of two companies Moderators/mediators: None	No	Dysfunctional outcomes of mergers on the employees for example: global stress; uncertainty; job satisfaction; commitment; company's trustworthiness, honest and caring; intention to remain; performance; absenteeism; turnover	Global stress: Cohen <i>et al.</i> (1983) ⁵⁹⁹ Job satisfaction: House <i>et al.</i> (1979) ⁶⁰⁰ Commitment: Porter and Smith (1970) ⁵⁰² Uncertainty: Schweiger <i>et al.</i> (1987) ⁶⁰¹ Company's trustworthiness: Meglino <i>et al.</i> (1988) ⁴⁹⁷ Intention to remain with the organisation: Meglino <i>et al.</i> (1988) ⁴⁹⁷ Performance, absenteeism and turnover: Company data	Positive effect: Realistic merger previews substantially reduced the dysfunctional outcomes of the merger
Hennessey <i>et al.</i> (1992) ⁵⁹⁷ USA	Prospective longitudinal 237 employees 6 months	Practices: Benefit awareness programme (creating awareness among employees the benefits available to them) Moderators/mediators: None	No	Various outcomes: Benefit satisfaction; job satisfaction; employee perceptions of organisational effectiveness	All outcomes were measured using scales constructed by the authors specifically for this study	Positive effect: The awareness programme had a positive impact on benefit satisfaction and employee perceptions of organisational satisfaction No effect: The programme had no effect on employee job satisfaction
Kinnunen <i>et al.</i> (2000) ⁵⁹⁸ Finland	Prospective longitudinal 210 employees 12 months	Practices: Organisational communication (quality, quantity, and rumours in the general communication occurring within the organisation) Restorative strategy (honest communication with the employees and to reassure them on the security of their jobs and maintain a positive atmosphere) Moderators/mediators: Gender	No	Job insecurity and outcomes of job insecurity; Organisational commitment; relationship with colleagues and supervisors; organisational efficiency	Job insecurity: Greenhalgh and Rosenblatt (1984) ⁶⁰² Organisational commitment: Cook and Wall (1980) ⁵⁵⁴ Relationship with colleagues and supervisors: Scale developed by the authors Organisational efficiency: Scale developed by the authors	Positive effect: Restorative strategy had a positive influence on feeling of job security of the employees. Job security on turn was a good predictor of relationship with the colleagues and organisational efficiency No effect: General organisational communication had no effect on feeling of job security of the employees

continued

TABLE 50 Communication (continued)

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Parker (1998) ⁴⁵⁴ UK	Prospective longitudinal 459 employees 18 months	Practices: Communication; job enlargement (measured as the horizontal range of the jobs); job enrichment (measured as jobs high on autonomy and control) Training (on quality management) Moderators/mediators: None	No	RBSE	RBSE scale was designed by the author	Positive effect: Increase in communication quality was associated with increase in self-efficacy. However, it did not have significant beta weight in the final regression equation despite significant zero order association, suggesting that communication briefs shares variance with the work background or personality factors of the employees
Axtell and Parker (2003) ⁴⁵⁸ UK	Prospective longitudinal 94 employees 18 months	Practices: Communication briefs (frequency with which communication briefs were given to the employees) Job enlargement (measured as the horizontal range of the jobs) Job enrichment (measured as jobs high on autonomy and control) Training (on quality management) Moderators/mediators: None	No	RBSE	RBSE scale was designed by the author	No effect: Communication briefs had no effect on RBSE

with by use of a restorative strategy using honest communication with employees.

The outcome for the second category of communication papers discussed in this section was employee perception of RBSE.

Results

The results of the communication strategy on the desired outcomes were mixed. For the first category of studies, Schweiger and DeNisi⁵⁹⁶ found that realistic merger previews were a good tool for limiting the dysfunctional outcomes of a merger, resulting in lower stress, job dissatisfaction, absenteeism and job turnover, and improved commitment and employee performance. However, the study by Hennessey *et al.*⁵⁹⁷ found that although a benefit awareness programme had a positive impact on satisfaction with benefits and the organisation, it had no effect on employee job satisfaction. Similarly, the study by Kinnunen *et al.*⁵⁹⁸ found that a dedicated restorative strategy using honest communication with employees, to provide reassurance of job security and maintain a positive work atmosphere, did result in lower levels of job insecurity and improvements in relationships with the colleagues. However, the general communication system in the organisation was completely unrelated to employees' feelings of job security.

The studies by Parker⁴⁵⁴ and Axtell and Parker⁴⁵⁸ both concluded that, although quality of communication briefings had a positive impact on employees perception of their RBSE, the quantity of such communication had no similar impact.

Omissions

Management theory places great emphasis on devising organisational communication plans for internal and external stakeholders, yet it appears that little of that has translated in longitudinal peer-reviewed research. Five studies met the review criteria for HRM practice in this area, but they focused on a limited range of possible outcomes. There appears to be substantial scope for further longitudinal research on the impact of different communication practices.

Summary

The five studies in this section provided evidence on how various forms of communication can be used to achieve the employee outcomes of reduced dysfunctional outcomes during a merger, feelings of job security, job satisfaction and enhanced RBSE. One study used a quasi-experimental

design, while four used a prospective longitudinal design. The studies can be divided in to two categories. In the first category were studies that dealt with communication by the organisation to create awareness of a given programme or any impending changes. In the second category were studies dealing with quality and quantity of communication briefs given to employees and their impact on RBSE. The results of these interventions are mixed. There was some support for the impact of tailored communication strategies dealing with specific issues as opposed to general organisational communications; however, this was based on only five eligible studies.

Family friendly

The term 'family friendly workplace' (or 'work and family') is one which recognises the non-workplace family responsibilities of its employees, and develops and implements policies that aim to help employees simultaneously fulfil work and family commitments. Some authors extend the use of the term to include practices that are employee friendly and take care of the well-being of employees and their families (such as general employee assistance programmes or specific help for drug or alcohol addiction).

Details of studies

Four studies met the inclusion criteria (*Table 51*). All studies were conducted in the USA. One study had a quasi-experimental design, one study had a prospective longitudinal design, and two studies used a retrospective longitudinal research design. The duration of the studies varied from 12 months to 7 years. The sample size of the studies varied from 207 employees to 60 sites encompassing 43,888 employees.

HRM practice/intervention

Of the four studies in this section, three investigated the impact of health promotion programmes or policies, elements of which included family friendly practice.⁶⁰³⁻⁶⁰⁵

The fourth study by Hammer *et al.*⁶⁰⁶ investigated couples' or individuals' use of alternative work arrangements and dependent care support.

Outcomes

The outcomes investigated these studies of family friendly practices were absenteeism (two studies), return on investment, medical claims made, job turnover, job satisfaction, and family-work/work-family conflict.

TABLE 51 Family friendly

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Bertera (1990) ⁶⁰³ USA	Quasi-experimental 60 sites (comprising 43,888 blue-collar employees) 2 years	Comprehensive workplace health promotion programme Moderator/mediator: None	No	Absenteeism; return on investment on the programme	Company records	Positive effect: Health promotion programme helped in significant reduction in disability days and provided a good return on investment
Astrup et al. (1992) ⁶⁰⁴ USA	Retrospective longitudinal 207 employees 7 years	Participation in company-sponsored wellness programme Moderator/mediator: Age of the employee	No	Absenteeism and medical claims	Company records	Positive effect: Wellness intervention slowed the rate of increasing claims among middle-aged participants
Gilleskie and Lutz (2002) ⁶⁰⁵ USA	Retrospective longitudinal 4422 individuals (all males) 12 months	Employer provided health insurance Moderator: Married/unmarried	No	Employment transition	Whether an individual has changed employer	No effect: Employer provided health insurance had no impact on married employees' decision to change their jobs and had a very small impact on the unmarried males
Hammer et al. (2005) ⁶⁰⁶ USA	Prospective longitudinal 234 couples 12 months	Utilisation of available workplace support (couples' or individuals' use of alternative work arrangement; couples' or individuals' use of dependent care support) Moderator: None	No	Work-family conflict; family-work conflict; job satisfaction	Work-family conflict: (Metemeyer et al. 1996) ⁶⁰⁷ Job satisfaction: JDS (Hackmann and Oldham 1975) ¹⁹⁵	Positive effect: Use of alternative work arrangements and dependent care supports are positively related to family-work conflict in dual-earner couples; use of workplace support is positively related to job satisfaction over time No effect: Couple level utilisation of workplace support does not appear to have a strong impact on individuals' report of work-family conflict

Results

Results from two studies indicated that health promotion and company sponsored wellness programmes reduced absence. The study by Bertera⁶⁰³ used a quasi-experimental research design and collected data from 43,888 employees working in 60 different sites. It concluded that the company's workplace health promotion programme gave good return on investment and led to significant reductions in employee absence. The study by Astrup *et al.*⁶⁰⁴ came to a similar conclusion, and the company's wellness programme was especially effective for middle-aged participants as it reduced their rates of medical claims. The third study in this category measured the impact of employer provided health insurance on employee turnover. The study found that employer provided health insurance had no impact on married employees' decisions to change their jobs and had a very small impact on the unmarried males.⁶⁰⁵

The only study on the uptake of workplace support, in the form of alternate work arrangements and employees' use of dependent care, found mixed effects. Hammer *et al.*⁶⁰⁶ concluded that use of alternative work arrangements and dependent care supports were positively related to reduced levels of family-work conflict in dual-earner couples. Use of workplace support was also positively related to job satisfaction over time. However, the study found that couples' use of workplace support did not appear to have an impact on individual reports of work-family conflict.

Omissions

This review found only four longitudinal studies that explored the efficacy of family-/employee-friendly policies or practices as HRM interventions, and these were limited in scope. Practices, for example flexible working arrangements, permanent part-time work, job-sharing, career break schemes, paid or unpaid family leave, and assistance with child care and elder-care responsibilities, which can help workers balance their work and family responsibilities, need to be examined longitudinally to establish the nature of their impact.

Summary

The four studies in this category investigated the impact of family and employee-friendly policies, such as health promotion programmes and workplace support. One study used a quasi-experimental research design, one used prospective longitudinal and two others used a retrospective

longitudinal research design. The results of these studies indicated that use of company sponsored health and wellness programmes are value for money and help reduce absenteeism. However, company provided health insurance benefit has no effect on employees' decisions to stay or leave from the company. Use of alternative work arrangements and dependent care support is positively related to reduced family-work conflict in dual-earner couples but couple level use of such support is not related to work-family conflict. There seemed to be substantial gaps in longitudinal research on family and employee friendly practice, with no peer-reviewed longitudinal research available on topics including flexible working arrangements, permanent part-time work, job-sharing, career break schemes, paid or unpaid family leave, and assistance with child care and elder-care responsibilities, which aim to help workers balance their work and family responsibilities.

Employee participation, representation and involvement

The terms employee participation/representation/involvement have been used to describe a wide range of practices in organisations.⁵¹¹ Common to all of these practices is the attention paid to increasing employees' influence over how their work is carried out or over other areas of organisational policy and practice.⁵¹¹

Details of studies

Eight studies met the inclusion criteria for the review (*Table 52*). Three of these studies were conducted in the USA, two in Australia, and one each in Germany, the Netherlands, and Korea. Seven studies had a quasi-experimental research design and one study had a prospective longitudinal research design. The duration of the studies varied from 32 days to 22 months. The sample size of these eight studies varied from 43 to 182 employees.

HRM practice/intervention

Of these eight studies, only two studies are discussed exclusively in this section.^{608,609} These studies researched the role of employee participation in the process of introducing changes to their own jobs, and the impact of employee participation in the job evaluation process, as HR practices.

The other six studies used employee participation in conjunction with other practices, for example

TABLE 52 Employee representation/involvement/participation

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Coch and French (1948) ⁶⁰⁸ USA	Quasi-experimental design 46 employees 32 days	Employee participation in the process of introducing changes to the job <i>Moderator/mediator:</i> None	No	Productivity; labour turnover	Company data	<i>Positive effect:</i> Participation of employees in the process of making changes to their jobs reduces the resistance to change and increases their post change productivity. It also helps in reducing employee turnover
Morgeson et al. (2001) ⁶⁰⁹ USA	Quasi-experimental 168 employees 3 months	Employee participation in job evaluation process <i>Moderator/mediator:</i> None	No	Pay satisfaction	PSQ (Horeman and Schwab 1985) ⁶¹⁵	<i>No effect:</i> Participation in the job evaluation process made no impact on employee pay satisfaction
Kleinbeck and Fuhrmann (2000) ⁶¹⁰ Germany	Quasi-experimental 43 employees 22 months	Participative productivity management (PPM) system	No	Productivity Group cohesion	Organisational productivity measure Group cohesion: Adapted from three scales – Widmeyer et al. 1985; ⁶¹⁶ Luhtanen and Crocker (1992), ⁶¹⁷ Wagner and Zick (1993) ⁶¹⁸	<i>Positive effect:</i> PPM led to improved productivity <i>No effect:</i> PPM had no effect on group cohesion
Pearson (1987) ⁶¹¹ Australia	Quasi-experimental 42 teams 12 months	Participative goal setting	Yes	Performance; job satisfaction	Performance: Achievement of set goals in the given time Job satisfaction: JDS (Hackman and Oldham 1975) ¹⁹⁵	<i>Positive effect:</i> Participative goal setting has positive effects on employee performance and job satisfaction
Pearson (1991) ⁶¹² Australia	Quasi-experimental 76 teams 5 months	Participative system for monitoring productivity Feedback on performance (productivity)	No	Role ambiguity and role conflict; internal work motivation; job satisfaction; productivity	1. Rizzo et al. (1970): ⁵⁰³ Role index 2. JDS (Hackman and Oldham, 1975); ¹⁹⁵ Internal work motivation 3. Job satisfaction (Cammann et al. 1979) ⁶¹⁹	<i>Positive effect:</i> Monitoring and feedback had a significant effect on reducing role ambiguity, increasing job satisfaction and increasing productivity

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Kleingeld et al. (2004) ⁶¹³ Netherlands	Quasi-experimental 182 employees 18 months	PMS (ProMES): Participation in implementation of a PMS	Yes	Individual performance data	Performance data from feedback reports generated by the PMS	Positive effect: Implementation of a ProMES was found to be better in improving employee performance than implementing the system based on simply telling the employees what was expected of them
Lee and Son (1998) ⁶¹⁴ Korea	Prospective longitudinal 116 employees 6 months	Appraisal review: Employee get opportunity to participate in discussion; goals are clearly set; career issues are discussed	No	Satisfaction with review; performance	Three-item scale made by the authors Performance ratings	Positive effect: Goal setting and career discussion of the appraisal review were positively related to employee satisfaction No effect: Overall, appraisal review had no effect on job performance
Latack and Foster (1985) ⁵²⁴ USA	Quasi-experimental 84 information systems professionals 18 months	Practices: Compressed work week (work schedule: 3 days, 38 hours) Participation in decision to adopt the compressed work week Moderators/mediators: None	No	Overtime costs; error rates; job satisfaction; the work schedule; absenteeism; personal leave time	JDI (Smith et al. 1969) ²⁴³	Positive effect: The data suggests substantial organisational pay-offs, including reduction in sick time costs, overtime costs and personal leave time Those involved in decision to adopt compressed work week expressed greater satisfaction with the work schedule No effect: There was no effect of compressed work week on either their job satisfaction or error rates

PMS, performance management system; PPM, Participative Productivity Management; ProMES, Performance Management System; PSQ, Pay Satisfaction Questionnaire.

performance management and staffing, and are therefore discussed in those sections as well.

Outcomes

The following outcomes were studied in the articles reviewed in this section: overtime costs, productivity (three papers), performance (three papers), error rates, labour turnover, pay satisfaction, group cohesion, job satisfaction (three papers), role ambiguity and conflict, work motivation and absenteeism.

Results

Results from two studies focusing exclusively on employee participation arrived at different conclusions, possibly due to the nature of the outcome measure and area of participation in which the employees were involved (one being a very specific intervention). The study by Coch and French⁶⁰⁸ found that participation of employees in the process of introducing changes to their jobs led to less resistance to change, improved labour productivity and helped reduce labour turnover. In contrast, the study by Morgeson *et al.*⁶⁰⁹ found that employee participation in a job evaluation process had no effect on employee pay satisfaction.

There were five studies on the use of participation in performance/productivity management practices. All five studies supported the conclusion that participation and involvement in any form of performance management practice positively impacts on outcomes, for example productivity, job performance, job satisfaction, role ambiguity and role conflict.^{610–614}

The eighth study was on the use of employee participation in the implementation of a compressed work week. It concluded that those involved in the decision to adopt a compressed working week expressed greater satisfaction with their work schedule than those not involved in the decision.⁵²⁴

Omissions

For this review, two studies had a primary focus on the effects of participation. The remaining studies all included participation as part of the evaluation of another HRM practice.

Summary

There were eight studies in this category, with six also being discussed in other sections, namely performance management and staffing. Seven of these studies used quasi-experimental design and one used a prospective longitudinal study. The

majority supported the positive impact of using employee participation when making key decisions that affect their working. There appeared to be less emphasis in the literature on using longitudinal research design to study the impact of participation practices, such as collective bargaining and employee involvement in strategic decision-making.

Performance appraisal and performance management

Studies in this section cover performance appraisal and performance management practices.

Details of studies

Twenty-five studies met the inclusion criteria (*Table 53*). Nineteen of these studies were conducted in USA, two in Australia and one each in the Netherlands, Germany, New Zealand and Korea. One study used a complete RCT experimental design, nine studies used quasi-experimental methods and 15 had a prospective longitudinal research design. The duration of the studies varied from 7 weeks to 6 years. The sample size of these 25 studies varied from five teacher–student dyads (10 persons in all) to 4413 employees.

HRM practice/intervention

The studies were concerned with one of the following:

- feedback
- goal setting, alone or in combination with feedback and/or incentives
- performance or productivity management systems, alone or in combination with feedback, goal setting, and incentives
- performance appraisal.

The largest number of the studies was on the use of feedback systems and their ability to influence desired outcomes. There were 13 studies that had feedback as their main independent variable, focusing on how rich feedback, characterised by large amounts of specific and positive information on one's work behaviour, can impact on performance and employee outcomes.

Goal setting, either alone or in combination with feedback and/or incentives, was investigated by six studies. The focus of these studies was on Locke's⁶²⁰ theory of goal setting, exploring how performance and attitudinal outcomes can be influenced by the way in which goal setting is conducted and implemented.

TABLE 53 Appraisal/performance management

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Codding <i>et al.</i> (2005) ⁶²⁷ USA	Prospective longitudinal Five teacher-student dyads (10 persons) 22 weeks	Performance feedback	Yes	Implementation of antecedent and consequence procedures in an ongoing behaviour support plan	Integrity data sheet	Positive effect: Treatment integrity of intervention improved
Kinicki <i>et al.</i> (2004) ⁶³⁷ USA	Prospective longitudinal 102 loan officers 12 months	Performance appraisal feedback: Feedback rich environment (specific, frequent, and positive feedback) Mediation: Credibility of the source of feedback	No	Job performance (mediated by cognitive variable)	Organisation's performance appraisal forms	Positive effect: A feedback rich environment is positively related to perceived accuracy of feedback, which leads to better performance Credibility of the source of feedback is also positively related to perceived accuracy of the feedback and recipients' intention to act on it
Smither <i>et al.</i> (2004) ⁶²³ USA	Prospective longitudinal 4413 financial services employees 12 months	Sharing of multisource feedback with colleagues	No	Performance	360° performance appraisal	Positive effect: Though the performance improved, the effect size of the improvement was very small (explained only 2% of the variance)
Reilly and Smither (1996) ⁶²¹ USA	Prospective longitudinal 92 managers 2.5 years	Upward feedback programme	No	Performance	Performance rating scale developed by the authors	Positive effect: Continued administration of upward feedback programme results in sustained improvement in performance
Parsons <i>et al.</i> (1985) ⁶²⁸ USA	Prospective longitudinal 51 hotel staff 6 months	Supervisor feedback	No	Attributions of performance: Luck or effort; job satisfaction; job turnover	1. JDI (Smith <i>et al.</i> 1969) ²⁴² 2. Attributions (Porac <i>et al.</i> 1981) ⁶³⁸	Positive effect: Positive supervisory feedback increased internal attribution, which increased work satisfaction and decreased turnover
Komaki <i>et al.</i> (1982) ⁶²⁶ USA	Quasi-experimental 200 employees 11.5 months	Feedback	No	Safety behaviour	Questionnaire for desired safety practices	Positive effect: Feedback improved safety behaviour

continued

TABLE 53 Appraisal/performance management (continued)

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
LeBaron et al. (1997) ⁶³⁹ USA	Prospective longitudinal 200 public clinics 6 years	Programme of measurement and feedback	No	Rate of vaccination coverage	Routine record-keeping	Positive effect: Regular feedback improved immunisation of the target population significantly
Walker and Smither (1999) ⁶²² USA	Prospective longitudinal 252 managers 5 years	Upward feedback	No	Job performance	Survey of performance devised by the authors	Positive effect: Upward feedback improves managerial performance
Arvey et al. (1978) ⁶²⁹ USA	Prospective longitudinal 245 employees 21 months	Goal setting (use of MBO)	No	Employee satisfaction	MSQ (Weiss et al. 1967) ⁴⁷³	Positive effect: There is a significant positive relationship between use of MBO and employee satisfaction
Ivancevich (1976) ⁶³⁰ USA	Quasi-experimental 104 sales persons 12 months	Goal setting (participative/assigned/ no goal setting)	No	Performance; job satisfaction	Market potential index – total retail sales volume divided by potential retail sales volume (p. 608); – two scales from JDI (Smith et al. 1969) ²⁴³	Positive effect: Both participative and assigned goal setting resulted in better performance and job satisfaction; the effects of these interventions were only there up to 12 months and the effects dissipated after 12 months of intervention suggesting regular training and refreshing the goal-setting process
Pearson (1987) ⁶¹¹ Australia	Quasi-experimental 42 teams 12 months	Participative goal setting	Yes	Performance; job satisfaction	Performance: Achievement of set goals in the given time Job satisfaction: JDS (Hackman and Oldham 1975) ¹⁹⁵	Positive effect: Participative goal setting has positive effects on employee performance and job satisfaction
Ludwig and Geller (1997) ⁶²⁵ USA	Quasi-experimental 324 pizza delivery persons 11 weeks	Goal setting and feedback	No	Safety behaviour	Wearing of safety belt	Positive effect: Goal setting with feedback improved safety behaviour of the employees

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Kim and Hamner (1976) ⁶²⁴ USA	Quasi-experimental 113 employees 3 months	Performance feedback (evaluative vs non-evaluative and goal setting)	No	Productivity; satisfaction	Performance: Achievement of set goals Job satisfaction: JDI (Smith et al. 1969) ²⁴²	<i>Positive effect:</i> Non-evaluative feedback with goal setting led to higher productivity and job satisfaction compared with goal setting alone <i>Positive effect:</i> Goal contingent payment with participative goal setting was better than hourly pay
Campbell (1984) ⁶³¹ USA	RCT 56 graduate students 6 weeks	Incentives: No pay; hourly pay; goal contingent pay; goal setting	No	Performance	Achievement of set targets	<i>Positive effect:</i> Goal contingent payment with participative goal setting was better than hourly pay
Kleinbeck and Fuhrmann (2000) ⁶¹⁰ Germany	Quasi-experimental 43 employees 22 months	PPM	No	Productivity; group cohesion	Organisational productivity measure Group cohesion: Adapted from three scales: Widmeyer et al. 1985, ⁶¹⁶ Luhtanen and Crocker 1992, ⁶¹⁷ Wagner and Zick 1993 ⁶¹⁸	<i>Positive effect:</i> PPM led to improved productivity <i>No effect:</i> PPM had no effect on group cohesion
Taylor and Pierce (1999) ⁶³² New Zealand	Prospective longitudinal 129 regional environmental council employees 6 months	PMS Pay for performance (focus on goal setting and appraisal) Interaction effects with: High and low performers	No	Work-related attitudes: Satisfaction with supervision and cooperation	Commitment – 15-item scale (Mowday et al. 1979), ⁵¹⁶ organisation-based self-esteem; job satisfaction – five-item (Hackman and Oldham 1975), ⁶⁴⁰ satisfaction with supervisor – five-item; cooperation with supervisor – four-item	<i>Mixed effects (PMS in interaction with high/low performer):</i> Substantial increases in ratings of satisfaction and cooperation with one's supervisor was found with the introduction of PMS for low performers. In contrast, high performers had high baseline for these attitudes towards supervision, followed by substantial drops immediately after receiving appraisal and bonus pay
Pearson (1991) ⁶¹² Australia	Quasi-experimental 76 teams 5 months	Participative system for monitoring productivity; feedback on performance (productivity)	No	Role ambiguity and role conflict: Internal work motivation; job satisfaction; productivity	Rizzo et al. (1970), ⁵⁰³ role index; JDS (Hackman and Oldham 1975), ¹⁹⁵ internal work motivation; job satisfaction (Cammann et al. 1979) ⁶¹⁹	<i>Positive effect:</i> Monitoring and feedback had a significant effect on reducing role ambiguity, increasing job satisfaction and increasing productivity

continued

TABLE 53 Appraisal/performance management (continued)

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Pritchard et al. (1989) ⁵⁷⁷ USA	Prospective longitudinal Five organisational units 2 years	ProMES: A system that developed productivity measurement in order to provide feedback to measure productivity; comprising feedback, goal setting and incentives based on achieved goals	No	Productivity	ProMES scale was used to measure productivity	<i>Positive effect:</i> Feedback alone improved productivity by 50%; when goal setting and incentives were added to it, productivity improved by 76%
Kleingeld et al. (2004) ⁶¹³ Netherlands	Quasi-experimental 182 employees 18 months	ProMES: Participation in implementation of a PMS	Yes	Individual performance data	Performance data from feedback reports generated by the PMS	<i>Positive effect:</i> Implementation of a participative PMS (ProMES) was found to be better in improving employee performance than implementing the system based on simply telling the employees what was expected of them
Pritchard et al. (1988) ⁵⁷⁶ USA	Quasi-experimental Five organisational units 2 years	ProMES A system that developed productivity measurement in order to provide feedback to measure productivity; comprising feedback, goal setting and incentives based on achieved goals	No	Productivity; job satisfaction; turnover intentions; morale; role clarity	ProMES Job satisfaction: Seven items adapted from MSQ (Weiss et al. 1967) ⁴⁷³ Turnover intention: Own questionnaire Morale: Adapted from ISR instruments (Seashore et al. 1983) ⁵⁹⁵ Role clarity: Adapted from Rizzo et al. (1970) ⁵⁰³	<i>Positive effect:</i> Results indicated that group-level feedback increased productivity on average by 50%, which was raised to 76% when goal setting and incentives were added to it. Work attitudes (e.g. job satisfaction, turnover intentions and morale) were good or better following intervention No such changes were observed in the control group
Murray (1981) ⁶³³ USA	Prospective longitudinal 87 managers 2.5 years	Performance appraisal: objective result orientated (MBO); subjective trait approach	No	Employee attitude towards the performance appraisal	Scale developed by the authors	Result-orientated (MBO) performance appraisal was viewed more positively by the employees than the trait approach to performance appraisal

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Lee and Son (1998) ⁶¹⁴ Korea	Prospective longitudinal 116 employees 6 months	Appraisal review: Employee get opportunity to participate in discussion Goals are clearly set; career issues are discussed	No	Satisfaction with review; performance	Three-item scale made by the authors; performance ratings	<i>Positive effect:</i> Goal setting and career discussion of the appraisal review were positively related to employee satisfaction <i>No effect:</i> Overall, appraisal review had no effect on job performance <i>Negative effect:</i> Introduction of electronic monitoring of employees at workplace in place of self regulated or supervisory monitoring had a negative effect on employees' perception of fairness and led to decrease in a climate of organisational trust
Westin (1992) ⁶³⁴ USA	Prospective longitudinal 200 customer service agents Not provided	Electronic monitoring	No	Employee perceptions of fairness; climate of organisational trust or distrust	Focus group and survey	<i>Positive effect:</i> A personal recognition programme resulted in significant decrease in employee absence compared with their baseline behaviour before the programme Control group showed no such improvement
Markham et al. (2002) ⁶³⁵ USA	Quasi-experimental Four plants (1100 employees) 12 months	Positive attendance improvement programme: Experimental group were part of a recognition programme; personal attention; public celebration; use of mementoes; time framed recognition; clarity of expectations; source of acknowledgement Control groups: Only information feedback; survey only; no intervention	Yes	Improvement in attendance	Absence measure at the plant level (no. of absentees/total no. of the pay role on a given day)	<i>Positive effect:</i> An operant-based system of individual rewards contingent on meeting group quota produced reliable performance increases among the telemarketers
Fellows and Mawhinney (1997) ⁶³⁶ USA	Prospective longitudinal 14 telemarketers 7 weeks	Reinforcement schedule and feedback function	No	Performance	Calls completed per group per day	

MBO, management by objectives; MSQ, Minnesota Employee Satisfaction Questionnaire; PMS, performance management system; ProMES, Productivity Measurement and Enhancement System.

There were six studies on how types of performance or productivity management systems are related to employee job performance or productivity. Three of these studies investigated the impact of a productivity management tool [Productivity Measurement and Enhancement System (ProMES)], on employee productivity and attitudinal outcomes.

There were two studies on how different types of performance appraisal or performance appraisal reviews can impact on given outcomes.

Of the remaining studies in this section, one looked at electronic monitoring of employees at work, one at recognition, and one at operant conditioning reinforcement schedules to boost performance or other desired outcomes.

Outcomes

Sixteen of the 25 studies looked at job performance or productivity as one of their outcomes. Job satisfaction was the second most investigated outcome variable, with eight studies including it as their dependent variable. Other variables that were investigated in these studies are attendance, safety behaviour and turnover.

Results

Feedback

Of the 13 studies on feedback, eight were on feedback alone and the rest were on feedback in combination with either goal setting or some form of performance or productivity management system. Four studies investigated how feedback impacts on job performance – all four used a prospective longitudinal design and indicated that feedback leads to a significant improvement in job performance of employees. Two of these studies used upward feedback (subordinate feedback on supervisor performance) as an intervention and found that it enhanced managerial job performance.^{621,622} One study investigated how feedback sharing with raters and seeking suggestions for improvement can influence the ratee's performance. The study concluded that, although there was a statistically significant difference between the ratees who shared their feedback and sought advice and those who did not, the effect size of improvement in performance was very low and explained only 2% of the variance.⁶²³ Two studies on feedback, using quasi-experimental designs, found that a significantly positive impact on employee productivity.^{612,624} Two other studies, one quasi-experimental and the other prospective longitudinal, concluded that feedback enhanced the safety behaviour of employees.^{625,626} The study

by Codding *et al.*⁶²⁷ reported that use of feedback can enhance the implementation integrity of an intervention programme. Feedback also helped to improve job satisfaction and reduce job turnover.^{612,628}

Goal setting, feedback and incentives

There were three studies on goal setting alone. Two of these used a quasi-experimental design and one used a prospective longitudinal research design. All three studies concluded that goal setting has a positive impact on job performance and job satisfaction, and showed that participative goal setting is particularly beneficial.^{611,629} However, the study by Ivancevich⁶³⁰ found that the effects of goal setting on job performance were not permanent and tended to dissipate after 12 months.

The other three studies were on goal setting in combination with feedback or financial incentives. Two studies concluded that goal setting works best when it is participative and combined with adequate feedback.^{624,625} Campbell⁶³¹ used an experimental design and reported that incentives linked to goal setting led to better performance than when incentives are paid at an hourly rate.

Performance or productivity management systems, feedback and incentives

All performance management systems used a combination of practices to achieve their desired outcomes. Of the six studies in this category, five investigated how these systems influenced productivity or employee performance. All of these studies concluded that performance or productivity management systems enhanced employee performance or increased productivity.^{576,577,610,612,613} Three of these studies were on the use of ProMES and all three concluded that, although feedback alone improves productivity by around 50% when combined with goal setting and incentives, productivity goes up by 76%.^{576,577} The sixth study on the use of a performance management system explored the impact of a newly installed performance management system, along with pay for performance on employee attitudes. The study found that high and low performers reacted differently to use of a performance management system involving pay for performance. For low performers, the new performance management system substantially increased ratings of satisfaction and cooperation with one's supervisor. In contrast, high performers had a high baseline for these attitudes towards supervision, followed by substantial drops immediately after receiving appraisal and bonus pay.⁶³²

Performance appraisal

There were only two longitudinal studies in this section that dealt with the impact of performance appraisal on given outcomes. The study by Murray⁶³³ found that use of objective performance appraisal coming from management by objectives was viewed more favourably than a trait-based performance appraisal system. Lee and Son⁶¹⁴ explored the impact of performance appraisal review on employee satisfaction and performance, and concluded that goal setting and career discussion components of the appraisal review were positively related to employee satisfaction. However, overall performance appraisal review was found to be unrelated to employee performance.

Studies on miscellaneous practices of performance management

There were three papers that explored the use of various performance management techniques to achieve outcomes, for example attendance and job performance. The paper by Westin⁶³⁴ found that the use of electronic monitoring of employees attendance and working was associated with decreased trust. The study by Markham *et al.*⁶³⁵ concluded that a positive attendance management programme, characterised by recognition, personal attention, public celebration, use of mementoes, clarity of expectations and acknowledgement, can significantly improve employee attendance. Fellows and Mawhinney⁶³⁶ concluded that an operant-based system of individual rewards contingent on meeting a group quota produced reliable performance increases among the telemarketers.

Omissions

Although there were no significant omissions on performance management, there does seem to be less longitudinal research on the use of various form of performance appraisal tools and techniques, and their impact on individual, team or organisational performance. The current section has only two studies on performance appraisal per se.

Summary

There are 25 studies in this review on performance appraisal and performance management. One study used an RCT method, nine used quasi-experimental methods, and 15 studies used prospective longitudinal design. The studies in this section can be grouped in four major categories, namely feedback, goal setting, performance management systems and performance appraisal studies. Three studies used various other techniques to achieve the desired outcomes. The

most studied outcomes were job performance and job satisfaction, with 16 and eight papers, respectively. Feedback was found to have a positive impact on job performance and job satisfaction, but feedback, in combination with goal setting and incentives, had a better impact on the desired outcomes. There seemed to be less emphasis by researchers on conducting longitudinal studies on impact of various types of performance appraisal systems on performance-related outcomes, as only one study explored that link.

Integrated measures

In this chapter we have been examining the impact of individual HRM practices on an outcome or plurality of outcomes, be they intermediate or final. It is often argued in the HRM literature that management practices work best when used in conjunction with other practices that fit together as a coherent set. Such sets of internally consistent practices are typically referred to as HR systems. The focus of much of the recent discussion has been on high-involvement systems, the core of which are practices designed to foster a high level of appropriate employee involvement and proactivity at all levels of the organisation. The term high-performance work system has increasingly been used – ahead of any strong evidence that the title is warranted – to label such a system. According to the US Department of Labour (1993: 1)⁶⁴¹ they are defined as: ‘Systems of mutually reinforcing practices [that] create multiple ways to develop worker skills, to align individual and organisational goals, and to share information crucial to solving problems’. In a similar vein, a decade later, Datta *et al.* (2005: 135)⁶⁴² saw them as systems ‘of HR (human resource) practices designed to enhance employees’ skills, commitment, and productivity’.

In such accounts, the concept of a high-performance work system is clearly linked to the high-involvement management emphasis on participation and employee commitment.^{1,191} The argument is that high-performance systems give workers sizeable discretion over their work, and provide the necessary skills and motivation for them to use this discretion for the benefit of the organisation. Work organisation practices, designed to provide opportunities for employee participation in substantive ‘shop floor’ decisions (Appelbaum *et al.* 2000: 26),¹³ are thus treated by some as the core high-performance practices, while skill acquisition and motivational enhancement practices are the HRM practices that are

'supportive' of this participation (Gittleman *et al.* 1998: 102).⁶⁴³ However, as Wood and Wall³¹ show, the involvement aspect has increasingly been neglected in the empirical work on HRM systems, at least in the stream of cross-sectional studies that developed in the 1980s following pioneering work by Arthur,¹⁴ MacDuffie,²⁰ Huselid¹⁸ and others. As the resource-based theory has been increasingly used to justify the association of HRM systems with high performance, the seeds for a diminishing role for employee involvement were set relative to emphases on skills and knowledge, labour flexibility and extrinsic motivation. This theory stresses that organisations achieve competitive advantage through having distinctive, if not unique, resources that are not easily imitated or substitutable.^{644,645} It thus sees HRM systems as particularly important for generating the competences of employees, and some even talk of the HRM system itself becoming a unique asset of the organisation, though this is not consistent with the idea of there being a generic type (or types) of system(s) that should result of high performance.

The emphasis on the need for practices to cohere if performance is to be optimised remains. The argument is, to use the words of Appelbaum *et al.* (2000: 34) 'that firms adopting a coherent set of workplace practices designed to maximise horizontal fit should have superior performance'. The authors take cohesion to mean that (1) the workplace practices are complementary; (2) synergies exist between the practices leading to positive interaction effects on performance; and (3) the practices form an integrated system. However, these meanings are distinct and should not, as Appelbaum *et al.*¹³ and others do, be conflated. Following Delery⁶⁴⁶ and Wood and de Menezes,⁶⁴⁷ these should be seen as distinct ways of conceiving a horizontal fit. As Wood and de Menezes⁶⁴⁷ outline, a complement of practices consists of all those practices that individually have a positive association with performance. As such, a complement of high-performance practices would be made up of the practices that are best in each of the domains of HRM. Each would add something unique and not detract from the effect of any other. Synergistic practices are those that enhance the effect on performance of another. A high-performance synergistic set would be one in which all practices interact positively with each other, so that the combined use of the practices has 'a greater effect on performance than the sum of effects of the individual practices' (Appelbaum *et al.* 2000: 134).¹³ Finally, an integrated approach implies that the practices reflect an underlying distinctive style⁶⁴⁸ or orientation to HRM, and that

it is this, and not the particular practices per se, that is really yielding high performance.

Through our analysis of individual practices, which has examined the connection between these and outcomes, we have identified a set of practices that may be best in each domain. We could, therefore, create a complementary set on the basis of this. However, to be certain they are complementary, we would need to ascertain that they have no negative impact on the effect of each other. For example, it is often argued that individual performance-related pay will detract from the positive effects of teamwork.

In our analysis of individual practices, we reported any synergistic relationships between practices. For example, in our review of performance appraisal studies we report two studies that show that goal setting works best when it is participative and combined with adequate feedback.^{624,625} We have not examined, however, studies that have used composite measures of HR practice or systems, as those studies typically do not compare the effect of individual practices with those of their composite measure.

In this section, we will introduce and report the results of studies that use composite measures of the HR system. We will continue to use our methodological selection criteria that limits our search to longitudinal, experimental or quasi-experimental studies.

The studies are concerned with assessing the impact of a particular system or subsystem of HRM. For example, Freeman and Kleiner⁶⁴⁹ concentrate on continuous flow production system, which is centred on a time-rate compensation system complemented by other HR changes, for example a new safety programme. This is contrasted with a piecework system in which payment is based directly on output and the system of production is highly individualised. Or in the case of Shipton *et al.*⁶⁵⁰ the central concept is the sophistication of HRM.

The studies are of two basic types: (1) ones that measure the system through a composite variable based on the extent of use of a set of practices to capture a system – as in the case of Shipton *et al.*'s⁶⁵⁰ sophistication of HRM – and (2) case studies before and after the introduction of a new system, as in Freeman and Kleiner's⁶⁴⁹ study of a change from piecework system to the new continuous flow production.

Details of studies

Ten studies met the inclusion criteria (*Table 54*). All of the studies were published in English, with seven being conducted in USA, two in the UK and one in Germany. The majority were prospective longitudinal studies.^{21,27,645,649–652} One study³⁷ used a prospective design, while Schuster⁶⁵³ used a retrospective longitudinal design. Finally, one study was a RCT.⁶⁵⁴

Some of the studies involved statistical analysis across samples of companies or workplaces,^{21,27,645,650–652} whereas others involved qualitative analysis supplemented by quantitative analysis of a single company.^{649,652–654}

HRM construct

No two studies examined the same concept.

Perhaps the simplest concept used was the HR practice of Wright *et al.*³⁷ This was measured by simply aggregating the use of nine practices: three concerned with selection and staffing, one with the extent of training, three with pay for performance, and two with participation – all measured by a simple binary divide (have or have not).

In a similar vein, HRM was the central concept of Guest *et al.*²⁷ It was again measured by an index containing 48 items that covered nine areas: recruitment and selection, training and development, appraisal, financial flexibility, job design, two-way communication, employment security and the internal labour market, single status and harmonisation, and quality.

Shipton *et al.*⁶⁵⁰ considered HRM systems in terms of their degree of sophistication, which, although not conceptually defined, was rated by an interviewer. Five dimensions were assessed: performance management, recruitment and selection, induction, training, and strategy. A high score on each represents sophistication and extensiveness, for example in the case of performance management, not only is there a formal appraisal scheme, but also appraisals are frequent, appraisers are trained and it extends to all employees.

Workman and Bommer⁶⁵⁴ focus on high-involvement work processes. Three types of interventions, effectively measuring three degrees of high-involvement management, were designed. The type that was the least level of involvement, labelled 'alignment job *design*', entailed removing impediments to effective motivation and the

fulfilment of job requirements, but no fundamental changes were made. The practices used were job rotation, aligned individual-organisational performance systems, and merit pay and bonus schemes. The intermediate group (called 'high-involvement work processes') involved more participation, in particular, quality circles, seeded by mentors, were introduced and workers were given participation training to help them adapt to an increased level of interdependent working. A gain-sharing reward system was introduced alongside the merit pay and bonus schemes used in the 'alignment job design'. The final intervention was 'autonomous work teams', where the team was self-managed, so responsibilities for problem-solving as well as job design itself were shared. Participation training was given and the group devised a team-based merit pay.

The core concept of Rauch *et al.* (2005: 683)⁶⁴⁵ was human development and utilisation, which is defined in terms of a set of 'practices used for enhancing employee skills through training and other forms of skill enhancement'. They included practices such as employee participation, empowerment and communication in the other forms of skill enhancement.

Ichniowski *et al.*²¹ assumed that there is a set of innovative HR practices that are at least applicable to traditional manufacturing industries, for example steel. Innovative work practices are: incentive pay, high screening in recruitment and selection, teamwork, employment security, flexible job assignments, high skills training and information sharing, and line manager-worker meetings on production and other issues. Using cluster analysis, Ichniowski *et al.*²¹ empirically identified four types of plants: at the two extremes, 'innovative' plants used all the labour practices, whereas 'traditional' plants used none of these practices. The two intermediate types both had teams, in contrast with the traditional system, but differed in the type of other practices they utilised. The more innovative of the two intermediate types differed from the high innovative system in that it did not tend to have screening in recruitment, employment security or job rotation, while the other intermediate type tended only to have information sharing and line manager-worker meetings. It was having these that differentiated it from the 'traditional' plants.

Katz *et al.*⁶⁵² reported a similar interplant study, but studied only one firm and focused on a company-wide quality of work programme,

TABLE 54 Bundles

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	Outcomes	Outcome measure(s)	Results +ve/-ve
Rauch <i>et al.</i> (2005) ⁶⁴⁵ Germany	Prospective longitudinal 119 entrepreneurs 4 years	HR development and utilisation: Training and development; decision-making involvement; support for personal initiative; goal communication	Employment growth	Average yearly growth in the number of employees during the last 3 years	Owners' human capital as well as employee HR development and utilisation are positively correlated with employment growth
Shipton <i>et al.</i> (2005) ⁶⁵⁰ UK	Prospective longitudinal 25–27 UK-based companies 2 years	HRM systems: Sophistication of HRM; learning climate; appraisal-linked remuneration	Organisational innovation in products and production technology	Respondents from the companies gave estimates of the number of entirely new and adapted products developed in the last 2 years; percentage of production workers involved in making the new products; current sales turnover accounted for by the new products; and the extent to which production processes had been changes to accommodate the new products	Effective HRM systems (incorporating sophisticated approaches to recruitment and selection, induction, appraisal and training) predict organisational innovation in products and production technology Organisational innovation is enhanced where there is a supportive learning climate, and inhibited (for innovation in production processes) where there is a link between appraisal and remuneration
Freeman and Kleiner (2005) ⁶⁴⁹ USA	Prospective longitudinal Case study of a single company 5 years	Individual practice of specific importance: Shift from piece rate to time rate form of compensation; bundle of practices: HR practices that were required for working in synchronisation with the new compensation system: Teamwork (more emphasis); communication skills	Productivity; profits	Monthly company data Productivity: Average number of shoes produced per day Profits: Total revenue minus labour costs and material costs	Labour management policies associated with shift from piece rate to time rate compensation decreased productivity but still increased profits (due to reduced labour and other costs)
Workman and Bommer (2004) ⁶⁵⁴ USA	RCT/full field experiment 149 call centre employees 10 months	Three interventions: Aligning organisational structures; increasing employee involvement; implementing autonomous work teams	Individual-level outcomes: Degree of group orientation; job satisfaction; organisational commitment Group-level performance measures: Customer survey scores; problems solved; escalations; repeat calls	Job satisfaction: Warr <i>et al.</i> (1979), ⁴⁷⁵ Intrinsic job satisfaction scale Organisational commitment: OCQ by Mowday <i>et al.</i> (1979) ⁵¹⁶ Performance: Customer service score; problems closed per employee; percentage of calls escalated; percentage of repeat calls	High-involvement work practices produced the most potent effects on job satisfaction and organisational commitment attitudes as well as performance Group work preference moderated the results between such that under high involvement and in autonomous work teams, high preferences for group work resulted in greater job satisfaction than when employees had lower preferences for group work

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	Outcomes	Outcome measure(s)	Results +ve/-ve
Wright <i>et al.</i> (2003) ³⁷ USA and Canada	Predictive design 50 business units (5635 respondents) 6 months	HR practices: Nine items in four areas – selection; pay for performance; training; participation; organisational commitment	Performance; Workers compensation; quality; shrinkage; productivity; operating expenses; profitability	Performance: Workers compensation; workers compensation/sales Quality: 100,000 pieces/error Shrinkage: Percentage of inventory loss Productivity: Payroll expenses/no. of pieces Operating expenses: All costs Profitability: Operating pre-tax profits/sales percentage	The HR practices of selection, pay for performance and training and employee participation, along with employee organisational commitment, are significantly related operational measures of performance
Guest <i>et al.</i> (2003) ²⁷ UK	Cross-sectional and longitudinal 366 firms 2 years	Use of HR practices: Recruitment and selection; training and development; appraisal; financial flexibility; job design; two-way communication; employment security; single status and harmonisation; emphasis on quality	Interviewee estimates of performance; Turnover; absence; industrial conflict; productivity; financial performance; objective performance; Labour productivity; financial performance	Manager estimates of labour productivity and financial performance on 5-point scale, compared against average for industry Independent financial data from Dun and Bradstreet: Value of sales per employee (labour productivity), company profit per employee (financial performance) Company records	Results show that greater use of the given HR practice is strongly associated with both productivity and financial performance but fails to show that HRM causes higher performance
Gomez-Mejia (1988) ⁶⁵¹ USA	Prospective longitudinal 388 firms 2.5 years	International HRM Strategy: Higher status for employees engaged in international activities; higher rewards for those engaged in international activities; international experience as a requirement for new hires; international experience as a requirement for promotion; training and development for engaging in international activities; international activities as a part of middle and upper management performance review	Export performance	Company records	The results of this study find significant impact of international HRM practices on export performance

continued

TABLE 54 Bundles (continued)

Study, country	Design, sample size, duration	Practice(s)/intervention(s); moderators/mediators (if any)	Outcomes	Outcome measure(s)	Results +ve/-ve
Ichniowski et al. (1997) ²¹ USA	Prospective longitudinal 36 homogeneous steel production lines owned by 17 companies 2190 observations	HRM practices bundle: Incentive pay (line incentive) Recruiting and selection (high screening); teamwork (high participation, multiple teams, formal team practice); employment security; flexible job assignment (job rotation); skills training; communication (information sharing, meet workers)	Productivity – labour	Production – increasing up-time	The study finds that lines that use these set of innovative work practices achieve substantially higher levels of productivity than lines that use a more traditional approach
Schuster (1983) ⁶⁵³ USA	Retrospective longitudinal Nine firms 5 years	Single intervention: Scanlon Plan – seemingly tailor-made to plants; labour and management committees	Productivity (output/hour); level of employment	On monthly basis; average number of workers employed on 12th day of each month	The results of this study find that use of cooperative programmes led to increase in productivity in six of the eight firms in which it could be measured and level of employment remained stable in eight out of the nine firms
Katz et al. (1983) ⁶⁵² USA	Prospective longitudinal 18 plants within a division of General Motors 9 years	Various practices: QWL programmes involving direct communication and 'shop floor decision-making'	Economic outcomes: quality index; efficiency Industrial relations outcomes: Grievance rates; absenteeism; disruption; contract demand; negotiation time; climate	Quality: No. of faults or demands appearing in inspections Efficiency: Direct labour hours/standardised hours calculated by industrial engineers; contract demands – no. of demands – often IR outcomes – self-explanatory	The study reports limited support for the QWL intervention in improving either the economic or industrial relations performance
IR, industrial relations; QWL, quality of work life.					

which, in Ichniowski *et al.*'s²¹ terms, was aimed at innovative practice. The practices used to measure the intensity of the quality-of-work programme were specific to the programme, ranging from upward communication programmes to alcohol- or drug-abuse programmes, and also included some procedural elements, for example the use of an outside consultant or quality-of-work specialist.

Schuster⁶⁵³ focused on unionised plants where the union and management had explicitly developed a cooperative relationship. The concept of union–management cooperation, the impact of which Schuster⁶⁵³ assessed, reflects the notions of Kochan about the changes in industrial relations in unionised settings in the early 1980s, also reflected in Katz *et al.*'s⁶⁵² study above, and culminated in Kochan's⁶⁵⁵ book with Katz and MacKersie, *The Transformation of Industrial Relations*. In Schuster's⁶⁵³ study there were differences between the novel practices, which varied across the nine manufacturing plants, but they most commonly involved plant-wide productivity-sharing plans, labour-management committees and work redesign projects.

Freeman and Kleiner⁶⁴⁹ contrasted continuous flow production with a piecework system, and conceptualised both primarily on the basis of their compensation systems, as these were, for them, 'a central element to any set of human resource policies' (ibid: 308). Nonetheless, the systems entailed complementary practices: piece rates were similar to supervisors who monitored the quality output and set rates, while the change to a continuous flow system included a change in the production system, teamwork, a new safety programme, as well as time rates. Such a contrast in systems is most applicable to shoe and apparel manufacturing, where piece rates have continued to be extensively used.

Gomez-Mejia's⁶⁵¹ focus was specifically on international HR strategy. The measure used was a seven-item scale that focused on how HR practice is geared to international elements, for example international experience is highly desirable when managers are hired or promoted, whereas some of the practices included reflect those in the other studies, for example inventive pay, intensive training.

Outcomes

The range of the outcomes used to test the impact of the various core HR constructs was equally large. The only two outcomes assessed in more than two

studies were economic; productivity was included in six and profitability or financial performance in four. Workers' compensation, a measure of the wages bill over sales revenue, was more a measure of efficiency than compensation. The other economic outcomes used in the studies, mainly in one only, were: quality, shrinkage, operating expenses, employment growth, employment stability, innovation in product, processes or technology, and export performance. Workman and Bommer⁶⁵⁴ used performance measures that were primarily specific to call centres, for example percentage of calls escalated, but also used a customer service measure. The other outcome measures used were concerned with HR or industrial relations measures – again mainly in one study only – and included: labour turnover, absenteeism, organisational commitment, job satisfaction, industrial conflict or disruption, contract demands, negotiation time, employment climate and grievance rate.

Results

Wright *et al.*³⁷ showed that HR practices lower operating expenses and increase profitability, and are also associated with organisational commitment, which Wright *et al.*³⁷ took to be suggestive of commitment mediating the link between HR practices and outcomes, although this is not formally tested.

The results of Guest *et al.*'s²⁷ study showed a positive association between HRM and profitability and a negative relationship between HRM and labour turnover. It was not, however, related to productivity. Moreover, when prior profit was included in the profitability equation, profit was no longer significantly associated with HRM. This suggests that profits may well lead to the introduction of HRM not vice versa, this conclusion being enhanced by the lack of association between HRM and productivity.

Shipton *et al.*⁶⁵⁰ revealed a positive link between sophisticated HRM and innovation in product and production technology, but not in process technology.

Workman and Bommer⁶⁵⁴ showed that the introduction of alignment job design, high-involvement work processes, and autonomous work teams all increased job satisfaction. However, in the case of autonomous work teams, the effect was moderated by the individual's preference for group working, so autonomous teams were only potent for those with such a preference. In the case of

high-involvement work processes, this preference intensified the positive impact of the processes on job satisfaction. Hence, while the job satisfaction of all individuals increased, the satisfaction of those with a strong preference for group working increased to a greater extent. However, only high-involvement work processes were associated with organisational commitment. Tests of performance showed that all three systems improved the four performance measures over and above the pre-test and control group measures, with the exception of one test, which showed that the number of problems resolved by employees was lower in autonomous work groups than for any other groups (including the control group).

The core concept of Rauch *et al.*,⁶⁴⁵ i.e. human development and utilisation, was positively associated with the only outcome measure they used, namely employment growth. The effect was also shown to be enhanced by the extent of the human capital of employees in the firm, measured by the owner's perception of whether employees were qualified to do the job.

Ichniowski *et al.*²¹ showed that the productivity of steel plants was progressively greater as they moved through each of the four categories, from traditional to innovative systems. Innovative systems were the most productive, while the limited use of innovative practices had some pay-offs.

The results of Katz's *et al.*'s⁶⁵² analysis of the performance effects of 'the quality of work life programme' revealed that the extent of the programme's adoption was related to product quality but not to higher productivity. Its effects on quality may have been partially mediated by its impact on grievance and absence rates (the two main effects for HR outcomes), which were negatively related to the extent of adoption.

Schuster⁶⁵³ showed that in six of the nine plants studied, the introduction of the cooperative programme increased productivity without the employment level being cut. The employment level was reduced in only one of the plants, and, unfortunately, this was the one plant where no productivity data were provided.

In contrast, Freeman and Kleiner's⁶⁴⁹ case study showed no productivity effects in the change from the traditional piece work system to a continuous flow method. However, profitability was improved. The costs of the complementary practices associated with piece work, for example

monitoring costs or costs involved in changing styles, were greater than those associated with the newly implemented time-based compensation and continuous flow method. These costs outweighed the productivity gains to be made from piece work, so, on balance, the new continuous flow system led to an overall better performance.

Gomez-Mejia's⁶⁵¹ study of international human resources strategy showed that the extent to which the firm had a strategy was positively associated with export performance.

Omissions

The main omission within the studies that directly purport to examine the impact of a HR system is that they did not specify, in any precise way, the concept of HRM underlying their work nor did they develop a clear rationale for the inclusion of the practices by which HRM was measured. Consequently the main omission from the set of studies is research that systematically defines its core concept and in which the correspondence between this and its measure is precise. There is also an absence of studies that first examine the association between the practices before constructing measures and as part of the understanding of the reality of the HRM they are studying.

There is also a lack of studies that test mediation effects, for example whether organisational commitment or job satisfaction mediates the impact of HRM on performance.

In the case studies, the practices are determined by the situation and in broad terms correspond to the concept of the underlying programme that the researcher is examining, although again in these cases more articulation of this concept would have been useful.

All studies are in the private sector and are mainly found in manufacturing settings. Studies of public sector and voluntary organisations were not identified by this review.

Summary

The studies taken together showed that HR practices do make a difference to performance. However, limitations in the methods and particularly the measures meant that, in many cases, the underlying concept was not clear enough for one to say which HR system is (or systems are) really more effective than others. The variety in the studies also limits generalisation.

Case studies, such as Freeman and Kleiner's⁶⁴⁹ offered convincing evidence of effects in one situation but generalisation to either other sites or assumed related or similar interventions would be premature. But even in some of the case studies there was insufficient detail of some practices to be certain about what they entailed, most notably Schuster's⁶⁵³ insufficient detail of the changes in job design in his cases.

Conclusions

The literature search to identify studies assessing the impact of HRM practices on intermediate and final outcomes in non-health-sector settings found evidence in nine of the ten categories of HRM practices established in Chapter 4. These are:

- work design
- staffing
- training and development
- compensation and rewards
- communication
- family friendly
- employee involvement, representation and participation
- performance appraisal and performance management
- integrated measures.

Work design has attracted most research attention accounting for over 50 of the identified studies. Other areas that have been the frequent focus of research include staffing (23 studies), training and development (25 studies), compensation and rewards (29 studies) and performance management (28 studies). In contrast with this, no evidence was found in the area of single status/harmonisation. This distribution of studies perhaps reflects the fact that the practices studied are in the longer established and more traditional HRM areas.

Additionally, the majority of studies included in this section measure individual level outcomes. Less research has looked at final outcomes (i.e. organisational performance).

As noted in Chapter 7 (Results, Work design), there are differences in the types of HRM practice that have been the focus of longitudinal research in the health and non-health sectors. Less research attention had been given here to the specific staffing practices of skill mix, staff ratios and working hours. In direct contrast with the health literature this chapter reports on six studies

examining the effects of different work schedules (such as flexitime, compressed work week and shift work) on various intermediate and final outcomes. However, the results cannot be presented in an additive manner due to the varied nature of the practices and outcomes studied.

The review of the health literature identified the heterogeneity of the studies included in the review and that finding is replicated here where the diversity of research topics in terms of HRM practices and outcomes measured often make it difficult to develop generalisable conclusions. This point is well-illustrated by the categories of work design, staffing and training and development where the HRM practices clearly fell into distinct subcategories.

There are some exceptions to this finding, where small numbers of papers were sufficiently similar to allow cumulative conclusions to be made.

Within the work design literature, consistent evidence has been found for the positive impact of increased job control and negative impact of high demands on employee outcomes, such as job satisfaction and absenteeism. Additionally, a number of concurring studies have established a positive link between autonomous team working and employee outcomes relating to individual/team productivity and job satisfaction.

Research investigating job rotation, job enlargement and job enrichment has concentrated more on the impact of job enrichment alone. Enriched jobs have been shown to be linked to reduced turnover, and to have a positive relationship with a number of intermediate outcomes including job satisfaction, motivation, involvement and commitment. Studies also mostly supported a positive relationship between job enrichment and employee performance and reduced turnover.

Within the literature on staffing, the studies investigating differing recruitment and selection techniques reported broadly positive impacts of these tools on intermediate outcomes including intention to leave, employee productivity, person-organisation fit and job satisfaction.

The studies across five broad training areas offer perhaps the best opportunity to develop generalisable conclusions. Although diversity was found in the types of training in this category (five subcategories) within each of these there was

reasonable similarity between the studies. Studies including performance and skill enhancement training provided consistent evidence that this type of training is associated with a range of positive outcomes. These are mostly measured at the individual level and often reflect the specific purpose of the training. Some of these studies include limited evidence on final outcomes, such as profitability and quality outcomes. Overall, the majority of studies present positive evidence on the outcomes specific to the training.

A group of studies that fall within both the performance management and compensation and reward categories looked at the impact of goal setting and feedback and found consistently positive results. Goal setting and feedback were found to enhance employee performance, particularly when goal setting is participative. In relation to compensation and rewards, several studies suggest that the effects of goal setting and feedback are enhanced by incentives.

The final area in which a consistent set of findings was identified is that of employee participation, representation and involvement. Here the majority

of results support the positive impact of using employee participation when making key decisions that affect them.

Despite these areas of commonality, the review is characterised by diversity and a lack of cumulative data. Overall, there are no more than four or five studies in any of the HRM practice categories that study the same intervention and outcomes. In addition, variations in organisational context in the non-health literature make it difficult to know how generalisable any findings are.

These findings point to significant gaps in longitudinal research in all of the HRM practice categories studied. These gaps exist on both the types of interventions being studied under a given practice and also the type of outcomes being investigated.

Despite these limitations, the findings do indicate some promising areas and give some indication of where the general HRM evidence base could inform future practice, policy and research in the NHS.

Chapter 9

Intermediate and final outcomes: correlations and effects

Introduction

This chapter addresses Objectives 3 and 4 of the review. It first considers findings from the literature on the relationship between intermediate outcomes of HRM practices. It then goes on to look at what evidence exists for the causal link between intermediate and final outcomes. The findings reported here specifically address:

- *Objective 3:* 3.1 What is the evidence on the intercorrelations of intermediate outcomes?
- *Objective 4:* 4.1 What is the evidence for the impact of intermediate outcomes on non-health final outcomes?
- *Objective 4:* 4.2 What is the evidence for the impact of intermediate outcomes on patient care outcomes?

Chapter 4 describes the intermediate and final outcomes, identified from the HRM literature for inclusion in this review. In Chapter 4 the importance of a third set of variables (salient employee behaviours) was also recognised. In relation to Objectives 3 and 4 this means the relationship between intermediate outcomes and salient productivity related employee behaviours (e.g. the association between job satisfaction and job performance). Employee behaviours were therefore considered alongside intermediate and final outcomes. These three groups of variables form the basis for the searches undertaken for this chapter.

Two sources of evidence were identified for this section, their use depending on the research objective:

- Meta-analyses and systematic reviews were used to examine the correlations among intermediate outcomes and the relationship of intermediate outcomes with employee behaviours.
- Individual longitudinal studies (in the absence of any systematic reviews) were used to investigate the impact of intermediate

outcomes on health and non-health final outcomes.

The chapter first presents methodology and findings from the meta-analyses in relation to correlations among intermediate outcomes and between intermediate outcomes and employee behaviours (Objective 3.1). The methodology and findings for the longitudinal studies linking intermediate with final outcomes are presented below (see Findings for Objective 4.2 and Findings for Objective 4.1).

Review methodology

No systematic reviews were identified in the searches for Objective 3.1. The methodology in relation to this objective therefore draws exclusively on meta-analytic reviews. We next provide a brief description of meta-analysis followed by details of the strategy used to identify and assess relevant meta-analyses.

Overview of meta-analysis

Meta-analysis is a powerful tool for summarising evidence of a relationship of interest across a number of studies. Taking the example of job satisfaction and organisational commitment, it allows individual studies reporting correlations between these two intermediate outcomes to be aggregated to provide an estimate of their true correlation. Meta-analyses are therefore an effective way of quantitatively reviewing the correlations among the intermediate outcomes and their relationships with employee behaviours. The large number of studies reporting correlations of interest to Objective 3.1 also points to the use of meta-analyses as the best source of evidence. For example, Judge *et al.*⁶⁵⁶ reporting on the correlation between job satisfaction and job performance, carried out a meta-analysis on 254 studies, comprising a sample size of 54,471 for all the studies, offering a far better synthesis of research than non-quantitative methods of review would allow.

Meta-analytic search strategy

A literature search (see example of typical research, below) was performed to identify meta-analyses and reviews on the selected intermediate outcomes. For each intermediate outcome, a search was conducted of the following electronic databases: MEDLINE, CINAHL, PsycINFO and Business Source Premier. Searches combined a validated search filter for identifying meta-analyses and systematic reviews (developed in MEDLINE but translated for the different databases)⁶⁵⁷ with a term, or terms, describing the intermediate outcome of interest. For example, searches for occupational commitment looked for the terms 'professional' or 'occupational' and 'commitment'. Sensitive searches were used in order to capture all possible papers.

Typical search

Database: Ovid MEDLINE <1950 to January Week 2 2007>

- 1 cochrane database of systematic reviews.jn. (3984)
- 2 meta-analysis.pt. (14,165)
- 3 medline.tw. (19,737)
- 4 systematic review.tw. (8284)
- 5 search.tw. (76,046)
- 6 or/1-5 (97,040)
- 7 organi?ational commitment.tw. (262)
- 8 6 and 7 (12)

Identifying meta-analyses for inclusion in the review

For inclusion in the review, meta-analyses had to satisfy the following criteria:

- The study had to be a meta-analysis or systematic review providing an analysis of 'the results of several independent ... trials or studies'.⁶⁵⁸ This excludes articles that perform analysis on a primary sample collected for the analysis, but that are described as a meta-analysis by its authors.
- The dependent variable of the meta-analysis or review had to be one of the selected intermediate outcome variables listed in Chapter 4, such as organisational commitment or job satisfaction.

- The meta-analysis or review had to report correlations between the dependent variable and at least one other selected intermediate outcome of interest, one of the employee behaviours (e.g. job performance), or a final outcome of interest (e.g. patient outcomes, profitability).
- The meta-analysis or review had to report a corrected correlation coefficient for this relationship. A correlation coefficient corrected takes into account unreliability of the measure of the independent variable or sampling error.
- The meta-analysis or review had to report the number of studies/samples from which the correlation coefficient was calculated.

Two reviewers independently sifted the results of literature searches to identify meta-analyses and reviews that satisfied these inclusion criteria. Reference tracking was also performed on included studies. Informal methods such as contact with experts and purposive searching offered an additional potential source of relevant studies.

Critical appraisal

All meta-analyses and reviews are vulnerable to different types of bias or error, which, in turn, affect their validity and reliability (see Appendix 9 for a fuller discussion of bias in meta-analyses). Meta-analyses and reviews should aim to use measures to limit the various potential sources of error or bias that may affect their methodological quality and their findings.⁶⁵⁹ The guidelines and reviews evaluating this form of analysis all stress the importance of adequate searches to identify relevant studies, the need for explicit inclusion criteria, and the need to appraise the quality of included studies.⁶⁵⁹⁻⁶⁶²

The quality of all included meta-analyses in this section of the review was evaluated using a checklist developed for this study (see Appendix 10), based on currently available checklists^{663,664} research on meta-analysis^{61,659-662,665-667} and piloted on meta-analyses included in this review. The checklist was developed to assess the efforts made by selected meta-analyses and reviews to limit publication bias, selection bias and extractor bias, and to examine the robustness of the results.^{659,662}

Details of the assessment of bias of all meta-analyses included in the review can be found at Appendix 11. For ease of interpretation, a brief summary of the definitions of correlational strength and assessment of bias is given below.

Interpretation of results

Correlations were described as very small (less than 0.1), small (at least 0.1), medium (at least 0.24 but less than 0.37) or large (minimum correlation of 0.37) based on the guidance of Cohen.⁶⁶⁸ We use the corrected correlation coefficient from the meta-analyses to assess this.

The checklist (Appendix 10) evaluated whether the reported measures taken by the meta-analyses included in this report made the likelihood of the different types of bias or error low, moderate or high. If the likelihood of publication bias were low, for example, then the quality of this element of the meta-analysis could be said to be high.

Search results

The search for meta-analyses or systematic reviews of intermediate outcomes identified no systematic reviews. The number of meta-analyses reporting on the various intermediate outcomes is presented in *Table 55*.

Overview of quality

The failure of all but one of the included meta-analyses to appraise the quality of their included studies lowers their quality and their findings should be accepted with caution. This caution should be enhanced still further in cases where no sensitivity or moderator analysis was performed, or where there is high publication, selection or extractor bias.

Findings for Objective 3.1

The primary aim of Objective 3.1 is to review the correlations between intermediate outcomes in order to establish the extent to which they overlap with each other. So, for example, if we have measured job satisfaction, what extra information do we get from measuring organisational commitment? In line with the project brief, we restricted our literature search to meta-analyses that assessed intermediate outcomes. However, a large subset of the meta-analyses of intermediate outcomes also assessed one or more productivity or performance-related employee behaviours. Given the importance of these behaviours in the overall HRM performance picture (as discussed in Chapter 4), we felt it important to include them although they are supplementary to the original project brief.

One of the intermediate outcomes included in the review is that of climate. Two of the meta-analyses included in this section of the review examined psychological climate. They differed from the other meta-analyses in this section due to the range of variables they covered and the complexity of inter-relationships they examined. Additionally, while most meta-analyses report individual correlations, the climate meta-analyses also report a more complex model of possible causal pathways, from climate to attitudes to employee behaviours. This means that they were unsuited to inclusion in the synthesis of meta-analyses. We report findings from the two climate meta-analyses separately for clarity.

TABLE 55 Results of the meta-analysis search

Intermediate outcome	No. found (minus duplicates)	No. satisfying inclusion criteria	No. from other sources	Total
Motivation	55	1	0	1
Job satisfaction	121	15	2	17
Organisational commitment	40	15	3	18
Professional commitment	3	3	0	3
Engagement	0	0	1	1
Burnout	37	2	0	2
Job involvement	8	3	1	4
Turnover intentions	18	0	0	0
Psychological contract	0	0	0	0
Organisational justice	26	6	0	6
Organisational support	0	0	1	1
Organisational climate	1	1	1	2

The findings for the review of Objective 3.1 are therefore described as follows:

- summary of the correlations among the intermediate outcomes
- summary of the correlations between the intermediate outcomes and employee behaviours
- correlations between climate, other intermediate outcomes and employee behaviours.

Correlations among intermediate outcomes

Table 56 summarises the corrected correlations between the intermediate outcomes reported in the meta-analyses. Where there was more than one meta-analysis reporting the relationship between two intermediate outcomes, the range of correlation values from the meta-analyses is shown. No meta-analyses of engagement or psychological contract met the inclusion criteria.

Table 56 shows moderate to high correlations between all of the intermediate outcome variables where data are available. A key objective of the brief for this study was to identify whether each intermediate variable identified offered something different. The associations between, for example, job satisfaction and organisational commitment (0.65), although strong, are not of sufficient

magnitude to suggest construct redundancy, and it is reasonable to conclude that each of the intermediate outcomes may contribute to efforts to understand and manage employee behaviours.

The meta-analyses provide the pattern of correlations that one might expect theoretically – not only because some of the constructs share some conceptual space (e.g. both job satisfaction and organisational commitment tap into employees’ affective reactions to their jobs and organisations), but also because there are proposed causal linkages between the intermediate outcomes.

The meta-analyses tend to classify variables studied in relation to the dependant variables in one of three ways:

- *antecedents* variables considered to contribute the development of the dependant variable
- *correlates* variables for which there is not consensus about the causal ordering with the dependant variable
- *consequences* variables considered to be influenced by the dependant variable.

So, for example, Rhoades and Eisenberger²⁰⁸ in their meta-analysis of organisational support, proposed antecedents included organisational justice; consequences of organisational support included job satisfaction, organisational commitment, job involvement, and turnover. In

TABLE 56 Corrected correlations between intermediate outcomes

	1	2	3	4	5	6	7	8
1. Motivation								
2. Job satisfaction	0.41							
3. Organisational commitment	0.56	0.53 to 0.65						
4. Occupational commitment		0.44 to 0.51	0.44 to 0.61					
5. Job involvement		0.33 to 0.45	0.44 to 0.53	0.52 to 0.67				
6. Turnover intent		-0.34 to -0.46	-0.46 to -0.51	-0.3	-0.3 to -0.31			
7. Organisational justice – distributive		0.47 to 0.56	0.4 to 0.51			-0.4		
8. Organisational justice – procedural		0.43 to 0.62	0.38 to 0.57			-0.4	0.67	
9. Organisational support		0.62	0.63 to 0.73			-0.51	0.59	

the Meeyr *et al.*⁶⁶⁹ meta-analysis of organisational commitment, proposed antecedents included organisational justice and organisational support; proposed consequences included turnover intentions; and proposed correlates included job satisfaction, job involvement and occupational commitment. However, the meta-analyses were mostly conducted on cross-sectional research. Although, the meta-analyses provide the patterns of correlations that one might predict, the fact that we are dealing with correlations leaves uncertain the causal ordering of the observed associations. For example, organisational justice is predicted to be a source of attitudinal outcomes such as job satisfaction, but it is likely that perceptions of justice are themselves an outcome of attitudes towards work as well as being an antecedent.⁶⁷⁰ There is a strong likelihood of reciprocal causal influences between many, if not all, of these constructs.

A further limitation of the studies should be noted. Research on intermediate outcomes has consisted almost entirely of survey research using self-report measures. Thus, many of the relationships may be inflated due to common method variance. It has become widely accepted that correlations between variables measured with the same method (e.g. self-report surveys) are possibly inflated due to the propensity of the subject to answer similarly to multiple items. For example, more optimistic or organisationally committed employees rating a number of intermediate outcomes might

give systematically higher scores than their less optimistic counterparts.

Although there is uncertainty regarding the causal ordering among the intermediate outcomes, all are proposed to be implicated in the development of salient organisational behaviours (job performance, OCB and withdrawal behaviours). We next turn to the correlations between the intermediate outcomes and individual employee behaviours.

Correlations between intermediate outcomes and individual employee behaviours

Meta-analyses were found for relationships between all the intermediate outcomes and at least one employee behaviour. The most comprehensive data examined relationships with job satisfaction and organisational commitment, which is perhaps unsurprising given the long history and enduring popularity of these concepts in the research literature. *Table 57* summarises the correlations between the intermediate outcomes and performance-related employee behaviours.

Generally, the meta-analyses reported here support significant, small to moderate relationships, between intermediate outcomes and individual employee behaviours (positive relationships with job performance and OCB, and negative relationships with withdrawal behaviours). However, relationships between absence and

TABLE 57 Corrected correlations between intermediate outcomes and employee behaviours

	Motivation	Job satisfaction	Organisational commitment	Occupational commitment	Job involvement	Turnover intent	Justice (distributive)	Justice (procedural)	Organisational support
Turnover		-0.12 to -0.26	-0.17 to -0.29	-0.17 to -0.21	-0.13 to -0.16	0.33 to 0.38	-0.5	-0.46	-0.11
Absence		-0.15 to -0.24	-0.11 to -0.23		-0.14				
Job performance		0.15 to 0.3	0.13 to 0.30	0.07 to 0.22	0.09		0.13 to 0.15	0.36	0.18 to 0.2
Organisational citizenship behaviour	0.23 to 0.28	0.28	0.2 to 0.32				0.22 to 0.25	0.22 to 0.27	0.22 to 0.28

intermediate outcomes are consistently small, questioning the posited link between absence and attitudes. Equally, the correlations between job involvement and employee behaviours are all weak. While many of the correlations point towards links between intermediate outcomes and employee behaviours, it is clear that caution is required in interpreting these results. Some conceptual and methodological problems are illustrated when we consider, for example, the meta-analytic correlations between job satisfaction and job performance.

The relationship between job satisfaction and job performance has been described as the 'Holy Grail' of occupational and organisational psychologists⁶⁷¹ and has generated a considerable research effort. As *Table 57* shows, the strength of the correlations from the three meta-analyses reported in this review vary from small to moderate. The most recent meta-analysis, by Judge *et al.*⁶⁵⁶ is superior in terms of methodological quality to any of the other meta-analyses included in this report (see Appendix 11 for quality reviews of the meta-analyses). Examining several hundred studies, Judge *et al.*⁶⁵⁶ found an average corrected correlation between job satisfaction and job performance of 0.3. Although a correlation of 0.3 qualifies as a 'moderate' effect size using Cohen's⁶⁶⁸ rule of thumb (see Critical appraisal, Interpretation of results, above), this result suggests the relationship is a significant one and should be treated as important, given the multitude of factors that may determine job performance.

However, although the correlations might encourage an interpretation that job satisfaction causes performance, we cannot determine from these mostly cross-sectional investigations whether this is the case. It appears quite plausible that there is an effect of performance on satisfaction. Job satisfaction may be 'a response to previous goal-achievement, job effectiveness, and associated personal rewards' (Warr:⁶⁷² 410). Associated personal rewards may be, for example, increased pay, recognition and positive feedback, autonomy or skill use, with possible ramifications for levels of job satisfaction.

An additional interpretation of the satisfaction–performance relationship is that additional variables cause both job satisfaction and performance.⁶⁷² For example, organisational support might increase job satisfaction while also creating an environment for effective job performance. The correlation between satisfaction

and performance might be less about a causal relationship and more to do with the influence of other factors on both variables.

These caveats to the satisfaction–performance relationship generally apply to the other intermediate outcome–employee behaviour correlations in *Table 57*. The correlations mostly demonstrate significant associations between employee psychological states and important employee behaviours but there is unresolved causal ambiguity.

One further point, given the intermediate outcomes are interrelated and therefore each will not have a unique relationship with the employee behaviours, the question arises as to the degree to which the above associations with employee behaviours are independent from one another. As already discussed in this section, the association between job satisfaction and performance may be partly accounted for by the association between organisational support and performance, or they may be linked in a causal chain, such that job satisfaction plays some part in linking organisational support and job performance. This means that it is not possible to arrive at conclusions about whether an intermediate outcome has a unique relationship with employee behaviours.

Correlations between climate, other intermediate outcomes and employee behaviours

We next look at two meta-analyses of climate that have attempted to model more than one step in the causal chain between intermediate outcomes and employee behaviours, and have sought to provide a more complete model of employees' reactions to their work environment.

Employees' perceptions of virtually every aspect of their work environment have been included in climate research, including the organisation as a whole, senior management, job characteristics, supervisors and co-workers. The picture is further confused by the overlap of climate dimensions with other intermediate outcomes, such as organisational support, and indeed with HRM practices. For example, job characteristics perceptions may be included in a climate measure and also classified as measure of job design.

We report here the results of two climate meta-analyses which have attempted to meaningfully classify the array of climate dimensions. The

climate meta-analyses by Carr *et al.*⁶⁷³ and Parker *et al.*⁶⁷⁴ in addition to reporting various one-to-one relationships between climate and intermediate outcomes and/or employee behaviours, each tested a series of models proposing that climate affects individual work outcomes through affective and cognitive states, such as job satisfaction and motivation. This procedure is useful for comparing alternative explanations for relationships, but should be used with caution. Correlations that are being compared come from different samples and populations and are not comparable in the same way as correlations from the same sample.

Both meta-analyses drew upon the model of HRM, climate and productivity proposed by Kopelman *et al.*¹⁵⁴ This model proposes that HRM practices in part shape organisational climate (comprising goal emphasis, means emphasis, reward orientation, task support and socioemotional support). Climate represents employees' perceptions of what the organisation is like in terms of its policies, practices and procedures. The climate in turn impacts on important individual- and organisational-level outcomes (e.g. job performance, OCBs and withdrawal behaviours) through the impact it has on cognitive and affective states, such as job satisfaction, work motivation and organisational commitment. The model suggests that HRM does not directly impact on employee psychological states; rather, HR practices are perceptually filtered (i.e. climate) by employees. Subsequent cognitive and affective states then mediate the relationship between climate and individual- and organisational-level outcomes. Furthermore, Kopelman *et al.*¹⁵⁴ propose that different climate dimensions are related to different cognitive and affective states, which, in turn, impact on different outcomes. For example, the impact on withdrawal behaviours occurs primarily through job satisfaction and motivation, whereas the impact on job performance occurs primarily through motivation alone.¹⁵⁴

Each meta-analysis adapted the model slightly, depending on the specific climate facets each adopted in order to categorise the extensive range of climate dimensions they studied.

Carr *et al.*⁶⁷³ categorised their wide variety of climate dimensions according to the three facets of climate proposed by Ostroff;⁶⁷⁵ affective, cognitive and instrumental. Affective climate is concerned with interpersonal and social relationships between employees, and includes the dimensions of participation, cooperation, warmth and social rewards. Cognitive climate relates to individuals and their involvement in work activities, and includes the dimensions of growth, innovation, autonomy and intrinsic rewards. Instrumental climate is concerned with task involvement and getting things done in the organisation, and comprises the dimensions of achievement, hierarchy, structure and extrinsic rewards.⁶⁷⁵ See *Table 58* for the correlations between the climate facets and intermediate outcomes and employee behaviours reported by Carr *et al.*⁶⁷³

Carr *et al.*⁶⁷³ then tested a series of conceptual models based on Kopelman *et al.*'s¹⁵⁴ work using meta-analytic path analysis. *Figure 5* shows the final path model that best represents the data.

This model shows differential relationship of affective, cognitive and instrumental climate perceptions with job satisfaction and organisational commitment. Affective climate has a stronger relationship with organisational commitment than do the cognitive and instrumental facets, while affective and instrumental climate perceptions have a stronger relationship with job satisfaction than does cognitive climate. Job satisfaction and organisational commitment each have a unique, negative relationship with withdrawal (turnover), while job satisfaction also has a unique, positive relationship with both job performance and well-being. This indicates that the relationships between

TABLE 58 Correlations between dimensions of climate, intermediate outcomes and employee behaviours

Climate dimensions	Intermediate outcomes and behaviours						
	Job satisfaction	Organisational commitment	Job involvement	Motivation	Well-being	Turnover	Performance
Affective	0.46	0.34			0.17	-0.28	0.09
Cognitive	0.33	0.28			0.07	-0.07	0.05
Instrumental	0.44	0.26			0.11	-0.33	0.05

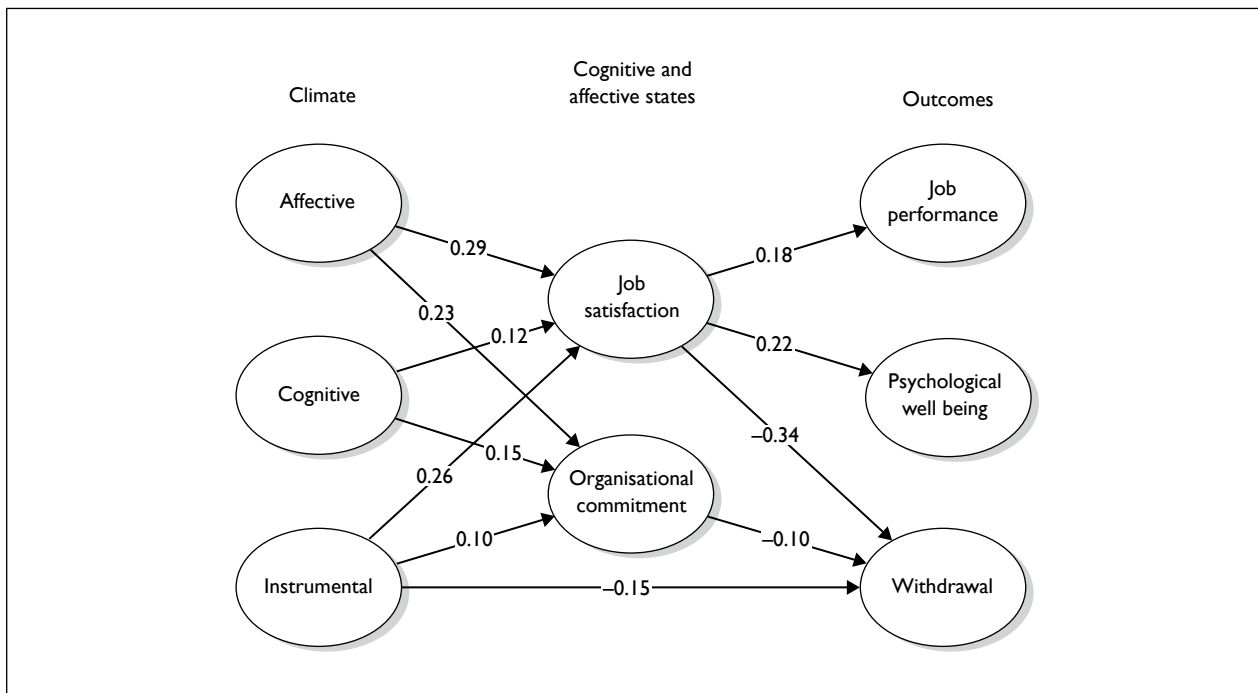


FIGURE 5 Path model relating climate to outcomes (Carr *et al.* 2003⁶⁷³). Figures in the diagram are regression weights that demonstrate the strength of the relationship on a scale between 0 and 1.

the three climate facets and job performance, well-being and withdrawal are indirect, occurring through their relationship with job satisfaction and, with withdrawal only, through their relationship with organisational commitment. Instrumental climate is the only facet to have a direct relationship with an outcome variable, having a direct, negative relationship with withdrawal behaviours.

The model infers causal links; however, it is important to remember that it is based on correlational data and causal interpretations should not be assumed. The majority of measures in the model were obtained via self-report methods, thereby potentially inflating the relationships reported as a result of common method variance.

In contrast with Carr *et al.*,⁶⁷³ Parker *et al.*⁶⁷⁴ classified their wide range of climate dimensions according to the five facets of climate posited by Jones and James⁶⁷⁶ concerning work environment perceptions, namely job, role, leadership, work group and organisational characteristics. Job characteristics include autonomy, challenge and importance; role characteristics include ambiguity, conflict and overload; leader characteristics comprise goal emphasis, support and upward influence; work group characteristics, include

cooperation, pride and warmth; and organisational attributes include innovation, management awareness and openness of information. Parker *et al.*⁶⁷⁴ refer to these facets collectively as psychological climate perceptions. See Table 59 for the correlations between the climate facets and intermediate outcomes and employee behaviours reported by Parker *et al.*⁶⁷⁴

Parker *et al.*⁶⁷⁴ developed a path model in an attempt to identify causal links between organisational climate and behavioural outcomes (Figure 6). Like Carr *et al.*,⁶⁷³ the authors then tested a series of conceptual models based on Kopelman *et al.*'s¹⁵⁴ work using meta-analytic path analysis. Figure 6 shows the final path model that best represents the data. Parker *et al.*⁶⁷⁴ found evidence that a general climate factor accounted for the relationship of the five climate dimensions with work outcomes. This is in line with James and James'²¹² argument that a common judgement process underlies diverse climate dimensions. This process is hypothesised to represent an assessment of whether the work environment is viewed as personally beneficial or detrimental to one's well-being.

This model shows an indirect effect of psychological climate perceptions on performance,

TABLE 59 Climate categories and intermediate outcomes and behaviours

Climate dimensions	Intermediate outcomes and behaviours						
	Job satisfaction	Organisational commitment	Job involvement	Motivation	Well-being	Turnover	Performance
Job	0.22	0.26	0.26	0.20	0.35		0.10
Role	0.28	0.22	0.22	0.09	0.27		0.06
Leader	0.41	0.32	0.32	0.21	0.44		0.16
Work group	0.48	0.27	0.27	0.20	0.25		0.12
Organisation	0.42	0.36	0.36	0.22	0.29		0.13

through their relationship with job satisfaction, work attitudes and motivation. The five facets of climate have a stronger relationship with job satisfaction than with job involvement and commitment, while job involvement and commitment have a stronger relationship with motivation than does job satisfaction. However, only job satisfaction also has a direct, positive relationship with performance. This means that the relationship between psychological climate perceptions and performance is mediated by job satisfaction, work attitudes and motivation, i.e. that the effects of climate are indirect, occurring through its relationship with job satisfaction and work attitudes and, in turn, through their relationship with motivation.

As with the results of Carr *et al.*,⁶⁷³ and the other meta-analyses reported in this chapter, causal relationships are not proven, and many of the correlations are potentially inflated.

In this chapter, we have so far considered the relationships among the intermediate outcomes and the relationships between the intermediate outcomes and employee behaviours that may contribute towards organisational performance. However, organisational performance is not merely an aggregate of individual performance. In this section and the next we review the evidence for the impact of intermediate outcomes, such as job satisfaction, on health and non-health final outcomes (Objectives 4.1 and 4.2).

Findings for Objective 4.2

Longitudinal research on intermediate outcomes and patient outcomes

Research question

Do intermediate outcomes, such as job satisfaction, have an impact on the patient care outcomes of

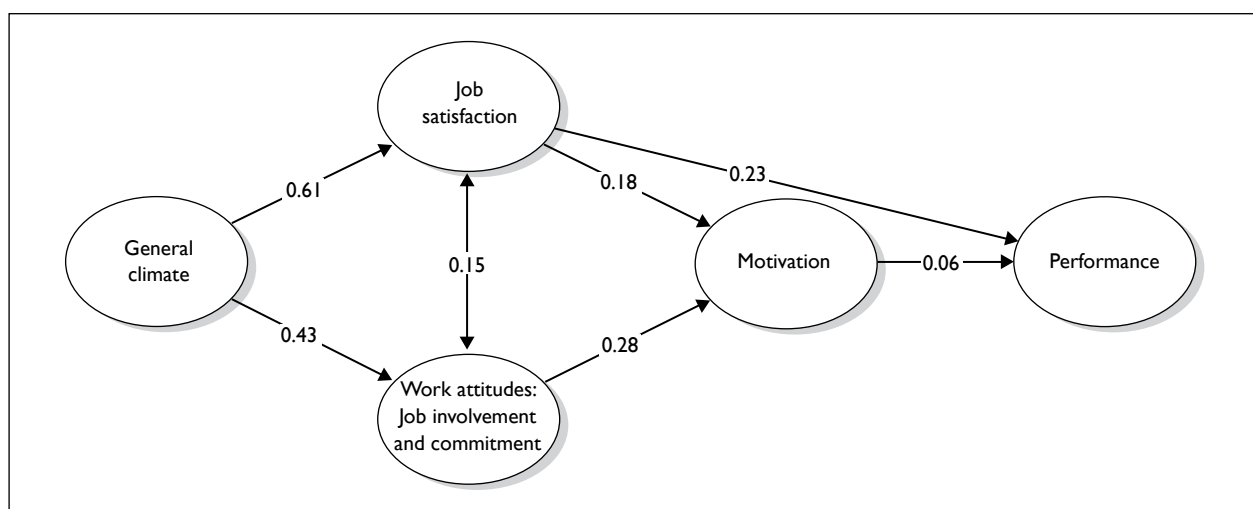


FIGURE 6 Path model relating climate to outcomes (Parker *et al.* 2003).⁶⁷⁴ Figures in the diagram are regression weights that demonstrate the strength of the relationship on a scale between 0 and 1.

mortality rates, patient waiting times, patient safety, patient satisfaction and patient length of stay?

Method

A systematic search of the literature was conducted to identify potential studies to answer this research question. The following databases were MEDLINE, EMBASE, CINAHL, SSCI, PsycINFO, King's Fund database and IBSS. In order to be included, studies have to satisfy the following criteria.

Inclusion criteria

- Longitudinal study design.
- Intermediate outcome related to health professionals (e.g. job satisfaction among nurses or doctors).
- One of the following patient outcomes: mortality, waiting times, length of stay, patient satisfaction, patient safety.
- The study must test the causal relationship between the intermediate outcome and the patient care outcome.

Exclusion criteria

Unpublished dissertations.

Results and discussion

The literature search retrieved the following numbers of unique studies for each of the intermediate outcomes (*Table 60*).

The titles and abstracts of all the retrieved studies were independently assessed for inclusion by two reviewers. No studies were identified that satisfied the inclusion criteria. Some studies satisfied all but one of the criteria, and so had to be excluded. For example, non-longitudinal design, by performing data collection of two different types of data at two different times (two cross-sectional studies rather than a single longitudinal study),^{677,678} studying the impact of an intervention on both the intermediate outcome and the patient outcome, but not

assessing the impact of the one on the other⁶⁷⁹ or by considering a patient care outcome not of interest, for example hospital admissions⁶⁸⁰ or adherence to therapy.⁶⁸¹ A previous review has also noted the lack of longitudinal studies examining the impact of nurses' job satisfaction on key patient outcomes.⁶⁸² This lack of evidence has not been addressed in the intervening years.

Summary

There is therefore no longitudinal evidence to assess whether intermediate outcomes, such as job satisfaction or burnout impacts on the patient care outcomes of mortality rates, patient waiting times, patient safety, patient satisfaction and patient length of stay.

Findings for Objective 4.1

Impact of intermediate outcomes on non-health final outcomes

To identify evidence for the impact of intermediate outcomes on final outcomes in the non-health sectors, longitudinal studies were searched for to provide stronger evidence of a causal link between the two. The procedure (see Conclusions, below) was repeated here, the only difference being that the variables termed as final outcomes are: performance, productivity or customer outcomes.

Details of studies

Six studies meet the inclusion criteria (*Table 61*). Five of these studies were conducted in the USA and one in the UK. Five of these studies have a prospective longitudinal research design and one uses a retrospective analysis of a longitudinal data set. The duration of the studies varies from 12 months to 8 years. Two studies use cross-industry sample, with Schneider *et al.*⁶⁸³ using data from 35 companies and Patterson *et al.*³⁶ reporting

TABLE 60 Studies for intermediate outcomes and patient outcomes

Intermediate outcome	Records retrieved by searches	Records satisfying inclusion criteria
Job satisfaction	279	0
Burnout	63	0
Organisational commitment	7	0
Professional commitment	2	0
Motivation	25	0
Turnover intentions	7	0
Climate	1	0

TABLE 61 The impact of intermediate outcomes on non-health final outcomes

Study, country	Design, sample size, duration	Intermediate outcome(s)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Schneider et al. (1998) ²¹⁷ USA	Prospective longitudinal 134 branches of a bank	Service climate	No	Customer perceptions of service quality	Survey designed by the authors	<i>Reciprocal causation:</i> Analysis examined the relationship between service climate and service quality, both at two points in time The results indicated that climate for service led to subsequent customer perceptions of service quality but that there was also a reciprocal effect for customer perceptions and climate
Bernhardt et al. (2000) ⁶⁸⁴ USA	Prospective longitudinal 382 restaurants of the same company 12 months	Employee satisfaction	No	Customer satisfaction Restaurant performance (sales, customer counts, profitability)	Surveys designed by the authors Company records	Using a time-series analysis of the data, the study finds a positive relationship between customer satisfaction and organisational performance No longitudinal analysis was conducted for the relationship between employee satisfaction and customer satisfaction, though the cross-sectional analysis reveals that these two variables are positively related. The authors also suggest that employee satisfaction is linked with organisational performance but they recommend longitudinal research to establish their cross-sectional findings
Koys (2001) ⁶⁸⁵ USA	Prospective longitudinal 28 stores 2 years	Employee satisfaction OCB Employee turnover	No	Organisational effectiveness: Customer satisfaction; profits	Surveys designed by the authors Company records	<i>Positive:</i> The results of the study show that employee satisfaction, OCB, and employee turnover predict organisational effectiveness in the subsequent year. Using cross-legged regression shows that Year 1's HR outcomes account for 14%–31% of the variance in Year 2's organisational effectiveness. A second set of regression analyses shows that Year 1's organisational effectiveness accounts for 0%–7% of the variance in Year 2's HR outcomes

continued

TABLE 61 The impact of intermediate outcomes on non-health final outcomes (continued)

Study, country	Design, sample size, duration	Intermediate outcome(s)	FM	Outcomes	Outcome measure(s)	Results +ve/-ve
Schneider et al. (2003) ⁶⁸³ USA	Retrospective longitudinal 35 companies 8 years	Employee attitudes; Job satisfaction; Satisfaction with empowerment; satisfaction with job fulfillment; satisfaction with pay; satisfaction with work group; satisfaction with security; satisfaction with work fulfillment; overall job satisfaction	No	Financial performance Market performance	ROA EPS	<i>Reverse causation:</i> The analysis revealed that Overall Job Satisfaction and Satisfaction With Security were predicted by ROA and EPS more strongly than the reverse (although some of the reverse relationships were also significant); Satisfaction With Pay suggested a more reciprocal relationship with ROA and EPS The study highlights the existence of reverse causality; i.e. employee attitudes are determined by organisational performance
Patterson et al. (2004) ³⁶ UK	Prospective longitudinal 42 manufacturing companies 12 months	Organisational climate Overall job satisfaction Organisational commitment	Yes	Company performance; Productivity and profitability	Company data	<i>Positive:</i> Subsequent productivity is significantly related with eight aspects of organisational climate and also with average job satisfaction (supervisory support, concern for employee welfare, skill development, effort, innovation and flexibility, quality, performance feedback, and formalisation). Job satisfaction mediates the relationship between climate and productivity
Morrow and McElroy (2007) ⁶⁸⁶ USA	Prospective longitudinal 31 subunits of a mortgage services company 12 months	Voluntary employee turnover	No	Organisational efficiency; Cost per loan; loan generation Organisational subunit performance; profitability; customer satisfaction	Cost per loan: Total expenses per subunit minus commission and bonuses (i.e. input), divided by the number of loans per month (i.e. output) Loan generation: The ratio of the total amount of loans funded per subunit per month (i.e. output) divided by the number of sales employees (i.e. input) Profitability: Basis points Customer satisfaction: Company records	<i>Mediation effects:</i> Cost-per-loan efficiency is found to fully mediate relations between voluntary employee turnover and two organisational performance outcomes, profitability and customer satisfaction, in both synchronous and longitudinal analyses

EPS, earnings per share; OCB, Organisational Citizenship Behaviour; ROA, return on assets.

data from 42 manufacturing firms. Four studies investigate the same organisation but sample across various subunits of these organisations. The study by Bernhardt *et al.*⁶⁸⁴ uses data from 382 restaurants; Koys⁶⁸⁵ reports data from 28 stores of the same organisation; Schneider *et al.*²¹⁷ collected data from 134 branches of a bank; and Morrow and McElroy⁶⁸⁶ investigated 31 subunits of a mortgage services company.

Intermediate outcome variables studied

Four of the six studies have used employee satisfaction as a predictor variable; other predictor variables used by these studies are organisational climate, service climate, organisational commitment and employee turnover.

Outcomes

The outcomes are customer satisfaction, customer perceptions of service quality, and financial performance (profits or market performance), productivity. One study has used organisational effectiveness as a final outcome.⁶⁸⁶

Results

Job satisfaction is investigated by four of the six studies. Two studies use prospective longitudinal analysis to explore the impact of job satisfaction on final outcomes.^{36,385} Both studies report a positive relationship between job satisfaction and final outcomes.

The study by Patterson *et al.*³⁶ also measured organisational climate and found that job satisfaction mediated the relationship between organisational climate and company productivity. Encouragingly, this study shows a similar pattern of results to the path models based on meta-analyses of climate and employee performance by Carr *et al.*⁶⁷³ and Parker *et al.*⁶⁷⁴ reported below (see Conclusions). So, together, these three studies find that employee attitudes (e.g. job satisfaction) mediate the relationship between climate and performance at the individual level and at the organisational level.

Across 28 retail stores, Koys⁶⁸⁵ found that employee satisfaction was moderately correlated with store profitability in the subsequent year, and strongly correlated with subsequent customer satisfaction ratings.

The study by Schneider *et al.*⁶⁸³ used a retrospective design of employee attitude data over 8 years in up to 35 companies to conclude that the relationship between job satisfaction and organisational

performance in cyclical and found stronger evidence of reverse causality, i.e. employee attitudes are determined by organisational performance. The analysis revealed that overall job satisfaction and satisfaction with security were predicted by return on assets (ROA) and earnings per share (EPS) more strongly than the reverse (although some of the reverse relationships were also significant); satisfaction with pay suggested a more reciprocal relationship with ROA and EPS.⁶⁸³

A fourth study⁶⁸⁴ uses a longitudinal analysis only between the two final outcomes of customer satisfaction and restaurant performance; it reports the link between job satisfaction and customer satisfaction using a cross-sectional analysis.

The fifth study in this group²¹⁷ used a prospective design to examine the relationship between service climate and final outcomes. Specifically, it examined the links between employee perceptions of service climate and customer perceptions of service quality across 134 bank branches. Survey responses were collected from both employees and customers at two time points, approximately 2 years apart. The results indicated that climate for service led to subsequent customer perceptions of service quality, but that there was also a reciprocal effect for customer perceptions and climate.

There are two studies that have explored the relationship between customer satisfaction and financial outcomes, which in the current review we have treated as final outcomes. The study by Bernhardt *et al.*⁶⁸⁴ finds a positive relationship between customer satisfaction and organisational performance; the study by Morrow and McElroy⁶⁸⁶ found cost-per-loan efficiency to fully mediate relations between voluntary employee turnover and two organisational performance outcomes, profitability and customer satisfaction, in both synchronous and longitudinal analyses. Such studies point to the multiple stages that may lie between HRM practices and financial performance.

Omissions

Other than limited data on the impact of employee satisfaction and climate on final outcomes in the non-health sector, no longitudinal evidence was identified on the impact of intermediate outcomes on final outcomes.

Summary

There are six studies in this review of longitudinal studies on the link between intermediate outcomes and final outcomes. Five of the studies use a

prospective longitudinal research design and one study uses a retrospective analysis of a longitudinal data set. Four studies have collected data from various subunits of the same organisation and two have used cross-organisation data. Four of the six studies examine the relationship between job satisfaction and final outcomes; two studies explored the link between climate and final outcomes, one looking at general organisational climate, the other at climate for service; the other intermediate outcomes in this review have not been subjected to longitudinal investigation in relation to final outcomes. Given the few longitudinal studies linking any given intermediate outcome with a final outcome we cannot arrive at any clear conclusion about the causal connection between these intermediate and final outcomes.

Conclusions

This chapter has covered a wide range of research, reviewing intercorrelations between the intermediate outcomes (Objective 3.1), and the impact of intermediate outcomes on final outcomes in both the non-health literature (Objective 4.1) and the health literature (Objective 4.2).

Many, but not all of, the intermediate outcomes were covered by meta-analyses. While there remains debate over the value of measuring each of the intermediate outcomes as a separate domain of assessment in relation to performance, the strength of the correlations does not indicate construct redundancy. The significant intercorrelations stem not only from some conceptual overlap and mostly likely common method variance, but also because there are causal linkages between the constructs. For example, employee perceptions of the organisation, as embodied in such constructs as climate, organisational support and justice, are generally proposed to shape motivation and employee attitudes, such as commitment and satisfaction. However, the causal linkages between these domains remain unclear.

Additional analyses reviewing the meta-analytic correlations between the intermediate outcomes of HRM and salient employee behaviours were mostly consistent in showing significant associations, although none was large. However, to date most research has merely asked about the existence or otherwise of a significant association between intermediate outcomes and employee behaviours. From this correlational data alone

we cannot determine whether one intermediate outcome (e.g. high job satisfaction) promoted the employee behaviour (e.g. good work performance), whether behaviours enhanced the intermediate outcomes, whether both effects occurred, or whether third variables were causally more important. Nevertheless, the data do point towards the importance of the intermediate outcomes for salient employee behaviours.

There were few meta-analytic data on motivation and none on the psychological contract. Both constructs have considerable prominence in the HRM and organisational behaviour. In the case of the psychological contract this absence may reflect the concepts relative newness, but also because it is an 'umbrella construct capturing a range of variables associated with trust, commitment and the exchange of expectations and obligations' (Sparrow:⁶⁸⁷ 15) and, consequently, it has been operationalised in many different ways. However, there is little doubt that the psychological contract is seen by many commentators as a useful vehicle to help understand and predict employee behaviour.

There were very few longitudinal studies to bring to bear on Objective 4.1. In non-health settings there was some limited evidence about organisations' average job satisfaction, climate and company performance, but very few studies have examined both intermediate and final outcomes on two or more occasions.⁶⁵² Schneider *et al.*⁶⁸³ did examine data at multiple time points, albeit on a very small sample ranging from only 12 to 35 companies. Their finding of reverse causality between average satisfaction and financial performance emphasises the need for caution in making causal interpretations, and also the need for further, more robust research.

There were no relevant longitudinal studies examining intermediate outcomes to patient outcomes. It is therefore worth noting that there are cross-sectional studies on staff intermediate outcomes and patient outcomes. For example, Robertson *et al.*⁶⁸⁸ found that nurse job satisfaction averaged at the ward level was related to observed standards of care delivery. Leiter *et al.*⁶⁸⁹ found that patients treated on wards where nursing staff averaged greater job-related emotional exhaustion (a dimension of burnout) were less satisfied with their nurses, doctors and average quality of care. These investigations are clearly worth pursuing with more substantial longitudinal data sets.

Chapter 10

Measuring the intermediate outcomes of HRM: the reliability of measures

Introduction

This chapter focuses on objective two of the research. Specifically, it is concerned with answering the following question: What is the evidence on the reliability of measures of the intermediate outcomes of HRM practices covered by this review?

The chapter first considers the ways in which the properties of a scale or measure are evaluated. The process of selecting measures of intermediate outcomes for the review is described and the evidence used in the review is identified. Finally, evidence about the reliability of selected measures is presented.

What is measurement reliability?

This review is concerned with self-report measures or scales used in survey instruments. Reliability is an important aspect of the quality of such measures. A scale's reliability refers to how consistently the scale measures a psychological feature or work characteristic. Psychometrics is the statistical process concerned with developing or assessing the quality of measurement scales and scale reliability is one of the properties by which a scale's quality is rated psychometric.

Methods of measuring reliability

The focus of this part of the review is the reported reliabilities of scales that measure the intermediate outcomes of HRM practices. Two basic forms of reliability exist for self-report instruments: internal consistency and test–retest reliability.

Internal consistency

The internal consistency of a scale indicates the extent to which all of the items in the scale are broadly measuring the same phenomenon as each other. For example, in a job satisfaction measure, the internal consistency would demonstrate the extent to which each item or question in the scale is actually measuring job satisfaction (either in

general or an aspect of it) in the same way as the other items in the scale. The most appropriate statistic to assess a scale's reliability is known as Cronbach's alpha and is expressed as a value between 0 and 1. Cronbach's alpha is the average correlation of each item in a scale with all of the other items in that scale. For a scale to have good reliability (good internal consistency), as a rule of thumb it should have a Cronbach's alpha of at least 0.7. We have used this measure as the best indicator of scale reliability.

Test–retest reliability

Test–retest reliability concerns the extent to which a scale's measurements are consistent over time. It is not always appropriate but can be helpful in assessing how well a measure performs. Hence in situations where the work environment (for example) is expected to be stable, test–retest reliability of a measure of work environment (the correlation between the time 1 and time 2 measures) should be > 0.7 . Equally, in situations where the work environment is expected to change (e.g. in response to HRM practices) test–retest reliability can be low. Test–retest reliability is less frequently reported in evaluation articles and is of less interest to the current review.

Inter-rater reliability

A third form of reliability concerns the stability or consistency of a measure when used by different raters given the same experiences (inter-rater reliability). Inter-rater reliability is important when results are aggregated and analysed at the organisational level (such as using the mean job satisfaction score across all employees in an organisation to represent organisational level job satisfaction). It is usually measured by intraclass correlation (ICC) of which there are two forms. ICC1 measures the extent to which individuals in a group agree (the basis for justifying aggregation to the mean is that there is good general agreement within a group, so a mean score is not hiding high levels of variation between individuals). ICC2 assesses the reliability of the mean score (approximately this measures the extent to which the mean scores on a scale for two random subsamples of the same group correlate). While of

interest to the current review, inter-rater reliability in the form of ICCs is only relevant to studies using organisational level aggregated data, which, as this review has established, are few in number, so it has not been possible to report ICCs for the data presented in this chapter.

Challenges in reviewing reliability

In order to review the reliability of a scale, it is ideal to identify several examples of scale use and compare reliability scores from a number of different samples. Previous reviews of the reliability of measures have highlighted a number of challenges inherent in extracting these data from the social science research literature:⁴⁹

- *inconsistent use of measures* although a well-established measure is cited in the article, the authors may have adapted or deleted items from the scale or altered response categories (sometimes without stating this in the article)
- *inaccurate reporting of reliability data* reliability statistics are given for the original or some historical sample rather than the current sample in the article
- *inconsistent reporting of reliability data in articles* although scales are used, their reliabilities are not reported for the sample.

These factors taken together mean that although there might, on the surface, be a large number of articles that report using a specific measure, there may in practice only be a limited amount of information available on the measure's reliability.

A further complication for this review is the extent to which one-off scales or single items have been used to measure concepts of interest. Where a scale appears only once in the literature its reliability is of relatively limited use in a review such as this. Single items cannot have their reliability assessed by the methods described here (as reliability is based on the relationships between items). For these reasons the review developed a pragmatic strategy for identifying relevant evidence, which is described below (see Conclusions).

Which intermediate outcomes is it valid to measure in this context?

In line with the project brief, this review uses validity to refer to the relevance of measuring certain intermediate outcomes in the HRM

performance chain. The intermediate outcomes included here were first identified in Chapter 4 as having the most potential in explaining the HRM–performance link. Evidence on the causal links between HRM practices and these intermediate outcomes was then reviewed in Chapters 5–7. In the context of this review, those intermediate outcomes that have been demonstrated to be sensitive to HRM practices are deemed 'valid' to measure:

- motivation
- job satisfaction
- organisational commitment
- occupational/professional commitment
- engagement
- burnout
- job involvement
- turnover intentions
- psychological contract
- organisational justice
- organisational support
- climate.

Process for selecting specific intermediate outcome measures for review

The aim is to identify key measures for each intermediate outcome domain included in the review. The strategy used is a four-step process:

- First, for each of the above 12 intermediate outcomes the specific measures used in the studies were identified. Where an intermediate outcome had a single scale associated with it, or if there were any scales predominantly used in the health literature, these would be selected for the review of reliability. This exercise revealed that for a number of intermediate outcomes no single scale emerged as the main or preferred measure. In some instances, the measure used was a one-off, designed by the researchers or was simply not specified at all. In other cases a number of specific measures were each used by one study or a small number of them. In these cases, expert opinion was used to select the best-established measures.
- Second, where an intermediate outcome area was not covered by the studies included in this review (as is the case with psychological contract) or the measure identified in this review was felt to be too specific for general use (as with climate for creativity and innovation) the subject experts on the research team identified an appropriate measure for inclusion.

- Third, for each of the included measures, a recent review of reliability data was sought. One evidence source was invaluable in this: *Taking the Measure of Work* – a guide to validated scales for organisational research and diagnosis²⁰¹ provides a comprehensive review, drawing on all papers using validated measures published in 15 top organisational research journals over the period 1990–9.
- Fourth, for the intermediate outcomes not covered by Fields' review²⁰¹ a search was undertaken for reviews of reliability for scales measuring the intermediate outcome. If no review of scale reliability could be identified then purposive searching was undertaken for a meta-analysis or longitudinal study to supplement the data presented here. Meta-analyses were also used where conceptual uncertainty existed around a measure. The aim of this search was to identify reliability data for the selected measures and to highlight if there were other well-established measures for any of the outcomes that had not already been covered in the review. In some instances intermediate outcomes had only been studied in cross-sectional research, so no example scales were covered in this review. However, these intermediate outcomes had been identified by the expert panel as being theoretically important and were thought to have demonstrable links with important employee behaviours such as job performance and staff turnover.

The remainder of the chapter presents evidence on scale reliabilities for measures of intermediate outcomes of HRM practices identified earlier in the report. For each intermediate outcome, the use of scales in the review is summarised and the main scale used to measure that outcome is described. Items and response categories are given and reliability data reported.

Reliability of intermediate outcome measures

Motivation

Five studies reported using measures of motivation as an outcome of HRM practices. Three studies each used a different established scale, one study used the researchers own scale and one study did not specify the measure of motivation. Of the three established measures, one was developed in the UK⁴⁷⁵ and is presented here. A second measure, which includes a subscale of work motivation (the JDS), is reported below (see Job satisfaction).

Established scales used in the review:

Warr *et al.* (1979):⁴⁷⁵ Intrinsic Job Motivation

Scale description

This is a six-item scale measuring intrinsic job motivation, i.e. the degree to which an employee is motivated to perform well in his/her current job in order to be intrinsically satisfied. The scale is taken from Warr *et al.*'s⁴⁷⁵ Work and Life Attitudes Survey.

Items and response category

- 'I feel a sense of personal satisfaction when I do this job well.'
- 'My opinion of myself goes down when I do this job badly.'
- 'I take pride in doing my job as well as I can.'
- 'I feel unhappy when my work is not up to my usual standard.'
- 'I like to look back on the day's work with a sense of a job well done.'
- 'I try to think of ways of doing my job effectively.'

Each item is rated on seven-point Likert-type scale, where 1 = no, I strongly disagree, 2 = no, I disagree quite a lot, 3 = no, I disagree just a little, 4 = I'm not sure about this, 5 = yes, I agree just a little, 6 = yes, I agree quite a lot, and 7 = yes, I strongly agree.

Reliability

A coefficient alpha value of 0.65 for test–retest reliability, based on 60 participants, was reported.⁴⁷⁵

One review of measures of motivation was identified.⁶⁹⁰ This does not include the Warr *et al.*⁴⁷⁵ measure, nor does it provide scale reliabilities for the measures it identifies. Eleven measures of work motivation are listed (including the JDS).

Job satisfaction

Job satisfaction was the most widely measured intermediate outcome in the review. Over 50 studies reported data using 17 different measures. Measures differ in the sense that they either measure overall satisfaction (e.g. with items such as 'in general, I like working here') or they measure satisfaction with individual facets of a job (e.g. pay, autonomy, supervision), which can then be combined to give an overall satisfaction score.

The measures commonly used in studies in this review all measure satisfaction with facets of the job to some degree. Additionally, some measures distinguish between intrinsic satisfaction (job content) and extrinsic satisfaction (rate of pay and security).⁴⁷⁵

Four measures emerge as the most commonly used in this type of research:

Hackman and Oldham (1974):¹⁹⁵ Job Diagnostic Survey (JDS)

Smith *et al.* (1969):²⁴³ Job Descriptive Index (JDI)

Weiss *et al.* (1967):⁴⁷³ Minnesota Satisfaction Questionnaire (MSQ)

Warr *et al.* (1979):⁴⁷⁵ Job Satisfaction Questionnaire

The most commonly used measure was JDS. The overall and facet-specific job satisfaction scales of the JDS form part of a larger questionnaire that was first developed in the early 1970s. The full JDS measures a range of different aspects of work including motivation, job characteristics. The job satisfaction and work motivation subscales are reported here.

Scale description

This is a 25-item measure consisting of four subscales: overall satisfaction; internal work motivation; growth satisfaction; and satisfaction with specific facets of the job. Details of the measure are taken from Fields²⁰¹ *'Taking the Measure of Work'*.

Items and response categories

Overall satisfaction

- 'Generally speaking I am very satisfied with this job.'
- 'I am generally satisfied with the kind of work I do in this job.'
- 'I frequently think of quitting this job.'
- 'Most people in this job are very satisfied with the job.'
- 'People on this job often think of quitting.'

Internal work motivation

- 'My opinion of myself goes up when I do this job well.'
- 'I feel a great sense of personal satisfaction when I do this job well.'
- 'I feel bad and unhappy when I discover that I have performed poorly on this job.'

- 'My own feelings generally are not affected much one way or the other by how well I do on this job.'
- 'Most people on this job feel a great sense of personal satisfaction when they do the job well.'
- 'Most people on this job feel bad or unhappy when they find that they have performed the work poorly.'

Responses for the items in the general and work motivation subscales are scored on a seven-point Likert scale: 1 = disagree strongly, 2 = disagree, 3 = disagree slightly, 4 = neutral, 5 = agree slightly, 6 = agree, and 7 = agree strongly.

Satisfaction with opportunities for growth

- 'The amount of personal growth and development I get in doing my job.'
- 'The feeling of worthwhile accomplishment I get from doing my job.'
- 'The amount of independent thought and action I can exercise in my job.'
- 'The amount of challenge in my job.'

Facet-specific items

- Security
 - 'the amount of job security I have'
 - 'how secure things look for me in the future in this organisation'.
- Compensation
 - 'the amount of pay and fringe benefits I receive'
 - 'the degree to which I am fairly paid for the amount I contribute to this organisation'.
- Satisfaction with co-workers
 - 'the people I talk to and work with on my job'
 - 'the chance to get to know other people while on the job'
 - 'the chance to help other people while at work'.
- Satisfaction with supervisor
 - 'the degree of respect and fair treatment I receive from my boss'
 - 'the amount of support and guidance I receive from my supervisor'
 - 'the overall quality of the supervision I receive in my work'.

The response categories for growth satisfaction and facet-specific satisfaction are: 1 = extremely dissatisfied, 2 = dissatisfied, 3 = slightly dissatisfied, 4 = neutral, 5 = slightly satisfied, 6 = satisfied, and 7 = extremely satisfied.

Reliability

Fields²⁰¹ reports Cronbach's alphas of between 0.55 and 0.92 for the various satisfaction subscales. General satisfaction is reported to have an alpha of 0.77, internal work motivation an alpha of 0.67.

Other measures of job satisfaction

Fields²⁰¹ identifies a further 20 validated measures of job satisfaction.

Organisational commitment

Twenty-one studies report on the links between HRM practices and organisational commitment. Six different scales of organisational commitment were identified, the most frequently used being those of Mowday *et al.*¹⁷³ and Meyer and Allen.⁴⁷⁷

Scales used in this review:

Mowday *et al.* (1982):¹⁷³ Shortened OCQ
Meyer and Allen (1984):⁴⁷⁷ Affective Commitment

The shortened Organisational Commitment Scale is presented here.

Scale description

This is a nine-item scale measuring the extent to which an individual accepts or shares the organisation's goals, is prepared to exert effort on the part of the organisation and wishes to maintain membership of the organisation.

Items and response categories

- 'I am willing to put in a great deal of effort beyond that normally expected in order to help this organisation to be successful.'
- 'I talk up this organisation to my friends as a great organisation to work for.'
- 'I would accept almost any type of job assignment in order to keep working for this organisation.'
- 'I find that my values and the organisations values are very similar.'
- 'I am proud to tell others that I am part of this organisation.'
- 'This organisation really inspires the very best in me in the way of job performance.'
- 'I am extremely glad that I chose this organisation to work for over others I was considering at the time I joined.'
- 'I really care about the fate of this organisation.'

- 'For me this is the best possible of all organisations for which to work.'

The response category is a seven-point Likert scale: 1 = strongly disagree, 2 = moderately disagree, 3 = slightly disagree, 4 = neither disagree nor agree, 5 = slightly agree, 6 = moderately agree, and 7 = strongly agree.

Reliability

Fields²⁰¹ reports reliabilities ranging between 0.74 and 0.92 from 13 studies using the measure.

Other measures of organisational commitment

Fields²⁰¹ identifies nine validated measures of organisational commitment in addition to the two identified here. This figure includes one scale of occupational commitment, which is reported next.

Occupational/professional commitment

One measure of professional or career commitment was identified in the papers included in the review:

Blau (1985):⁶⁹¹ The Career Commitment Scale

Scale description

This is an eight-item measure of occupational commitment developed with nursing staff in a North American hospital. In this context, career commitment is defined as one's attitude towards one's profession or vocation.⁶⁹¹

Items and response category (slightly abbreviated scale items are reported here as they appear in the original article).

- 'If I could get another job different from being a nurse and paying the same amount I would probably take it.'*
- 'I definitely want a career for myself in nursing.'
- 'If I could do it all over again, I would not choose to work in the nursing profession.'*
- 'If I had all the money I needed without working, I would probably still continue to work in the nursing profession.'
- 'I like this vocation too well to give it up.'
- 'This is the ideal vocation for a life work.'

- ‘I am disappointed that I ever entered the nursing profession.’*
- ‘I spend a significant amount of personal time reading nursing-related journals or books.’

(*Indicates that the item is reverse scored.)

The scale uses a five-point response category, which Blau⁶⁹¹ describes as ranging from 1 = strongly disagree to 5 = strongly agree.

Reliability

Blau⁶⁹¹ reports a Cronbach’s alpha of 0.87 for the career commitment scale. A second sample (consisting of roughly one-half repeat respondents and one-half new respondents) gave a Cronbach’s alpha of 0.85. Fields²⁰¹ reports alphas of 0.76–0.88 from five studies using the measure.

Engagement

None of the studies in the current review measured engagement, so no specific scales were identified this way. The literature search was also unable to identify any reviews of the reliability of a measure of engagement. This section therefore draws on evidence from a single study on the development of a short measure of engagement, which has been widely used in cross-sectional research on HRM:

Schaufeli et al. (2006).⁶⁹² Utrecht Work Engagement Scale – shortened version (UWES-9)

Scale description

This is a nine-item measure of work engagement, i.e. a positive work-related state of fulfilment characterised by vigour (high levels of energy while working, and persistence in the face of difficulties), dedication (sense of significance, enthusiasm, challenge and pride) and absorption (being fully concentrated and deeply engrossed in work). This measure is a shortened version of the original, 17-item UWES.¹⁷⁹

There are three items on each of the three subscales: vigour, dedication and absorption.

Example items

- Vigour
 - ‘At my work, I feel bursting with energy.’
 - ‘At my job, I feel strong and vigorous.’

- ‘When I get up in the morning, I feel like going to work.’
- Dedication
 - ‘I am enthusiastic about my job.’
 - ‘My job inspires me.’
 - ‘I am proud of the work that I do.’
- Absorption
 - ‘I feel happy when I am working intensely.’
 - ‘I am immersed in my work.’
 - ‘I get carried away when I am working.’

Response category

All items are rated on a seven-point Likert-type scale, where 0 = never, 1 = almost never, 2 = rarely, 3 = sometimes, 4 = often, 5 = very often, and 6 = always.

Reliability

Cronbach’s alpha coefficients ranged between 0.60 and 0.88 (median = 0.77) for the three-item vigour subscale, between 0.75 and 0.90 (median = 0.85) for the three-item dedication subscale, and between 0.66 and 0.86 (median = 0.78) for the three-item absorption subscale.⁶⁹² Cronbach’s alpha for the whole nine-item measure varied between 0.85 and 0.92 (median = 0.92).⁶⁹²

Coefficients for test–retest reliability were 0.61, 0.56 and 0.60 for the subscales of vigour, dedication and absorption, respectively, based on a sample of 293 participants, and 0.71, 0.66 and 0.68 for each of the subscales, respectively, based on a sample of 2111 participants.

Coefficients for test–retest reliability for the whole nine-item measure were 0.64 and 0.73, based on samples of 293 and 2111 participants, respectively.

Burnout

Thirty studies included a measure of emotional strain. A wide range of concepts were covered by the studies including negative emotions, stress, exhaustion, irritation, anxiety, self-esteem and psychosomatic complaints. There was also great variation in the measures used; however, the Maslach Burnout Inventory (MBI) was the most frequently reported (four studies):

Maslach and Jackson (1981, 1984).^{693,694} Maslach Burnout Inventory (MBI)

Scale description

The MBI was developed with health care professionals. The original MBI is a 25-item measure comprising three subscales:

- *Emotional exhaustion* characterised by low energy and feeling emotionally drained, also referred to as compassion fatigue.
- *Depersonalisation* typified by treating patients or clients as objects rather than people.
- *Diminished personal accomplishment* the tendency to evaluate oneself negatively, or experience reduced feelings of job competence.

More recently a general scale (MBI-General Survey) has been developed.¹⁸⁸ The general survey broadly parallels the original MBI, with the main change being that items on depersonalisation are replaced with one on cynicism.

A 22-item version of the MBI has been developed and found to be reliable.^{695,696} The 22-item scale is reported here.

Items and response category

- Exhaustion subscale
 - ‘I feel emotionally drained from my work.’
 - ‘I feel fatigued when I have to get up in the morning to face another day in the job.’
 - ‘Working with people all day is really a strain for me.’
 - ‘I feel ‘burned out’ from my work.’
 - ‘I feel frustrated by my job.’
 - ‘I feel I’m working too hard on my job.’
 - ‘Working directly with people puts too much stress on me.’
 - ‘I feel like I’m at the end of my rope.’
 - ‘I feel used up at the end of the day.’
- Personal accomplishment
 - ‘I can easily understand how my clients feel about things.’
 - ‘I deal very effectively with the problems of my clients.’
 - ‘I feel I am a positive influence on other peoples lives through my work.’
 - ‘I feel very energetic.’
 - ‘I can easily create a relaxed atmosphere.’
 - ‘I feel exhilarated after working with my clients.’
 - ‘I have accomplished many worthwhile things in this job.’
 - ‘In my work I deal with emotional problems calmly.’
- Depersonalisation
 - ‘I feel I treat some clients as impersonal “objects”.’

- ‘I have become more calloused towards people since I took this job.’
- ‘I worry that this job is hardening me emotionally.’
- ‘I feel some clients blame me for some of their problems.’
- ‘I don’t really care what happens to some clients.’

Respondents are asked to rate each item according to the intensity and frequency of their experience on a scale ranging from 1 (very mild) to 7 (very strong). There has been a tendency in research studies to use only the frequency measure.

Reliability

Many studies have used the MBI and reviews of these typically report Cronbach’s alphas of 0.74–0.89 for the three subscales.⁶⁹⁵

Other measures of burnout

Research into burnout has largely been dominated by use of the MBI. One review of measures of burnout was identified⁶⁹⁷ in which two other scales are reviewed.

Job involvement

Four studies include a job involvement measure as an outcome of HRM. Two studies reported using Lodahl and Kejner⁴²⁴ and one study used a measure by Kanungo.⁵⁹³ The fourth study did not specify the scale used.

No reviews of the reliability of job involvement measures were identified. A meta-analysis of job involvement¹⁸⁹ established that the two scales cited here tended to measure the same concept and that there were no substantive differences in relationships with other associated variables (e.g. job satisfaction). The more recent Kanungo⁵⁹³ scale is reported here.

Kanungo (1982).⁵⁹³ Job Involvement Questionnaire (JIQ)

Scale description

This is a 10-item scale to describe an employee’s specific beliefs regarding his/her relationship with, or involvement in, his/her current job.

Example items

- ‘The most important things that happen to me involve my present job.’

- 'To me, my job is only a small part of who I am.'
- 'I am very much involved personally with my job.'
- 'I live, eat and breathe my job.'
- 'Most of my interests are centred around my job.'
- 'I have very strong ties with my present job which would be very difficult to break.'
- 'Usually I feel detached from my job.'
- 'Most of my personal life goals are job-oriented.'
- 'I consider my job to be very central to my existence.'
- 'I like to be absorbed in my job most of the time.'

Response category

Each item is rated on six-point 'agree–disagree' Likert-type scale.

Reliability

Coefficient alpha values for the JIQ, as calculated by Kanungo,⁵⁹³ were 0.87 for internal consistency (based on 703 participants) and 0.85 for test–retest reliability (based on 63 participants).

Turnover intentions

Over 50 of the studies in this review included some form of absence, turnover or turnover intention measure. In 36 cases, a one-off or unspecified scale, or company records were used. The remaining studies cited 10 different scales, the most frequently cited being the Intention to Quit subscale of the Michigan Organisational Assessment Questionnaire (used in three studies).

No reviews of the reliability of turnover intention scales were identified.

Cammann *et al.* (1979):⁶¹⁹ Intention to Turn Over

Scale description

This is a three-item subscale of the Michigan Organizational Assessment Questionnaire, measuring an employee's intentions to leave his/her job.

Items and response category

- 'How likely is it that you will actively look for a new job in the next year?'
- 'I often think about quitting.'

- 'I will probably look for a new job in the next year.'

Response category

Item 1 is rated on a seven-point Likert-type scale, where 1 = not at all likely, 2 = somewhat likely, 3 = quite likely, and 7 = extremely likely.

Items 2 and 3 are rated on a seven-point Likert-type scale, where 1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = neither agree nor disagree, 5 = slightly agree, 6 = agree, and 7 = strongly agree.

Reliability

A coefficient alpha value of 0.83 is given based on a sample of more than 400 participants.⁶¹⁹

Psychological contract

No studies measuring psychological contract were found in the review of longitudinal studies. Equally, no review of psychological contract scales was identified in the literature. The details of the scale reported here are drawn from the Psychological Contract Inventory Technical Report.⁶⁹⁸

Rousseau (2000):⁶⁹⁸ Psychological Contract Inventory (PCI)

Scale description

This scale measures four dimensions of the psychological contract; relational (long-term or open-ended employment arrangements, based on mutual trust and loyalty), balanced (dynamic, open-ended employment arrangements), transactional (short-term employment arrangements, based primarily on economic exchange), and transitional (a cognitive state that reflects the consequences of organisational change). All four dimensions are considered from the perspective of both the employee and the employer.

The dimensions of relational and transactional psychological contract are generally considered to underpin the concept and, therefore, only these two scales are reported below.

Items and response categories

Employer obligations

'Consider your relationship with your current employer. To what extent has your employer made the following commitment or obligation to you?'

- Relational
 - ‘Concern for my personal welfare.’
 - ‘Be responsive to employee concerns.’
 - ‘Make decisions with my interests in mind.’
 - ‘Concern for my long-term well-being.’
 - ‘Support me in meeting higher goals.’
- Transactional
 - ‘Limited involvement in the organisation.’
 - ‘Training me only for management.’
 - ‘A job limited to specific, well-defined responsibilities.’

Employee obligations

‘Consider your relationship with your current employer. To what extent have you made the following commitment or obligation to your employer?’

- Relational
 - ‘Make personal sacrifices for this organisation.’
 - ‘Take this organisation’s concerns personally.’
 - ‘Protect this organisation’s image.’
 - ‘Commit myself personally to this organisation.’
- Transactional
 - ‘Perform only required tasks.’
 - ‘Do only what I am paid to do.’
 - ‘Fulfil a limited number of responsibilities.’
 - ‘Only perform specific duties.’
 - ‘Quit whenever I want.’
 - ‘I have no future obligations.’
 - ‘Leave at any time I choose.’
 - ‘I have much fewer commitments.’

Response category

All items were measured on a five-point Likert-type scale, where 1 = not at all, 2 = slightly, 3 = somewhat, 4 = moderately, and 5 = to a great extent.

Reliability

No reliability data are reported for the PSI.

Organisational justice

Four studies reported using a measure of organisational justice. Two studies developed specific scales, one was unspecified and the fourth study used a scale based on Gilliland’s⁶⁹⁹ procedural justice rules.

Two meta-analytic reviews of the concept were identified.^{202,670} Both supported the conceptualisation of justice as three distinct but

related factors: *distributive justice* refers to the degree of perceived fairness in organisational outcomes, given one’s inputs to the organisation; *procedural justice* is concerned with the perceived fairness of the procedures by which a given outcome is arrived at; and *interactional justice* is perceived as the interpersonal treatment people receive when procedures are implemented. Both meta-analyses recommend the measurement of the three constructs.

Fields²⁰¹ identifies only one scale measuring all three justice components in his review of measures for organisational research, which is presented here.

Niehoff and Moorman (1993):⁷⁰⁰ Distributive, Procedural and Interactive Justice

Scale description

This is a 20-item scale, five items relate to distributive justice, six to procedural justice and nine to interactional justice.

Items and response category

- Distributive justice items
 - ‘My work schedule is fair.’
 - ‘I think my level of pay is fair.’
 - ‘I consider my workload to be quite fair.’
 - ‘Overall the rewards I receive here are quite fair.’
 - ‘I feel that my job responsibilities are fair.’
- Procedural justice items
 - ‘Job decisions are made by the general manager in an unbiased manner.’
 - ‘My general manager makes sure that all employee concerns are heard before job decisions are made.’
 - ‘To make formal job decisions my general manager collects accurate and complete information.’
 - ‘My general manager clarifies decisions and provides additional information when requested by employees.’
 - ‘All job decisions are applied consistently across all affected employees.’
 - ‘Employees are allowed to challenge or appeal job decisions made by the general manager.’
- Interactive justice items
 - ‘When decisions are made about my job, the general manager treats me with kindness and consideration.’
 - ‘When decisions are made about my job,

- the general manager treats me with respect and dignity.’
- ‘When decisions are made about my job, the general manager is sensitive to my personal needs.’
 - ‘When decisions are made about my job, the general manager deals with me in a truthful manner.’
 - ‘When decisions are made about my job, the general manager shows concern for my rights as an employee.’
 - ‘Concerning decisions about my job, the general manager discusses the implications of the decisions with me.’
 - ‘The general manager offers adequate justification for decisions made about my job.’
 - ‘When making decisions about my job, the general manager offers explanations that make sense to me.’
 - ‘My general manager explains very clearly any decision made about my job.’

Responses are on a seven-point scale ranging from 1 = strongly disagree to 7 = strongly agree.

Reliability

Fields²⁰¹ reports Cronbach’s alpha coefficients for the scales as follows: distributive justice 0.72–0.74; procedural justice 0.85 and interactive justice 0.92.

Other measures of organisational justice

Fields²⁰¹ identifies 18 additional validated measures of organisational justice. The majority focus either on procedural justice or distributive justice.

Organisational support

One measure of perceived organisational support was reported in the studies included in the review and is reported here.

Eisenberger *et al.* (1986):²⁰⁶ Survey of Perceived Organisational Support

Scale description

Perceived organisational support is a unidimensional scale with two facets, valuation of employee contribution and concern about employee well-being.²⁰⁸ The Survey of Perceived Organisational Support measures the employee’s view of the extent to which his/her organisation values them, is concerned with their well-being and chooses to reward greater effort on their

part. There is a shorter 17-item version of the scale, which is presented here. It consists of eight items about how employees perceive themselves to be valued by the organisation and nine items about the extent to which the organisation considers their well-being in the decisions that it makes. Shorter versions have been used, but the scale authors recommend that both facets of perceived organisational support are used in its measurement.²⁰⁸

Items and response category

‘Listed below is a series of statements that represent possible feelings that individuals might have about the company or organisation for which they work. With respect to your own feelings about the particular organisation with which you are now working [name of organisation] please indicate the degree of your agreement or disagreement with each statement by checking one of seven alternatives below each statement.’

- ‘The organisation values my contribution to its well-being.’
- ‘If the organisation could hire someone at a lower salary to replace me it would do so.’*
- ‘The organisation fails to appreciate any extra effort from me.’*
- ‘The organisation strongly considers my goals and values.’
- ‘The organisation would ignore any complaint from me.’
- ‘The organisation disregards my best interests when it makes decisions that affect me.’
- ‘Help is available from the organisation when I have a problem.’
- ‘The organisation really cares about my well-being.’
- ‘The organisation is willing to extend itself in order to help me perform my job to the best of my ability.’
- ‘Even if I did the best job possible the organisation would fail to notice.’
- ‘The organisation is willing to help me when I need a special favour.’
- ‘The organisation cares about my general satisfaction at work.’
- ‘If given the opportunity, the organisation would take advantage of me.’*
- ‘The organisation shows very little concern for me.’*
- ‘The organisation cares about my opinions.’
- ‘The organisation takes pride in my accomplishments at work.’
- ‘The organisation tries to make my job as interesting as possible.’

(*Indicates that an item is reverse scored.)

Responses are scored on a seven-point scale, running from 1 = strongly disagree to 7 = strongly agree.

Reliability

Rhoades and Eisenberger²⁰⁸ describe the scale as unidimensional and having high internal reliability. This is confirmed in their review of more than 70 studies, most of which use the Survey of Perceived Organisational Support. Fields, in his review of the measure, reports coefficient alpha values from three studies, ranging from 0.74 to 0.95.

Other measures of organisational support

No other measures of organisational support were identified.

Organisational climate

Measuring organisational climate is especially complex due to the multifaceted nature of the concept. A wide range of dimensions can be covered in a generic climate model, and there is little consensus about which dimensions it is important to measure. Measures of organisational climate typically adopt one of two distinct approaches. First, the molar approach that looks at employees' perceptions of a variety of formal and informal practices, policies and procedures in an organisation. The two meta-analyses reported in Chapter 8 adopt this broad approach to climate measurement. However, there is no consensus about which climate measures should be included. Existing climate measures cover a vast number and variety of dimensions with little consensus as to the areas of organisational functioning that should be covered.

Second, facet-specific approaches try to identify a few key elements of climate that are relevant to the specific research question and use a small number of scales to measure those relevant climate dimensions. There is emerging evidence to suggest that specific climates (e.g. safety, innovation, customer service) are important in predicting specific organisational outcomes. In particular, in the health sector, safety climate has emerged as a prominent area of research in relation to patient outcomes.

One measure of climate was identified in the studies included in the review, the facet-specific measure of creative and innovative climate.²⁵¹ This

was felt to be too specific to be of general use so is not included here.

The literature review identified two meta-analytic reviews of molar climate measures,^{673,674} two recent studies of climate in health-care settings;^{701,702} and one review of safety climate in health care.⁷⁰³ Both of the studies in health-care settings support the importance of safety climate in determining patient safety outcomes (including medication errors).

The review of Flin *et al.*⁷⁰³ examines the psychometric properties of 12 measures of safety climate and concludes that the *Hospital Survey on Patient Safety* has undergone more rigorous testing than other measures and met more of their psychometric criteria. The scale is reported here.

Sorra and Nieva (2003).⁷⁰⁴ Hospital Survey on Patient Safety

Scale description

Safety climate is measured by 10 dimensions in the Sorra and Nieva⁷⁰⁴ instrument. Of these, Flin *et al.*⁷⁰³ recommend that three dimensions, relating to teamwork and organisational learning, are not used (as they are not demonstrated to be specific to safety climate). The seven remaining dimensions are described here.

Items and response category

Safety culture dimensions – unit level

- Supervisor/manager expectations and actions promoting safety
 - ‘My supervisor/manager says a good word when he/she sees a job done according to established safety procedures.’
 - ‘My supervisor/manager seriously considers staff suggestions for improving patient safety.’
 - ‘Whenever pressure builds up, my supervisor/manager wants us to work faster even if it means taking short cuts.’*
 - ‘My supervisor/manager overlooks patient safety problems that happen over and over.’*
- Communication openness
 - ‘Staff will freely speak up if they say something that may negatively affect patient care.’
 - ‘Staff feel free to question the decisions or actions of those with more authority.’

- ‘Staff are afraid to ask questions when something does not seem right.’*
- Feedback and communication about error
 - ‘We are given feedback about changes put into place on event reports.’
 - ‘We are informed about errors that happen in this unit.’
 - ‘In this unit, we discuss ways to prevent errors from happening again.’
- Non-punitive response to error
 - ‘Staff feel like their mistakes are held against them.’*
 - ‘When an event is reported, it feels like the person is being written up, not the problem.’*
 - ‘Staff worry that mistakes they make are kept in their personnel file.’*
- Staffing
 - ‘We have enough staff to handle the workload.’
 - ‘Staff in this unit work longer hours than is best for patient care.’*
 - ‘We use more agency/temporary staff than is best for patient care.’*
 - ‘We work in “crisis mode”, trying to do too much, too quickly.’*
- Hospital management support for patient safety
 - ‘Hospital management provides a work climate that promotes patient safety.’
 - ‘The actions of hospital management show that patient safety is a top priority.’
 - ‘Hospital management seems interested in patient safety only after an adverse event happens.’*

Safety culture dimensions – hospital wide

- Hospital hand-offs and transitions:
 - ‘Things ‘fall between the cracks’ when transferring patients from one unit to another.’*
 - ‘Important patient care information is often lost during shift changes.’*
 - ‘Problems often occur in the exchange of information across hospital units.’
 - ‘Shift changes are problematic for patients in this hospital.’*

(*Indicates the item is reverse scored.)

Responses are measured on a five-point Likert-type scale, where 1 = strongly disagree, 2 = disagree, 3 = neither, 4 = agree, and 5 = strongly agree.

Reliability

Sorra and Nieva⁷⁰⁴ report reliabilities for the scales as follows:

Supervisor/manager expectations and actions promoting safety: Cronbach’s alpha = 0.75
Communication openness: Cronbach’s alpha = 0.72
Feedback and communications about error: Cronbach’s alpha = 0.78
Non-punitive response to error: Cronbach’s alpha = 0.79
Staffing: Cronbach’s alpha = 0.63
Hospital management support for patient safety: Cronbach’s alpha = 0.83
Hospital handoff and transitions: Cronbach’s alpha = 0.80

Conclusions

Scales for nine of the intermediate outcomes were identified in the studies included in this review. Two intermediate outcomes domains (engagement and psychological contract) were not covered in the studies included in this review. However, they were felt to be conceptually important areas (particularly for future research) and measures were identified via expert opinion. In one area, climate, the only measure used in an included study was felt to be too specific to an area (creativity) for general use in studying the effects of HRM. Again the subject experts on the team identified alternative climate measures that are of theoretical interest in an NHS setting.

An extensive review of validated measures of a range of work-related variables (Fields²⁰¹) was used as the primary source of information for five of the intermediate outcome areas (job satisfaction, organisational commitment, occupational commitment, organisational justice and organisational support). For the remaining seven areas, reviews of scale reliabilities were sought, and where none could be found we drew on meta-analyses or empirical studies to provide some data on reliability and other scales.

The studies included in this review used a wide range of scales within most of the intermediate outcome areas, while in other areas a far smaller number of scales, or no scales were found.

The same pattern was found in the reviews of validated measures. The large numbers of scales identified in areas such as job satisfaction and organisational justice are a reflection of both the popularity of such concepts in the research literature and their multidimensionality – often scales are developed to measure specific facets of an intermediate outcome (e.g. procedural, distributive or interactional justice). The lack of scales of other areas in longitudinal HRM studies included in this review indicates either the relative youth of the concepts in HRM research terms (e.g. psychological contract) or the popularity of cross-sectional as opposed to longitudinal research

(e.g. engagement). This is not a reflection on their theoretical importance.

The aim here was to provide reliability information on scales demonstrated as having causal links in the HRM performance chain. Overall, validated scales with published reliability data were found for 10 of the 12 intermediate outcomes, the only exceptions being psychological contract and engagement. This is perhaps a reflection of the relatively recent recognition of the potential offered by these outcomes for explaining links in the HRM performance chain. The subject experts on the team identified promising scales for these areas.

Chapter 11

Conclusions and recommendations

Introduction

Identifying the links between HRM and individual and organisational performance is a critical issue for policy-makers and practitioners. Since the earliest studies in the USA by researchers such as Arthur^{14,648} and Huselid,¹⁸ many commentators have concluded that the evidence of the performance benefits of effective HRM is increasingly strong. As Marchington and Zagelmeyer⁷⁰⁵ note, a number of reports in the UK have stated that the economic and business case for good people management is now proven. For example, in the UK, the CIPD⁷⁰⁶ reported that 'more than 30 studies carried out in the UK and the USA since the early 1990s leave no room to doubt that there is a correlation between business management and performance, that the relationship is positive, and that it is cumulative' (CIPD 2001:⁷⁰⁶ 4). However, there is not unanimity about the strength of the evidence and judgements vary as to the extent to which the case is proven. More considered reviews of the evidence suggest that it is too early to be conclusive about the effects of HR practices on performance.³⁰ Hence the current review is a timely assessment of the nature and strength of the evidence linking HRM to performance.

Systematic review methodology

Previous reviews on the evidence base for the HRM performance link have been conducted with varying degrees of adherence to systematic principles, but none has followed the protocols of systematic review methodology. There is no real tradition of using this approach in the HRM field and their use more generally in organisational behaviour and management areas has only recently emerged. Such reviews are still limited in number.

Systematic review methodology offers the most sophisticated means of identifying and synthesising large amounts of evidence from disparate sources, as is the case in the HRM literature. The HRM topic itself, however, presented several challenges often not encountered in more limited and clearly demarcated reviews,

such as those in many areas of medicine where the methodology was first developed. Specifying and defining the interventions and outcomes to be studied was particularly complicated, and consequently developing inclusion and exclusion criteria and a robust means of synthesis was not a straightforward matter. As a result, this report presents an assessment of the evidence in relation to a wide range of HRM practices, rather than an in-depth appraisal and synthesis of findings involving a few well-defined practices. There are two methodological principles that have guided the review:

- The review is, in the main, concerned with cause and effect and, therefore, mostly restricts itself to the type of evidence capable of providing causal explanations.
- The review adopts a broad and inclusive approach to the assessment of evidence in order to reflect the complex and diverse nature of the HRM literature.

Given the multiple research questions this review sought to answer, along with the breadth of some of the research questions and the time limitations on the project, we did not attempt a coverage of all literature relevant to HRM, such as that on culture, strategy and leadership, but these concepts are included where they are directly tied to the HRM practices reviewed (e.g. leadership training).

Identification of HRM practices

An immediate challenge for the research team was that of marshalling the diverse/diffuse terminology within HRM into categories that could be used consistently throughout the review. Practices were identified using three different methods:

- a review of reviews
- expert opinion
- all practices identified from the subsequent literature searches were then mapped back on to the categories created by the first two methods, to test their coverage and inclusiveness.

Two researchers independently undertook reciprocal translation on the HRM practice terms in order to test the equivalence of themes across different research papers. This quickly demonstrated the diversity of approaches and definitions within the HRM literature, and led us to adopt a search strategy based on broader terms such as HRM and personnel management.

On the one hand, the implications for this review are that by adopting a broad search strategy, the evidence collected is an accurate reflection of the diversity of research within HRM, but is more difficult to distil into a few key messages. On the other hand, as in any review, some relevant research studies may not have been identified, particularly in this case if they did not include HRM, personnel management, or an equivalent term in the title or abstract and were not identified via citation searching or reference tracking.

Range and fidelity of use of HRM practices in the UK

Objective 1 for the research is concerned with identifying the main methods of HRM practices, the extent of their use in UK organisations, and the degree to which HRM policy is implemented. Initial work to identify the main methods of HRM identified 10 broad categories of practice/intervention. These were then searched for in high-quality HRM surveys in the UK. Several surveys were identified that examined the range of HRM practices being used in organisations in the UK. Of these, the WERS in particular is an excellent source of data on the extent of use of practices, providing some data on each of the broad categories of HRM practice. The majority of categories of practice identified in this review are also reported in surveys as present in over 70% of UK workplaces. However, within an individual workplace the extent of their use may vary as they may not be used for all staff.

Not all specific practices in each broad category used in this review are measured. For example, a survey might measure some aspects of work design, for example job autonomy, but not others, for example role breadth. Hence, the range of approaches to HRM practices within each broad category of HRM activity is unknown. Separate information for the health sector is sparse and points to the need for better monitoring of HRM practices used in the NHS and elsewhere in the health sector. WERS uses standard industrial

classification (SIC) codes that allows further breakdown of the data by sector. It is recommended that further analysis of this database is undertaken to provide more detailed information about the use of HRM in the health sector that this permits.

The categories of HRM practices, work design and staffing, training, employee involvement and performance management, which we have found to be most consistently associated with positive patient outcomes in the health sector have also been shown by the data in WERS to have good coverage in both health and non-health sectors. However, the information on them is not as deep as one would ideally like, as we do not have strong information on the variety of forms that each HRM practice may take. Such variations may lead to differences in their effects and durability.

Additionally, there is a need for awareness about the potential gap between intended HRM practices and actual or implemented practices. Social policy research has shown that the extent of implementation fidelity may affect whether a practice has its desired impact. However, no generic measure of implementation fidelity exists and there is little consistency in its measurement in the social policy area. Within HRM, some studies do gauge whether policies and practices have been implemented as they should be (e.g. reduced hours working, and monitoring and feedback), but, on the whole, the fidelity with which HRM practices are implemented is rarely measured in the research. However, only by evaluating whether a practice has been implemented properly can we assess whether any lack of impact is due to poor implementation or the inadequacies of the practice itself. Without assessing fidelity, it is also unclear whether any positive outcomes produced could be improved still further by increasing fidelity to the original model. Implementation fidelity has then to be considered as a potential moderator of outcomes, i.e. a variable that can influence the relationship between an HRM practice and its outcome.

Consequently, implementation fidelity needs to be measured and this report offers a framework and guidance for understanding and evaluating the fidelity in practice. A major implication for the findings of this review is that it is unclear whether variations in outcome or inconclusive findings are due to methodological weaknesses in which researchers have failed to distinguish between HRM policies as intended and HRM

practice as enacted. The recommendation here is for better methodological rigour in the assessment of implementation fidelity within HRM and performance research.

Evidence for the link between HRM practices and intermediate outcomes in the health sector

Intermediate outcomes are the intended outcomes of HRM practices, such as attitudes that may act as a link between HRM and final outcomes such as patient care. Longitudinal studies examining the relationship between HRM and such outcomes in the health field were identified by two strategies. First, a broad search for HRM and any outcome, with no limitations set in the search terms of type of outcome or setting, was undertaken. Second, a more specific search of the link between HRM and patient outcomes was conducted.

Longitudinal studies were found to exist for only 5 of the 12 intermediate outcomes identified for inclusion in the review. No longitudinal evidence was found for the impact of a large number of categories of HRM practices: these were recruitment, training, communication, employee involvement, family-friendly practices and performance management. Additionally, no longitudinal studies were identified that reported on the links between HRM practices and intermediate outcomes such as motivation, job involvement, occupational commitment, engagement, organisational justice, organisational climate, psychological contract and perceived organisational support. The review demonstrates that longitudinal research linking HRM practices and intermediate outcomes is underdeveloped in the health field.

The findings of the research examining the impact of HRM practices on intermediate outcomes identified in this review were far from conclusive. Positive relationships were found between team working on morale and job satisfaction, job variety and turnover intentions, and job complexity and job satisfaction. However, the numbers of studies on these relationships is small, and, moreover, other variables, such as job demands, job control, task reallocation, role ambiguity, pay and employee involvement, were not found to have a consistent impact on job satisfaction or organisational

commitment. Firm conclusions cannot be drawn from this research base.

Some constructs have emerged more recently (e.g. engagement and psychological contract) and, therefore, while theoretically important, may not yet have been the subject of longitudinal research. The research in health settings on burnout and job satisfaction is perhaps unsurprising, as burnout has long been proposed as a potential adverse reaction to care work, and job satisfaction is the most widely researched intermediate outcome in organisational psychology and organisational behaviour research, which chimes with how the layperson would first approach the assessment of work.

Overall, very limited evidence was found and the main theoretical links have not been tested longitudinally in the health sector. Considerably more longitudinal research is needed on a wider range of variables to understand the impact of HRM practices on final outcomes in the NHS. One quasi-longitudinal British study has appeared subsequent to our review by West *et al.*,⁷⁰⁷ which uses aggregated data from a somewhat diverse set of practices to create an index of high-performance HRM system, and finds it is significantly related to mortality rates in hospitals, controlling for prior mortality.

Impact of HRM practices on patient outcomes

The longitudinal research suggests that three types of HRM practices – employee involvement, training and performance management – have a positive impact on the key patient-care outcomes: mortality rates, length of stay, waiting times, patient safety and patient satisfaction. More specifically, working in quality improvement teams, training, and feedback were consistently and strongly associated with reduced infection rates, although much of the evidence is based on studies in the USA. We might therefore target each of these practices for further research.

More than one-half of the studies involving patient outcome identified in the review examined the impact of different staffing models through comparisons of cases using different grades and types of staff, different combinations of staff in teams, or different lengths of shift. The research on the health sector is therefore very different from the non-health sector research, which has been less concerned with staffing practices.

The mechanisms (i.e. the intermediate outcomes or performance-related employee behaviours) by which these HRM practices impact on patient outcomes have not been explored. This could be because the HRM practices that make up the majority of studies in this area (i.e. staffing levels, substitution) are not primarily conceptualised as having an impact via employee psychological states such as satisfaction and motivation. For example, they may affect the way work is done. Nonetheless, we should not rule out the possibility that such issues as staffing levels may have important implications for employee outcomes such as burnout or commitment without further research.

The recommendation here is that future research on HRM considers the impact of these practices on important employee psychological states and behaviours as well as at the patient outcomes level. Studying a broader range of employee outcomes will help provide a better understanding of these processes in an NHS setting.

Impact of HRM on intermediate and final outcomes in the non-health literature

A comparison of the non-health literature that was reported in Chapter 8 with the health literature reported in Chapters 6 and 7 reveals a number of clear similarities. First, there is an imbalance in the practices covered, so, in both areas certain domains of HRM are covered disproportionately more than in others. Practices in the categories of work design and staffing are more prevalent, whereas practices in other categories such as family friendly, communication and employee representation are underexplored. There are no studies of single status in either area. The gaps in research are not dissimilar between the two sectors in terms of the broad categories of HRM practice for which evidence was identified.

Second, there is considerable heterogeneity in the research within each of the HRM categories for both the health and non-health areas, and very few replication studies exist. This limits what a systematic comparison of the studies in a particular domain can achieve, as we are not comparing the same practices or performance measures.

Third, some HRM practices have been the subject of research in both the health and the non-health sectors. However, a major difference between the research in the two sectors is the specific practices that have been studied within each HRM category. For example, the studies in work design in non-health settings cover five main topics: team work, job complexity, job demands and control, job rotation, enlargement and enrichment, and role conflict or clarity. The work design studies in health are more limited in scope. Within staffing, for example, health research has focused more on topics such as staffing levels and substitution, whereas the non-health research has looked more at recruitment and selection, induction and flexible working practices.

Some other differences are to be expected. The final outcomes differ, between the health and non-health sectors, but also the intermediate outcomes and productivity-related employee behaviours have received much greater attention in non-health compared with health settings. Although there is a large number of studies in the non-health field, which have examined longitudinally the relationship between some of HRM practices and employee outcomes such as satisfaction, commitment and employee performance and turnover, there are clear gaps in the HRM literature. The coverage of intermediate outcomes such as engagement, psychological contract and climate are in non-health sectors just as neglected as they are in health.

The majority of studies in both areas present positive relationships between the practices studied. This may reflect a bias in the acceptance of papers by journal editors and referees' comments. But its implication is that we do not have a very firm basis for ruling out some practices as definitely not contributing significantly or independently to final or intermediate outcomes. An examination of the cross-sectional studies, if there were sufficient on specific practice–outcome links, might be used to identify some of these.

There is some similarity among the studies in this review, although it is rare for more than three or four studies to be sufficiently similar to compare directly, so many of the findings in this report are based on only a small number of studies. However, it is possible to identify some broad themes underlying the findings.

Broad emergent themes from the health and non-health literature

Work design

In the area of work design in the non-health literature, the most studied practices are in the employee autonomy and control categories, specifically within the studies on job enrichment, team working and job control. Job enrichment (i.e. providing employees with opportunities to take on broader roles with greater decision-making responsibility) was found to have universally positive effects on employee psychological states and positive employee behaviours. In addition, the weight of evidence on semiautonomous and autonomous teams (i.e. enriched jobs within team working) points again to positive impacts on employee attitudes and behaviours (e.g. productivity). Further evidence for the importance of employee autonomy within the work design literature can be found in studies of job demands and control. This is a key theory in the area of work stress and most studies have looked at individual outcomes such as job satisfaction and psychological and physical health outcomes.

These studies provide consistent evidence for the positive impact of increased job autonomy on employee outcomes such as job satisfaction, absence and health. Taken together, these studies emphasise the potential importance of HRM initiatives that involve designing jobs which provide employees with the opportunity to have control and discretion over their work. Although one longitudinal study has found evidence for an association between enriched jobs and organisational outcomes of company productivity and profitability, further longitudinal research at the organisational level is needed to build a more robust picture of organisational effects.³⁴

In the parallel field of employee participation, the small number of studies reviewed here support the widely advocated principle of involving employees in the design and implementation of changes (e.g. job redesign) that affect their work. Specifically in the health literature, employee involvement through quality improvement teams was found to be effective in terms of improved patient outcomes.

Training

In the area of training, findings in both health and non-health areas are consistently positive for

the impact of training on the specific intended outcomes of the training initiatives. In some cases there is evidence for the impact of training on more general employee attitudes and perceptions. There is also some limited evidence for the impact of training on the final outcome of organisational performance. But again, evidence is limited and further longitudinal research at the organisational level is required to clarify the nature of these relationships.

Performance management

Support for the impact of performance management practices is found in both the health and the non-health literature. There is evidence from both sectors for the importance of feedback on performance outcomes. In the non-health sector, feedback was found to have a positive impact on job performance and job satisfaction but this literature places greater emphasis on the importance of participative goal setting in conjunction with feedback. This specific link has not been tested in the health literature.

Promising practices

These studies have revealed what the Advanced Institute for Management Research programme (www.aimresearch.org/promising.html) refers to as 'promising practices' – work design that enhances employee autonomy and control, training, performance management (in the form of feedback, participative goal setting, education) and employee involvement.

The work design practices were central to the original concepts of high-involvement or commitment models,^{191,708} but, nonetheless, have increasingly been neglected in the HRM performance literature, as a recent overview³¹ has shown to be the case. However, intensive training that has been more central to the resource-based theory of the firm is also important. Indeed the emphasis on workers' knowledge and skill acquisition are, along with empowerment, the core elements of the Lawler¹⁹¹ and Walton⁷⁰⁸ models. They are also key to the more recent Bailey framework as adopted by Appelbaum *et al.*¹³ and others, in which practices that enhance employee skills and provide employees with a forum to participate (through work organisation changes such as empowerment) are central. There is further evidence for the significance of these from a longitudinal study of practices in manufacturing, which was not published at the time of our review. Birdi *et al.*⁷⁰⁹ replicated

the findings of Patterson *et al.*³⁴ reported in this review. Both studies found independent effects for job enrichment (empowerment in the terms of the Birdi *et al.*⁷⁰⁹ study) and extensive training on organisational performance, but not for the operational management initiatives of total quality management, JIT and advanced manufacturing technology.

Research effort expended on these promising areas may have the most pay-off but it would be a mistake given the heterogeneity and limited scope of the studies in the HRM if research were to overconcentrate on these for a number of reasons. First, other practices, especially those for which there is no research, may be important. Second, while they may be critical ingredients in a package of HRM practices, they may have synergistic effects on other practices. For example, Birdi *et al.* found that team working was not independently associated with productivity but it enhanced the impact of both training and empowerment, as well as operational practices such as JIT. This contrasts with the results of the longitudinal US study by Capelli and Neumark¹⁴⁹ included in our review, which tested for synergies between practices but found no strong ones. The practices relating to work organisation and training were limited, however, to team working, cross-training and job rotation not enrichment or other training measures.

Third, it may yet be that integrated approach to HRM in which practice use is a reflection of a more fundamental orientation on the part of management, be it high involvement or something else, is more significant for practice than any one individual practice. A cross-sectional study using WERS98⁸³ data shows that an integrated measure of high-involvement management centred on work organisation practices such as team-working, idea-capturing methods, and functional flexibility is related to the level and rate of change in productivity.⁶⁴⁷ Nonetheless, this high-involvement management is shown to be discrete from job enrichment, as, for example, it is being used in contexts where job autonomy is low as in mass production manufacturing firms. Moreover, job enrichment is more strongly related to labour productivity than high-involvement management.

The studies of integrated measures of HRM that we reviewed in Chapter 8, while showing that HR systems do make a difference to performance, found no evidence of an optimal bundle of

practices in terms of organisational performance. Limitations in the methods and particularly the measures means that, in many cases, the underlying concept is not clear enough for one to say which HR system is (or systems) are really more effective than others or whether there are some practices that account for most of the effect. Even in some of the case studies there was insufficient detail of some practices to be even certain what these entailed. Nor again can it be ruled out that one or more practice is a critical ingredient and the others are of little consequence for performance. The variety in the studies also limits generalisation. Case studies, such as that of Freeman and Kleiner,⁶⁴⁹ offered convincing evidence of effects of a package of practices in one situation, but generalisation to either other sites or assumed related or similar interventions would be premature.

Finally, we should not neglect practices outside the HRM domain. As we have seen, their impact may be affected by the use of HRM practices. It may also be that their use is strongly related to the use of HRM practices, which means that we can not be sure that if they are not included in the analysis any link between an HRM practice and performance that is found is either spurious or is a mediator of the link between the other practice and performance. In contrast, if HRM practices are found to be significant and non-HRM practices are found not to be then this strengthens any argument about their importance.

Relationship between intermediate outcomes and final outcomes

The intermediate outcomes examined in this review assessed a range of mental, emotional and attitudinal states that are hypothesised to provide a bridge between HRM and performance. While we acknowledge that HRM practices can have a direct impact on the knowledge and skills of employees, which, in turn, may influence organisational performance, this review concentrated on the role of employee sociopsychological states. The aim of Objective 3.1 was to investigate the correlations between these intermediate outcomes to assess whether they form discrete concepts. In some cases the meta-analyses reporting strong intercorrelations between some of the variables, but not to the degree that there was construct redundancy.

The review also explored, through meta-analytic data, the correlations between the intermediate outcomes and productivity-enhancing behaviours. The premise here is that the intermediate outcomes are determinants of salient employee behaviours, which, in turn, help generate effective organisational performance. The correlations between most of variables mostly were small to moderate.

Two limitations of the meta-analyses are important to note. First, their concentration on cross-sectional research means that it is not possible to draw conclusions about the causal direction of any of the relationships. Second, it is not possible to identify the unique relationship between each intermediate outcome and employee behaviours.

The studies of the impact of intermediate outcomes on final outcomes were sparse. No longitudinal research was found that examined the impact of intermediate outcomes on patient outcomes (Objective 4.1). In the non-health field, a small number of longitudinal studies were identified that examined the impact of intermediate outcomes (average employee job satisfaction and climate) on organisational performance (Objective 4.2). While the studies in this review show associations, the evidence on the casual direction of this relationship is mixed. This relationship is a crucial link for the premise that HRM influences final outcomes, partially through its impact on employee outcomes such as job satisfaction, and we clearly need more substantial data sets for surer interpretation.

Despite these caveats it is worth highlighting here a notable consistency in the findings on the relationships between climate, employee attitudes and performance at the individual level and the organisational level. At the individual level, two meta-analyses indicated that relationships of climate (employees' perceptions of formal and informal policies, practices, procedures and rewards) with job performance were mediated by employee attitudes such as job satisfaction. In other words, the studies suggest climate perceptions affect individual-level performance through their impact on employee attitudes. This finding was replicated at the organisational level, as the association between organisational climate, measured by employees' perceptions averaged for each company, and company productivity or profitability was found to be mediated by average level of job satisfaction. These studies provide support for the idea that HRM practices are the means through which employee's perceptions of

the organisation's climate are shaped, which, in turn, determine employee attitudes and behaviours supportive of organisational performance. HRM practice do not have a direct impact on employee's attitudes and behaviours; rather HRM practices are firstly filtered and interpreted by employees so they arrive at a view of what the organisation is like and the goals that it pursues.¹⁵⁵

An understanding of the impact of HRM practices on how employees perceive their work environment, and, in turn, the effect of this on their behaviours is then valuable and a promising area for further research. However, rather than treat climate as a catch-all concept that measures employee perceptions about organisation life, a more productive approach is to examine the link between the strategic focus of particular HRM practices and climate. For example, if an organisation's policy is to promote employee involvement, voice and participation through its HRM practices, to what extent do employees perceive that the organisation is enacting this focus. Such an approach also acknowledges the importance of assessing the implementation fidelity of HRM practices.

Measures of intermediate outcomes

In order to identify and report on the reliability of intermediate outcome measures, the scales in all included studies were identified. This demonstrated that the number of measures of intermediate outcomes included in the studies varied between types of outcomes. In some areas with a long research tradition such as job satisfaction large numbers of different scales were identified. In other, arguably more recent areas of HRM research interest, no generic scales appropriate to an NHS setting could be identified (as was the case for climate, for which measures vary widely in terms of subject matter precluding the identification of any one measure as particularly appropriate for HRM research) or there was no evidence from longitudinal research examining the link (as was the case for psychological contract).

Scales varied in the degree to which they were established, with examples of one-off scales or single-item measures. Where a well-established scale could be identified for an intermediate outcome area, it was selected for inclusion in the review. Where several comparable scales were

found or no scale could be identified the subject experts on the review team advised on scale selection. A major review of measures²⁰¹ was used as the primary source of reliability data for scales in 5 of the 12 areas. For the remainder, purposive searching was undertaken for reviews of reliability, meta- analyses or longitudinal studies using to provide reliability data for the scale.

Scales were included for two intermediate outcomes – engagement and psychological contract – despite the fact that these two outcomes were not amongst those measured by studies in this review. The rationale is that both are of burgeoning importance in HRM research and their conceptual importance in the area justified their inclusion.

In general, reasonable reliability data were found for all scales, with the exception of psychological contract, for which no evidence was available. Unsurprisingly, reliability data were reported from a larger number of studies for well-established measures (e.g. job satisfaction). Reliabilities for most scales were over the 0.7 rule-of-thumb threshold, which indicates good scale reliability.

The scales presented here provide a good starting point for the investigation of intermediate outcomes in the NHS based on the relevant literature. Many of the scales identified are not specific to the health sector and, given the range of intermediate outcomes included in studies in this review and the specific nature of many of the HRM practice and intermediate outcome links, there is scope for adapting existing scales or developing bespoke scales for the NHS in relation to key intermediate outcomes. More generally, developing or adapting scales for ‘newer’ intermediate outcomes, such as psychological contract, would support and encourage research in this area.

Conclusions

The HRM performance relationship is complex, multifaceted and multidirectional. Many frameworks of HRM and performance emphasise linkages between HRM and employee performance, mediated through workforce skills and employee psychological states, which result in superior organisational performance. However, there is, as we have seen, no longitudinal research exploring the totality of any causal chain from HRM to intermediate outcomes and employee behaviours, to organisational performance. Cross-sectional research also is limited to parts of the

chain and, moreover, there is insufficient evidence that HRM causes changes in organisational performance. The conclusion from our analysis is that, on the one hand, it would be premature to say that we have a strong evidence base for the HRM performance link; on the other hand, however, there is some evidence supporting elements of each stage in the causal chain and theoretical grounds for believing that an HRM system based on enhancing employee skills, attitudes and behaviours should be beneficial for organisational performance, and, specifically, in the case of the NHS, patient outcomes. However, there is a clear need for research that overcomes the weaknesses of the current studies.

Future research

Big science

Many of the studies that we have reviewed are limited in scope to one or two practices and intermediate or outcome variables. Studies of this kind, especially on new practices or in under-researched contexts such as health organisations, will continue to be useful. But the implications of our overview of the evidence in relation to the six questions we have addressed is that research of a much larger scale is required, which covers all aspects of the chain from practices to final outcomes, and which enables one to test the differential effects of individual practice, synergistic relationships and integrated approaches.⁶⁴⁷ This echoes Wall and Wood’s³⁰ conclusion that there is a need in the HRM area to adopt a strategy of articulating and investigating the relative merits of competing hypotheses, for more longitudinal studies with data from multiple sources or independent audits of HRM, rather than relying on questionnaire surveys using the response of a single person in the organisation. Many of the important questions are ones that also require large samples and the greater the number of variables involved, the larger the sample size required, especially to test for synergies or integrated use. High response rates in such large sample sizes are also required if we are to provide a firm base for generalisation.

The principles underlying the design criteria for such studies are the ones that have guided the longitudinal and experimental studies on which we have largely concentrated our review. So, the overall weaknesses of the research area we have reviewed stem not from the design, but rather from the almost inevitable limitations of the small-scale funding that characterises social science.

This argument has implications for funding and resource allocation. Funding for an individual or research team, over just a few years, does not provide the resources to deploy the recommended methods. What is required, as Wall and Wood³⁰ suggest, is much more intensive collaboration than is the current norm among the many potentially interested parties, including academics, employer organisations, employee organisations, professional bodies and government departments. In short we need big science projects on management practices and performance that build on the understanding generated by such systematic reviews as this one.

The notion of 'big science' does not preclude detailed study of the nature of practices, the intention behind them or the fidelity of their implementation. Indeed, as noted earlier in the chapter, smaller studies that examine intent and the depth of practices might be useful. However, attending to such detail and the diversity in the way in which the same generic practice is designed and used could be seen as amplifying the need for a large team of coordinated researchers as in natural science, for example the Human Genome Project.

Using and supplementing existing data

There are several ways in which existing data sources could be further used to inform this area of investigation, some examples of which are given here:

First, WERS,⁸³ an example of a large survey and hence 'big science' by current standards, collects data on the health sector and does, in fact, follow up questions about use of HR practices with a further layer of questions (e.g. is appraisal used for pay or development), but in fact there has been little or no use made thus far of these data. Further bespoke analysis of the WERS data set could provide more detailed information about the use of general HR practices in the health sector.

Second, it would be highly desirable to supplement the HCC Staff and Patient Surveys with a regular survey of HR practices at the organisational/trust level. This could provide a powerful resource for identifying effective HR practices and their effects on employees within the health sector. It could be updated regularly as new practices come on stream and old ones are discontinued.

A third area that could provide opportunity for the exploration of HR practices in the health

sector is based on the Core Standards data. The HCC requires Trusts to declare their degree of compliance with the Government's core standards for health care. The core standards are not HR practices in themselves, but specify the need for systems to be in place within Trusts, for example to ensure that clinicians continuously update skills and techniques relevant to their clinical work (C5c, HCC Annual Health Check, 2007/8). Empirical research could be undertaken to map core standards to HR practice areas and assess the range of specific systems in place in Trusts to meet these core standards, providing data on a limited range of HR priorities within Trusts and offering the scope to explore the differential impact of specific HR practices against a particular core standard.

Change and intervention studies

To date, most research conducted to investigate the links between HRM and performance, and the relationships with, and between, intermediate outcomes and employee behaviours have been cross-sectional and correlational. While in many cases the associations are as predicted, we cannot verify causality. We concur with Iles and Sutherland⁷¹⁰ (in their review of change management in the NHS) that we more need quasi-experimental research, which is better suited to detecting causal effects. The prevalence of changes in HRM policies and practices, especially in work organisation, provide a good opportunity for researchers and health-care managers to examine the impact of changes in HR practice on employee and patient outcomes. We need to use change programmes to gather robust and comprehensive data to help unpick the multiple dimensions and relationships that constitute HRM and performance. However, assessing the impact of any HRM initiative must be done with care, taking into consideration its relationship with other practices, the organisational context in general, and using robust methodologies for studying employee responses and organisational outcomes.

Multilevel investigation of HRM and performance

In recent years, research on HRM and performance has mainly adopted an organisational level of analysis, empirically testing associations between HRM practices and performance. In contrast, more traditional research in HRM and organisational behaviour has gathered individual-level data and examined the relationships between employee attitudes and behaviours that we identified as

intermediate outcomes in the review. Given that HRM performance models propose that superior HRM practices result in more skilled, committed, motivated and productive employees, which, in turn, enhance organisational effectiveness, it is impossible to understand how HRM practices influence performance without considering these mechanisms. Ostroff and Bowen¹⁵⁵ highlighted that this causal chain is based on multilevel issues, in which we have an organisational-level linkage between HRM and organisational performance, and individual-level linkages between employees' psychological states and behaviours. But there is also a cross-level and multilevel premise that there is a collective influence of employee psychological states and employee behaviours on organisational performance. Therefore, to understand the linkages between HRM and performance, we need integrated research at multiple levels, yet a multilevel perspective has rarely been applied to this issue. Advances in multilevel analysis now provide powerful techniques for analysing longitudinal and multilevel models of HRM and performance. We strongly advocate using such an approach to capturing change in HRM practices and performance, incorporating measures at individual and other relevant levels of analysis (e.g. team, ward).

Concluding comments

This review shows that the longitudinal evidence on the linkage between HRM and performance is limited, especially within the health sector. Many cross-sectional studies within the non-health sector, and a small number within the health sector, have found an association between HRM and performance, but they cannot claim to demonstrate a causal link. We know little about how, and in what circumstances, HRM may lead to enhanced performance. However, we are optimistic that the shortfall of evidence is more due to limitations in the quality of research data rather than the likely spuriousness of claims about the importance of HRM for employee and organisational outcomes. Major empirical challenges remain if we are to understand the HRM and performance link; but 'big science', change and intervention studies and multilevel research will help considerably in progressing our understanding of the relationship between HRM and performance.



Acknowledgements

Contribution of authors

Malcolm Patterson, Jo Rick, Stephen Wood and Andrew Booth designed the review and drafted the protocol and were responsible for its ongoing conduct.

All authors were involved in the development of the methodology. Jo Rick was responsible for day-to-day project management, Christopher Carroll and Shashi Balain conducted the searches, and all authors were involved in sifting of articles and data extraction. All authors contributed to the drafting of the report and approved the final version.



References

1. Walton R. From control to commitment in the workplace. *Harvard Business Review* 1985;**63**:76–84.
2. Pfeffer J. *Competitive advantage through people: unleashing the power of the workforce*. Boston, MA: Harvard University Press; 1994.
3. Kochan T, Osterman P. *Mutual gains*. Boston, MA: Harvard Business School Press; 1995.
4. Barney J. Looking inside for competitive advantage. *Academy of Management Executive* 1995;**9**:49–61.
5. Taylor S, Beechler S, Napier N. Toward an integrative model of strategic international human resource management. *Academy of Management Review* 1996;**21**:959–85.
6. Taylor S, Beechler S, Najjar M, Ghosh BC. A partial test of a model of strategic international human resource management. *Advances in International Comparative Management* 1998;**12**:207–36.
7. Cua KO, McKone KE, Schroeder R. Relationships between implementation of TQM, JIT, and TPM and manufacturing performance. *Journal of Operations Management* 2001;**19**:675–94.
8. Flynn B, Sakakibara S, Schroeder R. Relationship between JIT and TQM: practices and performances. *Academy of Management Journal* 1995;**38**:1325–60.
9. Sakakibara S, Flynn BB, Schroeder RG, Morris WT. The impact of just-in-time manufacturing and its infrastructure on manufacturing performance. *Management Science* 1997;**43**:1246–57.
10. Shah R, Ward PT. Lean manufacturing: context, practice bundles, and performance. *Journal of Operations Management* 2003;**21**:129–49.
11. Womack J, Jones D, Roos D. *The machine that changed the world*. New York, NY: Rawson; 1990.
12. Dean JW, Bowen D. Management theory and total quality: improving research and practice through theory development. *Academy of Management Review* 1994;**19**:392–418.
13. Appelbaum E, Bailey T, Berg P, Kalleberg AL. *Manufacturing advantage: why high performance work systems pay off*. Ithaca, NY: Cornell University Press; 2000.
14. Arthur JB. Effects of human resource systems on manufacturing performance and turnover. *Academy of Management Journal* 1994;**37**:670–87.
15. Batt R. Managing customer services: human resource practices, quit rates, and sales growth. *Academy of Management Journal* 2002;**45**:587–98.
16. Becker BE, Huselid MA. High performance work systems and firm performance: a synthesis of research and managerial implications. In Ferris GR (ed.) *Research in Personnel and Human Resource Management*, 16, Greenwich, CT: JAI Press; 1998. pp. 53–101.
17. Guthrie JP. High involvement work practices and turnover and productivity: evidence from New Zealand. *Academy of Management Journal* 2001;**4**:180–90.
18. Huselid MA. The impact of human resource management practices on turnover, productivity, and corporate financial performance. *Academy of Management Journal* 1995;**38**:635–72.
19. Lawler E, Mohrman SA, Ledford GE Jr. *Creating high performance organizations*. San Francisco, CA: Jossey-Bass; 1995.
20. MacDuffie J. Human resource bundles and manufacturing performance: organizational logic and flexible production systems in the world auto industry. *Industrial and Labor Relations Review* 1995;**48**:197–221.
21. Ichniowski C, Shaw K, Prennushi G. The effects of human resource management practices on productivity. *American Economic Review* 1997;**87**:291–313.
22. Guest DE. Human resource management and performance: a review and research agenda. *International Journal of Human Resource Management* 1997;**8**:263–76.
23. Becker B, Gerhart B. The impact of human resource management on organizational performance, progress and prospects. *Academy of Management Journal* 1996;**39**:779–801.
24. Delery JE, Doty DH. Modes of theorizing in strategic human resource management: tests of universalistic, contingency, and configurational

- performance predictions. *Academy of Management Journal* 1996;**39**:802–35.
25. Hoque K. Human resource management and performance in the UK hotel industry. *British Journal of Industrial Relations* 1999;**37**:419–43.
 26. Wood SJ, De Menezes L. High commitment management in the UK: evidence from the Workplace Industrial Relations Survey, and Employers: Manpower and Skills Practices Survey. *Human Relations* 1998;**51**:485–515.
 27. Guest DE, Michie J, Conway N, Sheehan M. Human resource management and corporate performance in the UK. *British Journal of Industrial Relations* 2003;**41**:291–314.
 28. West MA, Borrill C, Dawson J, Scully J, Carter M, Anelay S, *et al.* The link between the management of employees and patient mortality in acute hospitals. *International Journal of Human Resource Management* 2002;**13**:1299–1310.
 29. Wood SJ. Getting the measure of the transformed organization. *British Journal of Industrial Relations* 1999;**37**:391–419.
 30. Wall TD, Wood SJ. The romance of human resource management and performance, and the case for big science. *Human Relations* 2005;**58**:429–62.
 31. Wood S, Wall T. Work enrichment and employee voice in human resource management – performance studies. *International Journal of Human Resource Management* 2007;**18**:1335–72.
 32. De Menezes LM, Wood S. The reality of flexible work systems in Britain. *International Journal of Human Resource Management* 2006;**17**:1–33.
 33. Patterson MG, West MA, Lawthorn R, Nickell S. *Impact of people management practices on business performance. Issues in People Management*. London: Institute of Personnel and Development; 1997.
 34. Patterson MG, West MA, Wall TB. Integrated manufacturing, empowerment, and company performance. *Journal of Organizational Behavior* 2004;**2**:641–65.
 35. Wood SJ. Human resource management and performance. *International Journal of Management Reviews* 1999;**1**:367–413.
 36. Patterson MG, Warr PB, West MA. Organizational climate and company performance: the role of employee affect and employee level. *Journal of Occupational and Organizational Psychology* 2004;**77**:193–216.
 37. Wright PM, Gardner T, Moynihan LM. The impact of HR practices on the performance of business units. *Human Resource Management Journal* 2003;**1**:21–36.
 38. Guest D, Conway N. Peering into the black hole: the downside of the new employment relations in the UK. *British Journal of Industrial Relations* 1999;**37**:367–389.
 39. Peccei R, Wood S. Does total quality management make a difference to employee attitudes? (Special edition on Total Quality Management edited by S Hill and A Wilkinson). *Employee Relations* 1995;**1**:55–65.
 40. Coyle-Shapiro J. Changing employee attitudes: the independent effects of TQM and profit sharing on continuous improvement. *Journal of Applied Behavioral Science* 2002;**38**:57–77.
 41. Parker S, Wall T, Jackson P. That's not my job: developing flexible employee work orientations. *Academy of Management Journal* 1997;**40**:899–929.
 42. Huselid MA, Becker BE. Comment on 'measurement error in research on human resources and firm performance: how much error is there and how much does it influence effect size estimates?' *Personnel Review* 2000;**5**:835–54.
 43. Gerhart B, Wright PM, McMahan GC, Snell SA. Measurement error in research on human resources and firm performance: how much error is there and how does it influence effect size estimates? *Personnel Psychology* 2000;**53**:803–34.
 44. Briner R. Evidence-based human resource management. In Trinder L, Reynolds S (eds). *Evidence-based practice – a critical appraisal*. Oxford: Blackwell Science; 2000. pp. 184–211.
 45. Levy P, Williams J. The social context of performance appraisal: a review and framework for the future *Journal of Management* 2004;**30**:881–905.
 46. Taris TW. Is there a relationship between burnout and objective performance? A critical review of 16 studies. *Work and Stress* 2006;**20**:316–34.
 47. NHS CRD. *Undertaking systematic reviews of research on effectiveness*. CRD Report Number 4. York: CRD, University of York; 2001.
 48. Higgins J, Green S. *Cochrane handbook for systematic reviews of interventions*. 4.2.5 (Updated 2005). Oxford: The Cochrane Collaboration; 2005.
 49. Rick J, Briner RB, Daniels K, Perryman S, Guppy A. *A critical review of psychosocial hazard measures*. HSE

- Report CRR 356/20,. London: Health and Safety Executive; July 2001.
50. Rick J, Thomson L, Briner R, O'Regan S, Daniels K. *Review of existing supporting scientific knowledge to underpin standards of good practice for key work-related stressors, Phase 1*. HSE Research Report RR024. London: Health and Safety Executive; October 2002.
 51. Petticrew M, Roberts H. *Systematic reviews in the social sciences*. Oxford: Blackwell; 2006.
 52. Pawson R, Greenhalgh T, Harvey G, Walshe K. Realist review – a new method of systematic review designed for complex policy interventions. *Journal of Health Services Research and Policy* 2005;**10**:21–33.
 53. Greenhalgh T, Robert G, Bate P, Kyriakidou O, Macfarlane F, Peacock R. *How to spread good ideas. A systematic review of the literature on diffusion, dissemination and sustainability of innovations in health service delivery and organisation*. London: NHS SDO; 2004.
 54. Dixon-Woods M, Shaw RL, Agarwal S, Smith JA. The problem of appraising qualitative research. *Quality and Safety in Healthcare* 2004;**13**:223–25.
 55. Dixon-Woods M, Agarwal S, Young B, Jones D, Sutton A. *Integrative approaches to qualitative and quantitative evidence*. London: Health Development Agency; 2004.
 56. Tranfield D, Denyer D, Smart P. Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *British Journal of Management* 2003;**14**:207–22.
 57. Dixon-Woods M, Fitzpatrick R, Roberts K. Including qualitative research in systematic reviews: problems and opportunities. *Journal of Evaluation in Clinical Practice* 2001;**7**:125–33.
 58. Mays N, Roberts E, Popay J. Synthesising research evidence. In Fulop N, Allen P, Clarke A, Black N (eds). *Studying the organisation and delivery of health services*. London: Routledge; 2001.
 59. Dixon-Woods M, Sutton A, Shaw R, Miller T, Smith J, Young B, *et al.* Appraising qualitative research for inclusion in systematic reviews: a quantitative and qualitative comparison of three methods. *Journal of Health Services Research and Policy* 2007;**12**:42–7.
 60. Bravata D, McDonald KM, Shojania KG, Sundaram V. Challenges in systematic reviews: synthesis of topics related to the delivery, organization and financing of health care. *Annals of Internal Medicine* 2005;**142**:1056–65.
 61. Egger M, Zellweger-Zahner T, Schneider M, Junker C, Lengeler C, Antes G. Language bias in randomised controlled trials published in English and German. *Lancet* 1997;**350**:326–29.
 62. Moher D, Fortin P, Jadad AR, Juni P, Klassen T, Le Lorier J, Liberati A, *et al.* Completeness of reporting of trials published in languages other than English: implications for conduct and reporting of systematic reviews. *Lancet* 1996;**347**:363–66.
 63. Booth A. Cochrane or cock-eyed? How should be conduct systematic reviews of qualitative research? Qualitative Evidence-based Practice Conference, Taking a Critical Stance. Coventry University, 14–16 May 2001. URL: www.leeds.ac.uk/educol/documents/00001724.htm (accessed 20 September 2006).
 64. Eakin J, Mykhalovskiy E. Reframing the evaluation of qualitative research: Reflections on a review of assessment guidelines in the health sciences. *Journal of Evaluation in Clinical Practice* 2003;**9**:187–194.
 65. Dixon-Woods M, Cavers D, Agarwal S, Annandale E, Arthur A, Harvey J, *et al.* Conducting a critical interpretive synthesis of the literature on access to healthcare by vulnerable groups. *BMC Medical Research Methodology* 2006;**6**.
 66. Straus SE, Richardson WS, Glasziou P, Haynes RB. *Evidence-based medicine: how to practice and teach EBM*, 3rd edn. New York, NY: Churchill Livingstone; 2005.
 67. Rothman K, Greenland S. In *Modern epidemiology*. 2nd edn. Philadelphia, PA: Lippincott-Raven; 1998.
 68. Rothman K. *Epidemiology: an introduction*. New York, NY: Oxford University Press, 2002.
 69. Zacharatos A, Hershcovis MS, Turner N, Barling J. Human resource management in the North American automotive industry: a meta-analytic review. *Personnel Review* 2007;**36**:231–54.
 70. Grayson L, Gomersall A. *A difficult business: finding the evidence for social science reviews*. Swindon: ESRC UK Centre for Evidence Based Policy and Practice. URL: www.evidencenetwork.org/Documents/wp19.pdf (accessed 23 August 2007).
 71. Grant M, Brett A, Long A. Developing a review question: a spiral approach to literature searching. Poster presentation. *Third Symposium on Systematic Reviews: Beyond the Basics of Systematic Reviews*. Oxford, July 2000.
 72. Booth A. Who will appraise the appraisers? The paper, the instrument and the user. *Health Information and Libraries Journal* 2007;**24**:72–6.

73. Edwards A, Russell I, Stott N. Signal versus noise in the evidence base for medicine: an alternative to hierarchies of evidence. *Family Practice* 1998;**15**:319–22.
74. Soares HP, Daniels S, Kumar A, Clarke M, Scott C, Swann S, *et al.* Bad reporting does not mean bad methods for randomised trials: observational study of the randomised controlled trials performed by the Radiation Therapy Oncology Group. *British Medical Journal* 2004;**328**:22–4.
75. Dixon-Woods M, Agarwal S, Jones D, Young B, Sutton A. Synthesising qualitative and quantitative evidence: a review of methods. *Journal of Health Services Research and Policy* 2005;**10**:45–53.
76. Popay J, Roberts H, Sowden A, Petticrew M, Arai L, Rodgers M, *et al.* *Guidance on the conduct of narrative synthesis in systematic reviews: a product of the ESRC methods programme (Version 1)*. Lancaster: Institute of Health Research; 2006.
77. Hyde P, Boaden RB, Cortvriend P, Harris C, Marchington M, Pass S, *et al.* *Improving health through HRM: mapping the territory*. London: Chartered Institute of Personnel and Development; 2006.
78. Boselie P, Dietz G, Boon C. Commonalities and contradictions in HRM and performance research. *Human Resource Management Journal* 2005;**15**:67–94.
79. Michie S, West M. *Measuring staff management and human resource performance in the NHS*. London: Commission for Health Improvement, 2003.
80. National Institute of Clinical Studies *Factors supporting high performance in health care organisations*. Melbourne, NSW: La Trobe University Health Management Group.
81. Noblit GW, Dwight HR. *Metaethnography: synthesising qualitative studies*. London: Sage; 1988.
82. WERS *Inside the workplace. Findings from the 2004 Workplace Employment Relations Survey*. Abingdon: Routledge; 2006.
83. WERS *Workplace Employee Relations Survey. First findings*; 1998. URL: www.dti.gov.uk/files/file11678.pdf (accessed 10 August 2006).
84. WERS *Inside the workplace. First findings from the Workplace Employee Relations Survey*; 2004. URL: www.dti.gov.uk/files/file11423.pdf (accessed 1 September 2006).
85. WERS *Workplace Employee Relations Survey, 2004. Cross-section management questionnaire (MQ)*. URL: [www.wers2004.info/pdf/Vol%202%20\(part%202\)%20-%20Cross-Section%20Management%20Questionnaire.pdf](http://www.wers2004.info/pdf/Vol%202%20(part%202)%20-%20Cross-Section%20Management%20Questionnaire.pdf) (accessed 4 September 2006).
86. *ESWT Establishment Survey on Working Time 2004–2005*. Luxembourg: European Foundation for the Improvement of Living and Working Conditions; 2006. URL: <http://www.eurofound.eu.int/pubdocs/2006/27/en/1/ef0627en.pdf> (accessed 10 August 2006).
87. *CVTS Continuing Training in Enterprises in Europe. European Continuing Vocational Training Survey in Enterprises*; 2001. URL: http://ec.europa.eu/education/programmes/leonardo/new/leonardo2/cvts/index_en.html (accessed 10 August 2006).
88. *EPOC Employee Direct Participation in Organisational Change (EPOC Project)*. European Foundation for the Improvement of Living and Working Conditions; 1996. URL: www.eurofound.eu.int/publications/files/EF9803EN.pdf (accessed 10 August 2006).
89. *CIPD Reward management. Annual Postal Survey Report 2006*. London: Chartered Institute of Personnel and Development; 2006. URL: www.cipd.co.uk/NR/rdonlyres/B7AA6A5C-0728-46FE-A671-555950BD4BCF/0/rewmansr0206.pdf (accessed 10 August 2006).
90. *IPD Performance pay trends in the UK. IPD Survey Report 9*. London: Institute of Personnel and Development; 1999. URL: www.cipd.co.uk/NR/rdonlyres/972D73A3-B1DD-4499-BCC1-66C8EB1C639C/0/topical_trend_survey.pdf (accessed 10 August 2006).
91. *NESS National Employers Skills Survey 2004: main report*. London: Department for Education and Skills; 2005. URL: www.dfes.gov.uk/successforall/downloads/nationalemployersskillsurvey2004mainreport-176-268.pdf (accessed 10 August 2006).
92. *CIPD Getting a kick out of work. Flexible working trends. Postal Survey Report 2002*. London: Institute of Personnel and Development; 2002. URL: www.cipd.co.uk/NR/rdonlyres/F7F79AF4-65F0-4236-888C-6B6B8D4A4979/0/Flexible_Working.pdf (accessed 10 August 2006).
93. *CIPD Managing employee careers. Issues, trends and prospects. Postal Survey Report 2003*. London: Chartered Institute of Personnel and Development; 2003. URL: www.cipd.co.uk/NR/rdonlyres/E96E8FE4-9403-4304-82AC-879D8BC51EDE/0/manag_emp_car_Postal_survey.pdf (accessed 10 August 2006).
94. *CIPD Flexible working: impact and implementation. An employer postal survey. Postal Survey Report 2005*. London: Chartered Institute of Personnel and Development; 2005. URL: www.cipd.co.uk/NR/rdonlyres/257CE4EE-356B-43F5-8927-5C86203D7AA1/0/flexworksurv0205.pdf (accessed 10 August 2006).

95. CIPD *Performance management. Postal Survey Report 2005*. London: Chartered Institute of Personnel and Development; 2005. URL: www.cipd.co.uk/NR/rdonlyres/07BC1B70-E82A-455D-94F6-AEEE3DÉE0D4D/0/perfmansr0905.pdf (accessed 10 August 2006).
96. CIPD *Absence management. Postal Survey Report 2006*. London: Chartered Institute of Personnel and Development; 2006. URL: www.cipd.co.uk/NR/rdonlyres/22CB05C5-E52D-445B-891A-9886C95FD90D/0/absmgmt0706.pdf (accessed 10 August 2006).
97. CIPD *Learning and development. Annual Postal Survey Report 2006*. London: Chartered Institute of Personnel and Development; 2006. URL: www.cipd.co.uk/NR/rdonlyres/97BE272C-8859-4DB1-BD99-17F38E4B4484/0/lrnandevsurv0406.pdf (accessed 10 August 2006).
98. CIPD *Recruitment, retention and turnover. Annual Postal Survey Report 2006*. London: Chartered Institute of Personnel and Development; 2006. URL: www.cipd.co.uk/NR/rdonlyres/A5316993-E9EB-413D-A673-D1D6A5063DD3/0/recruitretntsurv06.pdf (accessed 10 August 2006).
99. Wood S, Stride C, Wall T, Clegg C. Revisiting the use and effectiveness of modern management practices. *Human Factors and Ergonomics in Manufacturing* 2004;**14**:415–32.
100. CRANET *CRANET Survey on Comparative Human Resource Management. Executive Report*. Cranfield: Cranfield University; 2003.
101. CIPD *Benefiting from a balanced life? CIPD Survey Report 10*. London: Chartered Institute of Personnel and Development; 1999. URL: www.cipd.co.uk/NR/rdonlyres/C930B528-55AA-4192-85BD-888BEFA4345D/0/balancedsurvey.pdf (accessed 10 August 2006).
102. Newton J, Hunt J, Stirling J. Human resource management in general practice. *British Journal of General Practice* 1996;**46**:81–85.
103. CHAI *National NHS Staff Survey 2007*. London: Commission for Healthcare Audit and Inspection; 2008.
104. Dusenbury L, Brannigan R, Falco M, Hansen W. A review of research on fidelity of implementation: implications for drug abuse prevention in school settings. *Health Education Research* 2003;**18**:237–56.
105. Dobson L, Cook T. Avoiding type III error in program evaluation: results from a field experiment. *Evaluation and Program Planning* 1980;**3**:269–76.
106. Godard J. Beyond the high-performance paradigm? An analysis of variation in Canadian managerial perceptions of reform programme effectiveness. *British Journal of Industrial Relations* 2001;**3**:25–52.
107. Cunningham I, James P, Dibben P. Bridging the gap between rhetoric and reality: line managers and the protection of job security for ill workers in the modern workplace. *British Journal of Management* 2004;**15**:273–90.
108. Hutchinson S, Purcell J. *Bringing policies to life, the vital role of front line managers in people management. Executive Briefing*. London: Chartered Institute of Personnel and Development; 2003.
109. Whittaker S, Marchington M. Devolving HR responsibility to the line: threat, opportunity or partnership? *Employee Relations* 2003;**25**:245–61.
110. Truss C. Complexities and controversies in linking HRM with organizational outcomes. *Journal of Management Studies* 2001;**38**:1121–49.
111. Mihalic S. The importance of implementation fidelity. *Emotional and Behavioural Disorders in Youth* 2004;**4**:83–86 and 99–105.
112. Mihalic S. The importance of implementation fidelity. In (eds). *Blueprints Violence Prevention Initiative*. Boulder, CO; IBS; 2002. pp. 1–2.
113. Dane A, Schneider B. Program integrity in primary and early secondary prevention: are implementation effects out of control. *Clinical Psychology Review* 1998;**18**:23–45.
114. Hulscher M, Laurant M, Grol R. Process evaluation on quality improvement interventions. *Quality and Safety in Health Care* 2003;**12**:40–6.
115. Blakely C, Mayer J, Gottschalk R, Schmitt N, Davidson W, Riotman D, *et al.* The fidelity-adaptation debate: implications for the implementation of public sector social programs. *American Journal of Community Psychology* 1987;**15**:253–68.
116. Elliott D, Mihalic S. Issues in disseminating and replicating effective prevention programs. *Prevention Science* 2004;**5**:47–53.
117. Forgatch M, Patterson G, DeGarmo D. Evaluating fidelity: predictive validity for a measure of competent adherence to the Oregon model of parent management training. *Behaviour Theory* 2005;**36**:3–13.
118. Rinaldi M, McNeil K, Firm M, Koletsi M, Perkins R, Singh S. What are the benefits of evidence-based

- supported employment for patients with first-episode psychosis? *Psychiatric Bulletin* 2004;**28**:281–4.
119. Arai L, Roen K, Roberts H, Popay J. It might work in Oklahoma but will it work in Southampton? Context and implementation in the effectiveness literature on domestic smoke detectors. *Injury Prevention* 2005;**11**:148–51.
120. Roen K, Arai L, Roberts H, Popay J. Extending systematic reviews to include evidence on implementation: Methodological work on a review of community-based initiatives to prevent injuries. *Social Science and Medicine* 2006;**63**:1060–71.
121. O'Brien R. Translating a research intervention into community practice: the nurse–family partnership. *Journal of Primary Prevention* 2005;**26**:241–57.
122. Resnick B, Inguito P, Orwig D, Yahiro J, Hawkes W, Werner M, *et al.* Treatment fidelity in behaviour change research: a case example. *Nursing Research* 2005;**54**:139–43.
123. Penuel W, Means B. Implementation variation and fidelity in an Inquiry Science Program: analysis of GLOBE data reporting patterns. *Journal of Research in Science Teaching* 2004;**41**:294–315.
124. Cash S, Berry M. Measuring service delivery in a placement prevention program: an application to an ecological model. *Administration in Social Work* 2003;**27**:65–85.
125. Resnick B, Neale M, Rosenheck R. Impact of public support payments, intensive psychiatric community care, and program fidelity on employment outcomes for people with severe mental illness. *Journal of Nervous and Mental Disease* 2003;**191**:139–44.
126. Herzog S, Wright P. Addressing the fidelity of personal and social responsibility model implementation. *Research Quarterly for Exercise and Sport* 2005;**76**(Suppl.):A-76.
127. McGrew J, Griss M. Concurrent and predictive validity of two scales to assess the fidelity of implementation of supported employment. *Psychiatric Rehabilitation Journal* 2005; **29**:41–7.
128. Faw L, Hogue A, Liddle H. Multidimensional implementation evaluation of a residential treatment program for adolescent substance use. *American Journal of Evaluation* 2005;**26**:77–93.
129. Bond GR, Becker DR, Drake RE, Vogler KM. A fidelity scale for the Individual Placement and Support model of supported employment. *Rehabilitation Counselling Bulletin* 1997;**40**:265–84.
130. Whittaker JK, Schinke SP, Gilchrist LD. The ecological paradigm in child, youth, and family services: implications for policy and practice. *Social Service Review* 1986;**60**:483–503.
131. Mueser KT, Drake RE, Bond GR, Resnick SG. Models of community care for severe mental illness: A review of research on case management. *Schizophrenia Bulletin* 1998;**24**:37–74.
132. Steinhardt M. Physical education. In Jackson PW (ed.). *Handbook of research on curriculum*. New York, NY: Macmillan; 1992. pp. 961–1001.
133. Holland S. Measuring process in drug abuse treatment research. In DeLeon G, Ziegenfuss JT (eds). *Therapeutic communities for addictions: readings in theory, research, and practice*. Springfield, IL: Charles C Thomas; 1986. pp. 169–81.
134. Knutson NM, Forgatch MS, Rains LA. *Fidelity of implementation rating system (FIMP): the training manual for PMTO*. Eugene, OR: Oregon Social Learning Center; 2003.
135. Bond GR, Drake RE, Mueser KT, Latimer E. Assertive community treatment for people with severe mental illness: critical ingredients and impact on patients. *Disease Management and Health Outcomes* 2001;**9**:141–59.
136. Noel P. The impact of therapeutic case management on participation in adolescent substance abuse treatment. *American Journal of Drug and Alcohol Abuse* 2006;**32**:311–27.
137. Grol R, Dalhuijsen J, Thomas S, Veld C, Rutten G, Mokkink H. Attributes of clinical guidelines that influence use of guidelines in general practice: observational study. *British Medical Journal* 1998;**17**:858–61.
138. Bellg A, Borelli B, Resnick B, Hecht J, Minicucci D, Ory M, *et al.* Enhancing treatment fidelity in health behaviour change studies: best practices and recommendations from the NIH Behaviour Change Consortium. *Health Psychology* 2004;**23**:443–51.
139. Medical Research Council. *A framework for the development and evaluation of RCTs for complex interventions to improve health*. London: Medical Research Council; 2000.
140. McGovern P, Gratton L, Hope-Haily V, Stiles P, Truss, C. Human resource management on the line? *Human Resource Management Journal* 1997;**7**:12–29.
141. Protherough R, Pick J. *Managing Britannia: culture and management in modern Britain*. Exeter: Imprint Academic; 2003.

142. Van Veldhoven M. Financial performance and the long-term link with HR practices, work climate and job stress. *Human Resource Management Journal* 2005;**15**:30–53.
143. Wright PM, Gardner TM, Moynihan LM, Park HJ, Gerhart B, Delery JE. Measurement error in research on human resources and firm performance: additional data and suggestions for future research. *Personnel Psychology* 2001;**54**:875–901.
144. Hackman JR, Wageman R. Total quality management: empirical, conceptual and practical issues. *Administrative Science Quarterly* 1995;**40**:309–42.
145. Khilji SE, Wang X. 'Intended' and 'implemented' HRM: the missing linchpin in strategic human resource management research. *International Journal of Human Resource Management* 2006;**17**:1171–89.
146. Huselid M, Jackson S, Schuler R. Technical and strategic human resource management effectiveness as determinants of firm performance. *Academy of Management Journal* 1997;**40**:171–88.
147. Currie G, Procter S. The interaction of human resource policies and practices with the implementation of teamworking: evidence from the UK public sector. *The International Journal of Human Resource Management* 2003;**14**:581–99.
148. Bacon N, Blyton P. The effects of co-operating or conflicting over work restructuring: evidence from employees. *The Sociological Review* 2006;**54**:1–19.
149. Capelli P, Neurmark D. Do 'high-performance' work practices improve establishment-level outcomes? *Industrial and Labor Relations Review* 2001;**54**:737.
150. Harachi TW, Abbott RD, Catalano RF, Haggerty KP, Fleming CB. Opening the black box: using process evaluation measures to assess implementation and theory building. *American Journal of Community Psychology* 1999;**27**:711–31.
151. Montgomery P, Donkoh C, Underhill K. Independent living programs for young people leaving the care system: the state of the evidence. *Children and Youth Services Review* 2006;**28**:1435–48.
152. Nutley S, Homel P. Delivering evidence-based policy and practice: lessons from the implementation of the UK Crime Reduction Programme. *Evidence and Policy* 2006 **2**:5–26.
153. Becker B, Huselid M, Pickus P, Spratt M. HR as a source of shareholder value: research and recommendations. *Human Resource Management* 1997;**36**:39–47.
154. Kopelman RE, Brief AP, Guzzo R. The role of climate and culture in productivity. In Schneider B. (ed.). *Organizational climate and culture*. San Francisco, CA: Jossey-Bass; 1990. pp. 282–318.
155. Ostroff C, Bowen DE. Moving HR to a higher level: HR practices and organizational effectiveness. In Klein KJ, Kozlowski SWJ (eds). *Multilevel theory, research, and methods in organizations: foundations, extensions, and new directions*. San Francisco, CA: Jossey-Bass; 2000. pp. 211–67.
156. Sparrow PR. Developing diagnostics for high performance organization cultures. In *The international handbook of organizational culture and climate*. Chichester: John Wiley and Sons Ltd; 2001. pp. 85–106.
157. Iaffaldano MT, Muchinsky PM. Job satisfaction and job performance: a meta-analysis. *Psychological Bulletin* 1985;**97**:251–73.
158. Locke EA. Job satisfaction. In Gruneberg M, Wall T (eds). *Social psychology and organizational behavior*. New York: Wiley; 1984. pp. 93–117.
159. Organ DW. *Organizational citizenship behaviour: the good soldier syndrome*. Lexington, MA: Lexington Books; 1998.
160. Hoffman BJ, Blair CA, Meriac JP, Woehr DJ. Expanding the criterion domain? a quantitative review of the OCB literature. *Journal of Applied Psychology* 2007;**92**:555–66.
161. Taber TD, Alliger GM. A task-level assessment of job satisfaction. *Journal of Organizational Behaviour* 1995;**16**:101–21.
162. Organ DW, Ryan K. A meta-analytic review of attitudinal and dispositional predictors of organizational citizenship behavior. *Personnel Psychology* 1995;**48**:775–802.
163. Halbesleben KN, Jonathon RB, Petroski GF, Meyer W. Relationship between management philosophy and clinical outcomes. *Health Care Management Review* 2007;**32**:128–39.
164. Becker B, Huselid M. Strategic human resources management: where do we go from here? *Journal of Management* 2006;**32**:898–925.
165. Combs J, Liu Y, Hall A, Ketchen D. How much do high-performance work practices matter? A meta-analysis of their effects on organizational performance. *Personnel Psychology* 2006;**59**:501–28.
166. Michie S, West M. Managing people and performance: an evidence based framework applied to health service organisations. *International Journal of Management Reviews* 2004;**5/6**:91–111.

167. Boxall P, Purcell J. *Strategy and human resource management*. London: Palgrave Macmillan; 2003.
168. Kanfer R, Ackerman PL. Individual differences in work motivation: further explorations of a trait framework. *Applied Psychology: An International Review* 2000;**49**:470–82.
169. Arnold A. *Work psychology: understanding human behaviour in the workplace*. London: Pearson Education; 2005.
170. Locke EA. The nature and causes of job satisfaction. In Dunnette MD (ed.). *Handbook of industrial and organizational psychology*. Chicago, IL: Rand McNally; 1976. pp. 1297–349.
171. Judge TA, Parker S, Colbert AE, Heller D, Ilies R. Job satisfaction: a cross-cultural review. In Anderson N, Ones DS, Sinangil HK, Viswesvaran C (eds). *Handbook of industrial, work and organizational psychology*, Vol 2; 2001. pp. 25–52.
172. Guest DE. Commitment. In Nicholson N, Audia PG, Pillutla MM (eds). *The Blackwell encyclopedia of management: organizational behaviour*, 2nd edn. London: Blackwell; 1995. pp. 44–6.
173. Mowday R, Porter L, Steers R. *Employee–organizational linkages*. New York: Academic Press 1982.
174. Meyer J, Allen N. A three-component conceptualization of organizational commitment. *Human Resource Management Review* 1991;**1**:61–89.
175. Cohen A. Organizational commitment and turnover: a meta-analysis. *Academy of Management Journal* 1993;**36**:1140–57.
176. Wallace JE. Professional and organizational commitment: compatible or incompatible? *Journal of Vocational Behavior* 1993;**42**:333–49.
177. Lee K, Carswell JJ, Allen NJ. A meta-analytic review of occupational commitment: relations with person- and work-related variables. *Journal of Applied Psychology* 2000;**85**:799–811.
178. Carson KD, Bedeian AG. Career commitment: construction of a measure and examination of its psychometric properties. *Journal of Vocational Behaviour* 1994;**44**:237–62.
179. Schaufeli WB, Salanova M, Gonzalez-Roma V, Bakker AB. The measurement of engagement and burnout: a two-sample confirmatory factor analytic approach. *Journal of Happiness Studies* 2002;**3**:71–92.
180. Mauno S, Kinnunen U, Ruokolainen M. Job demands and resources as antecedents of work engagement: a longitudinal study. *Journal of Vocational Behaviour* 2006;**70**:149–71.
181. Maslach C, Schaufeli WB, Leiter MP. Job burnout. *Annual Review of Psychology* 2001;**52**:397–422.
182. Schaufeli WB, Bakker AB. The measurement of work engagement with a short questionnaire: a cross-national study. *Educational and Psychological Measurement* 2007;**66**:701–16.
183. Schaufeli WB, Bakker AB. Job demands, job resources and their relationship with burnout and engagement: a multi-sample study. *Journal of Organizational Behavior* 2004;**25**:293–315.
184. Schaufeli WB, Enzmann D. *The burnout companion to study and practice: a critical analysis*. Philadelphia, PA: Taylor & Francis; 1998.
185. Le Blanc PM, Hox JJ, Taris TW, Schaufeli WB, Peeters MCW. Take care! The evaluation of a team-based burnout intervention program for oncology care providers. *Journal of Applied Psychology* 2007;**92**:213–27.
186. Lee RT, Ashforth BE. A meta-analytic examination of the correlates of the three dimensions of job burnout. *Journal of Applied Psychology* 1996;**81**:123–33.
187. Leiter MP, Maslach C. The impact of interpersonal environment on burnout and organizational commitment. *Journal of Organizational Behavior* 1988;**9**:297–308.
188. Schaufeli WB, Leiter MP, Maslach C, Jackson SE. Maslach Burnout Inventory – general survey. In Maslach C, Jackson SE, Leiter MP (eds). *The Maslach burnout inventory – test manual*, 3rd edn. Palo Alto, CA: Consulting Psychologists Press; 1996. pp. 19–26.
189. Brown SP. A meta-analysis and review of organizational research on job involvement. *Psychological Bulletin* 1996;**120**:235–55.
190. Lawler EE III, Hall DT. Relationship of job characteristics to job involvement, satisfaction, and intrinsic motivation. *Journal of Applied Psychology* 1970;**54**:305–12.
191. Lawler EE III. *High-involvement management: participative strategies for improving organizational performance*. San Francisco, CA: Jossey-Bass; 1986.
192. Hackman JR, Lawler EE III. Employee reactions to job characteristics. *Journal of Applied Psychology* 1971;**55**:259–86.
193. Kahn WA. Psychological conditions of personal engagement and disengagement at work. *Academy of Management Journal* 1990;**33**:692–724.
194. Janssen O. Innovative behaviour and job involvement at the price of conflict and less

- satisfactory relations with co-workers. *Journal of Occupational and Organizational Psychology* 2003;**76**:347–64.
195. Hackman JR, Oldham GR. Development of the job diagnostic survey. *Journal of Applied Psychology* 1975;**60**:159–70.
196. Morrell K, Loan-Clarke J, Wilkinson A. Unweaving leaving: the use of models in the management of employee turnover. *International Journal of Management Reviews* 2001;**3**:219–44.
197. Rousseau DM. *Psychological contracts in organizations: understanding written and unwritten agreements*. Thousand Oaks, CA: Sage; 1995.
198. Rousseau DM, Schalk R. *psychological contracts in employment: cross-national perspectives*. Thousand Oaks, CA: Sage; 2000.
199. Cropanzano R, Greenberg J. Progress in organizational justice: tunnelling through the maze. *International Review of Industrial and Organizational Psychology* 1997;**12**:317–72.
200. Greenberg J. Organizational justice: yesterday, today, and tomorrow. *Journal of Management* 1990;**16**:399–432.
201. Fields DL. *Taking the measure of work: a guide to validated scales for organizational research and diagnosis*. Sage: London; 2002.
202. Cohen-Charash Y, Spector PE. The role of justice in organizations: a meta-analysis. *Organizational Behavior and Human Decision Processes* 2001;**2**:278–321.
203. Bies RJ, Moag JF. Interactional justice: communication criteria of fairness. *Research on Negotiations In Organizations* 1986;**1**:43–55.
204. Greenberg J. Employee theft as a reaction to underpayment inequity: the hidden costs of pay cuts. *Journal of Applied Psychology* 1990;**75**:561–68.
205. Greenberg J. The social side of fairness: interpersonal and informational classes of organizational justice. In Cropanzano R (ed.). *Justice in the workplace: approaching fairness in human resource management*. Hillsdale, NJ: Erlbaum; 1993. pp. 79–103.
206. Eisenberger R, Huntington R, Hutchison S, Sowa D. Perceived organizational support. *Journal of Applied Psychology* 1986;**71**:500–7.
207. Shore LM, Shore TH. Perceived organizational support and organizational justice. In Cropanzano RS, Kacmar KM (eds). *Organizational politics, justice and support: managing the social climate of the workplace*. Westport, CT: Quorum; 1995. pp. 149–65.
208. Rhoades L, Eisenberger R. Perceived organizational support: a review of the literature. *Journal of Applied Psychology* 2002;**87**:698–714.
209. Rousseau DM. The construction of climate in organizational research. In Cooper C, Robertson I (eds). *International review of industrial and organizational psychology*. New York: Wiley; 1988. pp. 139–158.
210. Schneider B, Reichers AE. On the etiology of climates. *Personnel Psychology* 1983;**36**:19–39.
211. Campbell J, Dunnette M, Lawler E, Weick K. *Managerial behavior, performance, and effectiveness*. New York: McGraw-Hill; 1970.
212. James LA, James LR. Integrating work environment perceptions: explorations into the measurement of meaning. *Journal of Applied Psychology* 1989;**74**:739–51.
213. James LR, Jones AP. Organizational climate: a review of theory and research. *Psychological Bulletin* 1974;**8**:1096–112.
214. Schneider B. The psychological life of organizations. In Ashkanasy NM, Wilderon CPM, Peterson MF (eds). *Handbook of organizational culture and climate*. Thousand Oaks, CA: Sage; 2000. pp. xvii–xxi.
215. Schneider B. Organizational climates: an essay. *Personnel Psychology* 1975;**36**:19–36.
216. Schneider B. The climate for service: an application of the climate construct. In Schneider B (ed.). *Organizational climate and culture*. San Francisco, CA: Jossey-Bass; 1990. pp. 383–412.
217. Schneider B, White SS, Paul MC. Linking service climate and customer perceptions of service quality: tests of a causal model. *Journal of Applied Psychology* 1998;**83**:150–63.
218. Zohar D. A group level model of safety climate: testing the effect of group climate on microaccidents in manufacturing jobs. *Journal of Applied Psychology* 2000;**85**:587–96.
219. Rentsch J. Climate and culture: interaction and qualitative differences in organizational meanings. *Journal of Applied Psychology* 1990;**75**:668–81.
220. Steel RP, Shane GS, Kennedy KA. Effects of social-system factors on absenteeism, turnover, and job performance. *Journal of Business and Psychology* 1990;**4**:423–30.

221. Mathieu JE, Hofmann DA, Farr JL. Job perception–job satisfaction relations: an empirical comparison of three competing theories. *Organizational Behaviour and Human Decision Processes* 1993;**56**:370–87.
222. James LR, Tetrick LE. Confirmatory analytic tests of three causal models relating job perceptions to job satisfaction. *Journal of Applied Psychology* 1996;**71**:77–82.
223. James LR, Jones AP. Perceived job characteristics and job satisfaction: an examination of reciprocal causation. *Personnel Psychology* 1980;**33**:97–135.
224. De Cotiis TA, Summers TP. A path analysis of a model of the antecedents and consequences of organizational commitment. *Human Relations* 1987;**40**:445–70.
225. Brown S, Leigh TW. A new look at psychological climate and its relationship to job involvement, effort, and performance. *Journal of Applied Psychology* 1996;**81**:358–68.
226. Pritchard RD, Karasick BW. The effects of organizational climate on managerial job performance and satisfaction. *Organizational Behavior and Human Performance* 1973;**9**:126–46.
227. Ulrich D. Measuring human resources: an overview of practice and a prescription for results. *Human Resource Management Journal* 1997;**36**:303–515.
228. Parkes KR. Occupational stress among student nurses: a natural experiment. *Journal of Applied Psychology* 1982;**67**:784–96.
229. Nielsen ML, Kristensen TS, Smith-Hansen L. The Intervention Project on Absence and Well-being (IPAW): design and results from the baseline of a 5-year study. *Work and Stress* 2002;**16**:191–206.
230. Jones RAP, Dougherty M, Martin S. Program evaluation of a unit reengineered for patient-focused care. *Holistic Nursing Practice* 1997;**11**:31–46.
231. O'Connor S. Evaluating the implementation of team-nursing in a clinical setting. *British Journal of Nursing* 1993;**2**:542–47.
232. Jung F, Pearcey L, Phillips J. Evaluation of a program to improve nursing assistant use. *Journal of Nursing Administration* 1994;**24**:42–7.
233. De Jonge J, Dormann C, Janssen PPM, Dollard MF, Landeweerd JA, Nijhuis FJN. Testing reciprocal relationships between job characteristics and psychological well-being: a cross-lagged structural equation model. *Journal of Occupational and Organizational Psychology* 2001;**74**:29–46.
234. Agho AO, Mueller CW, Price JL. Determinants of employee job satisfaction: an empirical test of a causal model. *Human Relations* 1993;**46**:1007–27.
235. Bateman TS, Strasser S. A longitudinal analysis of the antecedents of organisational commitment. *Academy of Management Journal* 1984;**27**:95–112.
236. Blau G. Testing the longitudinal impact of work variables and performance appraisal satisfaction on subsequent overall job satisfaction. *Human Relations* 1999;**52**:1099–113.
237. Lovgren G, Rasmussen BH, Engstrom B. Working conditions and the possibility of providing good care. *Journal of Nursing Management* 2002;**10**:201–9.
238. Sandman BA. The measurement of job stress: development of the Job Stress Index. In Cranny CJ, Smith PC, Stone EF (eds). *Job satisfaction: How people feel about their jobs and how it affects their performance*. New York, NY: Lexington; 1992. pp. 241–254.
239. Goldberg D. *Manual of the General Health Questionnaire*. Windsor, ON: NFER-Nelson; 1978.
240. Jones RA, Dougherty M, Martin S. Program evaluation of a unit reengineered for patient-focused care. *Holistic Nursing Practice* 1997;**11**:31–46.
241. Price JL, Mueller C. *Absenteeism and turnover of hospital employees*. Greenwich, CT: JAI Press; 1986.
242. Marmot MG, Davey Smith G, Stansfeld SA, Patel C, North F, Head J, et al. Health inequalities among British civil servants: the Whitehall II study. *Lancet* 1991;**337**:1387–93.
243. Smith PC, Kendall LM, Hulin CL. *The measurement of satisfaction in work and retirement*. Chicago, IL: Rand McNally; 1969.
244. Porter LW, Steers RM, Mowday RT, Boulian PV. Organizational commitment, job satisfaction and turnover among psychiatric technicians. *Journal of Applied Psychology* 1974;**59**:603–9.
245. Brayfield AH, Rothe HF. An index of job satisfaction. *Journal of Applied Psychology* 1951;**35**:307–11.
246. Karasek R, Theorell T. *Healthy work: stress, productivity, and the reconstruction of working life*. New York, NY: Basic Books; 1990.
247. Rasmussen BH. *Utveckling Av Ett Kliniskt Relevant Instrument För Att Mäta Arbetstillfredsställelse I Vården*. Report. Umeå: Department of Nursing Umeå University; 1996.

248. Macdonald M, Bodzak W. The performance of a self-managing day surgery nurse team. *Journal of Advanced Nursing* 1999;**29**:859–68.
249. Browne G, Lam L, Giles H, McCaskill M, Exley B, Fasher B. The effects of a seamless model of management on the quality of care for emergency department patients. *Journal of Quality in Clinical Practice* 2000;**20**:120–6.
250. Pines AM, Aronson E, Kafry D. *Burnout: from tedium to personal growth*. New York, NY: Free Press; 1981.
251. Ekvall G, Arvonen J, Waldenstrom-Lindblad I. *Creative organizational climate. Construction and validation of a measuring instrument, Report 2*. Stockholm: Swedish Council for Management and Work Life Issues; 1983
252. Krausz M, Koslowsky M, Shalom N, Elyakim N. Predictors of intentions to leave the ward, the hospital, and the nursing profession: a longitudinal study. *Journal of Organizational Behavior* 1995;**16**:277–88.
253. Carson SS, Stocking C, Podsadecki T, Christenson J, Pohlman A, MacRae S, *et al*. Effects of organizational change in the medical intensive care unit of a teaching hospital: a comparison of 'open' and 'closed' formats. *Journal of the American Medical Association* 1996;**276**:322–8.
254. Jeffery HE, Kocova M, Tozija F, Gjorgiev D, Pop-Lazarova M, Foster K, *et al*. The impact of evidence-based education on a perinatal capacity-building initiative in Macedonia. *Medical Education* 2004;**38**:435–47.
255. Ogden J, Hoppe R. Changing practice nurses' management of obesity. Proceedings of the ASO and BDA symposium, 25 November 1997, St Bartholomew's Hospital, London. *Journal of Human Nutrition and Diet* 1998;**11**:249–56.
256. Campbell JC, Coben JH, McLoughlin E, Dearwater S, Nah G, Glass N, *et al*. An evaluation of a system-change training model to improve emergency department response to battered women. *Academic and Emergency Medicine* 2001;**8**:131–8.
257. Barnason S, Merboth M, Pozehl B, Tietjen MJ. Utilizing an outcomes approach to improve pain management by nurses: a pilot study. *Clinical Nurse Specialist* 1998;**12**:28–36.
258. Harrison LL, Novak DA. Evaluation of a gerontological nursing continuing education programme: effect on nurses' knowledge and attitudes and on patients' perceptions and satisfaction. *Journal of Advanced Nursing* 1998;**13**:684–92.
259. Birnbaum ML, Robinson NE, Kuska BM, Stone HL, Fryback DG, Rose JH. Effect of advanced cardiac life-support training in rural, community hospitals. *Critical Care Medicine* 1994;**22**:741–9.
260. Gottlieb DJ, Parenti CM, Peterson CA, Lofgren RP. Effect of a change in house staff work schedule on resource utilization and patient care. *Archives of Internal Medicine* 1991;**151**:2065–70.
261. Fischer U, Vosschenrich R, Baum F, Schorn C, Funke M, Strasser G, *et al*. Qualitätsmanagement in einer radiologischen Abteilung. *Management in der Radiologie. Radiologe* 2002;**42**:361–8.
262. McMullen M, Alexander MK, Bourgeois A, Goodman L. Evaluating a nurse practitioner service. *Dimensions of Critical Care Nursing* 2001;**20**:30–4.
263. Lavis J, Davies H, Oxman A, Denis, J-L, Golden-Biddle K, Ferlie E. Towards systematic reviews that inform health care management and policy-making. *Journal of Health Services Research and Policy* 2005;**10**(Suppl. 1):35–48.
264. Healthcare Commission. *NHS performance indicators*. London: Healthcare Commission; 2005.
265. Department of Health. *Creating a patient-led NHS: delivering the NHS Improvement Plan*. London: Department of Health; 2005.
266. Appleby J, Harison A, Devlin N. *What is the real cost of patient choice?* London: King's Fund; 2003.
267. Appleby J, Devlin N. *Measuring NHS success*. London: King's Fund; 2005.
268. Okamoto T, Shimozuma K, Katsumata N, Koike M, Hisashige A, Tanaka K, *et al*. On behalf of the Task Force of the Japanese Breast Cancer Society for the Development of Guidelines for Quality of Life Assessment Studies of Breast Cancer Patients. Measuring quality of life in patients with breast cancer: a systematic review of reliable and valid instruments available in Japan. *Breast Cancer* 2003;**10**:204–13.
269. Gilbody SM, House AO, Sheldon T. Routine administration of health related quality of life (HRQoL) and needs assessment instruments to improve psychological outcome – a systematic review. *Psychological Medicine* 2002;**32**:1345–56.
270. Bunn F, Byrne G, Kendall S. The effects of telephone consultation and triage on healthcare use and patient satisfaction: a systematic review. *British Journal of General Practice* 2005;**55**:956–61.
271. Draper M, Cohen P, Buchan H. Seeking consumer views: what use are results of hospital consumer

- surveys? *International Journal for Quality in Health Care* 2001;**13**:463–8.
272. Sitzia J. How valid and reliable are patient satisfaction data? An analysis of 195 studies. *International Journal for Quality in Health Care* 1999;**11**:319–28.
273. Sitzia J, Wood N. Patient satisfaction: a review of issues and concepts. *Social Science and Medicine* 1997;**45**:1829–43.
274. Gwadry-Sridhar FH, Flintoft V, Lee DS, Lee H, Guyatt GH. A systematic review and meta-analysis of studies comparing readmission rates and mortality rates in patients with heart failure. *Archives of Internal Medicine* 2004;**164**:2315–20.
275. Devereaux PJ, Choi PTL, Lacchetti C, Weaver B, Schunemann HJ, Haines T, *et al.* A systematic review and meta-analysis of studies comparing mortality rates of private for-profit and private not-for-profit hospitals. *Canadian Medical Association Journal* 2002;**166**:1399–406.
276. Baktsevani C, Uden G, Willman A. Outcomes of evidence-based clinical practice guidelines: a systematic review. *International Journal of Technology Assessment in Health Care* 2004;**20**:427–33.
277. Sinuff T, Kahnamoui K, Cook DJ, Luce JM, Levy MM. Rationing critical care beds: a systematic review. *Critical Care Medicine* 2004;**32**:1588–97.
278. West E. Management matters: the link between hospital organisation and quality of patient care. *Quality in Health Care* 2001;**10**:40–8.
279. Mitchell PH, Shortell SM. Adverse outcomes and variations in organization of care delivery. *Medical Care* 1997;**35**:NS19–32.
280. Moher D, Cook DJ, Eastwood S, Olkin I, Rennie D, Stroup DF. Improving the quality of reports of meta-analyses of randomized controlled trials: the QUOROM statement. *Lancet* 1999;**357**:1896–900.
281. McEvoy GM, Cascio WF. Strategies for reducing employee turnover: a meta-analysis. *Journal of Applied Psychology* 1985;**70**:342–53.
282. Burns SM, Earven S, Fisher C, Lewis R, Merrell P, Schubart J, *et al.* Implementation of an institutional program to improve clinical and financial outcomes of mechanically ventilated patients: one-year outcomes and lessons learned. *Critical Care Medicine* 2003;**31**:2752–63.
283. Russell D, Vorderbruegge M, Burns SM. Effect of an outcomes-managed approach to care of neuroscience patients by acute care nurse practitioners. *American Journal of Critical Care* 2002;**11**:353–62.
284. Burns SM, Marshall M, Burns JE, Ryan B, Wilmoth D, Carpenter R, *et al.* Design, testing, and results of an outcomes-managed approach to patients requiring prolonged mechanical ventilation. *American Journal of Critical Care* 1998;**7**:45–57.
285. Schweer LH, Cook BS, Fanta KB. Trauma nurse practitioner: front line approach to management of the pediatric trauma patient in an academic program. *Journal of Trauma Nursing* 2004;**11**:157–63.
286. Lau FL, Leung KP. Waiting time in an urban accident and emergency department – a way to improve it. *Journal of Accident and Emergency Medicine* 1997;**14**:299–301.
287. George S, Read S, Westlake L, Williams B, Fraser-Moodie A, Pritty P. Evaluation of nurse triage in a British accident and emergency department. *British Medical Journal* 1992;**304**:876–8.
288. Sparr LF, Ruud DH, Hickam DH, Cooney TG. The effect of house officer rotation on inpatient satisfaction and ward atmosphere: preliminary findings. *Military Medicine* 1994;**159**:47–53.
289. Barry TL, Davis DJ, Meara JG, Halvorson M. Case management: an evaluation at Childrens Hospital Los Angeles. *Nursing Economics* 2002;**20**:22–7.
290. Sakr M, Kendall R, Angus J, Sanders A, Nicholl J, Wardrope J. Emergency nurse practitioners: a three part study in clinical and cost effectiveness. *Emergency Medicine Journal* 2003;**20**:158–63.
291. Atwood J, Hinshaw A, Gerber R. *Professional Occupational Nurse Job Satisfaction Scale*. Tucson, AZ: Tucson College of Nursing, University of Arizona; 1988.
292. Goldstone L, Ball J, Collier M. *Monitor: an index of the quality of nursing care for acute medical and surgical wards. North West Nurse Staffing Project Report*. Newcastle upon Tyne: Newcastle upon Tyne Polytechnic Products; 1984.
293. Speedling EJ, Morrison B, Rehr H, Rosenberg G. Patient satisfaction surveys: closing the gap between provider and consumer. *Quality Review Bulletin* 1983;**9**:224–8.
294. Moos RH. *Evaluating treatment environments: a social ecological approach*. New York, NY: Wiley; 1974.
295. Lankshear AJ, Sheldon TA, Maynard A. Nurse staffing and healthcare outcomes: a systematic

- review of the international research evidence. *Advances in Nursing Science* 2005;**28**:163–74.
296. Tourangeau AE, Giovannetti P, Tu JV, Wood M. Nursing-related determinants of 30-day mortality for hospitalized patients. *Canadian Journal of Nursing Research* 2002;**33**:71–88.
297. Sovie MD, Jawad AF. Hospital restructuring and its impact on outcomes: nursing staff regulations are premature. *Journal of Nursing Administration* 2001;**31**:588–600.
298. Dexter F, Epstein RH, Marcon E, de Matta R. Strategies to reduce delays in admission into a postanesthesia care unit from operating rooms. *Journal of Perianesthesia Nursing* 2005;**20**:92–102.
299. Brooks RG, Walsh M, Mardon RE, Lewis M, Clawson A. The roles of nature and nurture in the recruitment and retention of primary care physicians in rural areas: a review of the literature. *Academic Medicine* 2002;**77**:790–8.
300. Baltes BB, Briggs TE, Huff JW, Wright JA, Neuman GA. Flexible and compressed workweek schedules: a meta-analysis of their effects on work-related criteria. *Journal of Applied Psychology* 1999;**84**:496–513.
301. Landrigan CP, Rothschild JM, Cronin JW, Kaushal R, Burdick E, Katz JT, *et al.* Effect of reducing interns' work hours on serious medical errors in intensive care units. *New England Journal of Medicine* 2004;**351**:1838–48.
302. Poulouse BK, Ray WA, Arbogast PG, Needleman J, Buerhaus PI, Griffin MR, *et al.* Resident work hour limits and patient safety. *Annals of Surgery* 2005;**241**:847–56.
303. Howard DL, Silber JH, Jobs DR. Do regulations limiting residents' work hours affect patient mortality? *Journal of General Internal Medicine* 2004;**19**:1–7.
304. Bolton LB, Aydin CE, Donaldson N, Brown DS, Nelson MS, Harms D. Nurse staffing and patient perceptions of nursing care. *Journal of Nursing Administration* 2003;**33**:607–14.
305. Potter P, Barr N, McSweeney M, Sledge J. Identifying nurse staffing and patient outcome relationships: a guide for change in care delivery. *Nursing Economics* 2003;**21**:158–66.
306. Davydov L, Caliendo G, Mehl B, Smith LG. Investigation of correlation between house-staff work hours and prescribing errors. *American Journal of Health-System Pharmacy* 2004;**61**:1130–4.
307. Beglinger J. Quantifying patient care intensity: an evidence-based approach to determining staffing requirements. *Nursing Administration Quarterly* 2006;**30**:193–202.
308. Dimick JB, Swoboda SM, Pronovost PJ, Lipsett PA. Effect of nurse-to-patient ratio in the intensive care unit on pulmonary complications and resource use after hepatectomy. *American Journal of Critical Care* 2001;**10**:376–82.
309. Amaravadi R, Dimick JB, Pronovost PJ, Lipsett PA. ICU nurse-to-patient ratio is associated with complications and resource use after esophagectomy. *Intensive Care Medicine* 2000;**26**:1857–62.
310. Callaghan LA, Cartwright DW, O'Rourke P, Davies MW. Infant to staff ratios and risk of mortality in very low birthweight infants. *Archives of Disease in Childhood Fetal and Neonatal Edition* 2003;**88**:F94–97.
311. Stilwell J, Szczepura A, Mugford M. Factors affecting the outcome of maternity care. 1. Relationship between staffing and perinatal deaths at the hospital of birth. *Journal of Epidemiology and Community Health* 1988;**42**:157–69.
312. Marcin JP, Rutan E, Rapetti PM, Brown JP, Rahnamayi R, Pretzlaff RK. Nurse staffing and unplanned extubation in the pediatric intensive care unit. *Pediatric Critical Care Medicine* 2005;**6**:254–7.
313. Bourbonnais R, Vinet A, Meyer F, Goldberg M. Certified sick leave and work load. A case referent study among nurses. *Journal of Occupational Medicine* 1992;**34**:69–74.
314. Bailit JL, Blanchard MH. The effect of house staff working hours on the quality of obstetric and gynecologic care. *Obstetrics and Gynecology* 2004;**103**:613–16.
315. Bollschweiler E, Krings A, Fuchs K-H, Pistorius G, Bein T, Otto U, *et al.* Alternative shift models and the quality of patient care. *Langenbeck's Archives of Surgery* 2001;**386**:104–9.
316. Laine C, Goldman L, Soukup JR, Hayes JG. The impact of a regulation restricting medical house staff working hours on the quality of patient care. *Journal of the American Medical Association* 1993;**269**:374–8.
317. Burroughs TE, Davies AR, Cira J, Dunagan WC. Understanding patient willingness to recommend and return: a strategy for prioritizing improvement opportunities. Joint Commission. *Journal on Quality Improvement* 1999;**25**:271–87.

318. Sibbald B, Shen J, McBride A. Changing the skill-mix of the health care workforce. *Journal of Health Services Research and Policy* 2004;**9**:28–38.
319. Fletcher KE, Underwood W III, Davis SQ, Mangrulkar RS, McMahon LF Jr, Saint S. Effects of work hour reduction on residents' lives: a systematic review. *Journal of the American Medical Association* 2005;**294**:1088–100.
320. Lang TA, Hodge M, Olson V, Romano PS, Kravitz RL. Nurse–patient ratios: a systematic review on the effects of nurse staffing on patient, nurse employee, and hospital outcomes. *Journal of Nursing Administration* 2004;**34**:326–37.
321. Laurant M, Reeves D, Hermens R, Braspenning J, Grol R, Sibbald B. Substitution of doctors by nurses in primary care. *The Cochrane Database of Systematic Reviews* 2004;**4**:CD001271.
322. Pronovost PJ, Angus DC, Dorman T, Robinson KA, Dremsizov TT, Young TL. Caring for the critically ill patient. Physician staffing patterns and clinical outcomes in critically ill patients: a systematic review. *Journal of the American Medical Association* 2002;**288**:2151–62.
323. Spisso J, O'Callaghan C, McKennan M, Holcroft JW. Improved quality of care and reduction of housestaff workload using trauma nurse practitioners. *Journal of Trauma* 1990;**30**:660–5.
324. Partovi S, Nelson B, Bryan ED, Walsh MJ. Faculty triage shortens emergency department length of stay. *Academic Emergency Medicine* 2001;**10**:990–5.
325. Topeli A, Laghi F, Tobin MJ. Effect of closed unit policy and appointing an intensivist in a developing country. *Critical Care Medicine* 2005;**33**:299–306.
326. Reynolds HN, Haupt MT, Thill-Baharozian MC, Carlson RW. Impact of critical care physician staffing on patients with septic shock in a university hospital medical intensive care unit. *Journal of the American Medical Association* 1988;**260**:3446–50.
327. Bucheli B, Martina B. Reduced length of stay in medical emergency department patients: a prospective controlled study on emergency physician staffing. *European Journal of Emergency Medicine* 2004;**11**:29–34.
328. Pepe PE, Mattox KL, Duke JH, Fisher PB, Prentice FD. Effect of full-time, specialized physician supervision on the success of a large, urban emergency medical services system. *Critical Care Medicine* 1993;**21**:1279–86.
329. Christmas AB, Reynolds J, Hodges S, Franklin GA, Miller FB, Richardson JD, *et al.* Physician extenders impact trauma systems. *Journal of Trauma: Injury Infection and Critical Care* 2005;**58**:917–20.
330. Grouse A, Bishop R. Non-medical technicians reduce emergency department waiting times. *Emergency Medicine* 2001;**13**:66–9.
331. Aigner MJ, Drew S, Phipps J. A comparative study of nursing home resident outcomes between care provided by nurse practitioners/physicians versus physicians only. *Journal of the American Medical Directors Association* 2004;**5**:16–23.
332. Barr M, Johnston D, McConnell D. Patient satisfaction with a new nurse practitioner service. *Accident and Emergency Nursing* 2000;**8**:144–7.
333. Green A, Edmonds L. Bridging the gap between the intensive care unit and general wards – the ICU liaison nurse. *Intensive Critical Care Nursing* 2004;**20**:133–43.
334. Person SD, Allison JJ, Kiefe CI, Weaver MT, Williams OD, Centor RM, *et al.* Nurse staffing and mortality for Medicare patients with acute myocardial infarction. *Medical Care* 2004;**42**:4–12.
335. Li TC, Phillips MC, Shaw L, Cook EF, Natanson C, Goldman L. On-site physician staffing in a community hospital intensive care unit. Impact on test and procedure use and on patient outcome. *Journal of the American Medical Association* 1984;**252**:2023–7.
336. Hinshaw AS, Atwood JR. A patient satisfaction instrument: precision by replication. *Nursing Research* 1982;**31**:170–5, 191.
337. Hall LM, Doran D, Baker GR, Pink GH, Sidani S, O'Brien-Pallas L, *et al.* Nurse staffing models as predictors of patient outcomes. *Medical Care* 2003;**9**:1096–109.
338. Lee T, Yeh M, Chen H, Lien G. The skill mix practice model for nursing: measuring outcome. *Journal of Advanced Nursing* 2005;**51**:406–13.
339. Fontaine K, Rositani R. Cost, quality and satisfaction with hospice after-hours care. *The Hospice Journal* 2000;**15**:1–14.
340. Barkell NP, Killinger KA, Schultz SD. The relationship between nurse staffing models and patient outcomes: a descriptive study. *Outcomes Management* 2002;**6**:27–33.
341. Bolton LB, Jones D, Aydin CE, Donaldson N, Brown DS, Lowe M, *et al.* A response to California's mandated nursing ratios. *Journal of Nursing Scholarship* 2001;**33**:179–84.

342. Oswanski MF, Sharma OP, Raj SS. Comparative review of use of physician assistants in a level I trauma center. *American Surgeon* 2004;**70**:272–9.
343. Simmer TL, Nerenz DR, Rutt WM, Newcomb CS, Benfer DW. A randomized, controlled trial of an attending staff service in general internal medicine. *Medical Care* 1991;**2**:JS31–40.
344. Tenner PA, Dibrell H, Taylor RP. Improved survival with hospitalists in a pediatric intensive care unit. *Critical Care Medicine* 2003;**31**:847–52.
345. Petersen LA, Brennan TA, O'Neill AC, Cook FE, Lee TH. Does housestaff discontinuity of care increase the risk for preventable adverse events? *Annals of Internal Medicine* 1994;**121**:866–72.
346. Fairchild DG, McLoughlin KS, Gharib S, Horsky J, Portnow M, Richter J, *et al.* Productivity, quality, and patient satisfaction: comparison of part-time and full-time primary care physicians. *Journal of General Internal Medicine* 2001;**16**:663–7.
347. Hoffman LA, Tasota FJ, Zullo TG, Scharfenberg C, Donahoe MP. Outcomes of care managed by an acute care nurse practitioner/attending physician team in a subacute medical intensive care unit. *American Journal of Critical Care* 2005;**14**:121–32.
348. Terris J, Leman P, O'Connor N, Wood R. Making an IMPACT on emergency department flow: improving patient processing assisted by consultant at triage. *Emergency Medicine Journal* 2004;**21**:537–41.
349. Rudy EB, Davidson LJ, Daly JM, Clochesy JM, Sereika SM, Baldisseri M, *et al.* Care activities and outcomes of patients cared for by acute care nurse practitioners, physician assistants, and resident physicians: a comparison. *American Journal of Critical Care* 1998;**7**:267–81.
350. McCausland MP, Persing RJ, Kiley M. Primary nursing in a psychiatric setting. *Nursing Economics* 1988;**6**:297–301.
351. Mark B, Harless D, McCue M. The impact of HMO penetration on the relationship between nurse staffing and quality of care. *Health Economics* 2005;**14**:373–53.
352. Mark B, Harless D, McCue M, Xu X. A longitudinal examination of hospital registered nurse staffing and quality of care. *Health Services Research* 2004;**39**:277–98.
353. Robert J, Fridkin S, Blumberg H, Anderson B, White N, Ray SM, *et al.* The influence of the composition of the nursing staff on primary bloodstream infection rates in a surgical intensive care unit. *Infection Control and Hospital Epidemiology* 2000;**21**:7–12.
354. Arnow P, Allyn PA, Nichols EM, Hill DL, Pezzlo M, Bartlett RH. Control of methicillin-resistant *Staphylococcus aureus* in a burn unit: role of nurse staffing. *Journal of Trauma* 1982;**22**:954–9.
355. O'Connor AE, Lockney AL, Sloan PD, McGrail MR. Does the presence of an emergency physician improve access based quality indicators in a rural emergency department? *Emergency Medicine Australasia* 2004;**16**:55–8.
356. French D, Zwemer FL Jr, Schneider S. The effects of the absence of emergency medicine residents in an academic emergency department. *Academic and Emergency Medicine* 2002;**9**:1205–10.
357. Porter JM, Ursic C. Trauma attending in the resuscitation room: does it affect outcome? *American Surgeon* 2001;**67**:611–14.
358. Multz AS, Chalfin DB, Samson IM, Dantzker DR, Fein AM, Steinberg HN, *et al.* A “closed” medical intensive care unit (MICU) improves resource utilization when compared with an “open” MICU. *American Journal of Respiratory and Critical Care Medicine* 1998;**157**:1468–73.
359. Baldock G, Foley P, Brett S. The impact of organisational change on outcome in an intensive care unit in the United Kingdom. *Intensive Care Medicine* 2001;**27**:865–72.
360. Ghorra S, Reinert SE, Cioffi W, Buczko G, Simms H. Analysis of the effect of conversion from open to closed surgical intensive care unit. *Annals of Surgery* 1999;**229**:163–71.
361. Weitzel T, Robinson SB. A model of nurse assistant care to promote functional status in hospitalized elders. *Journal for Nurses in Staff Development* 2004;**20**:181–6.
362. Mayo PH, Weinberg BJ, Kramer B, Richman J, Seibert-Choi O, Rosen MJ. Results of a program to improve the process of inpatient care of adult asthmatics. *Chest* 1996;**110**:48–52.
363. Davis D, Thomson O'Brien MA, Freemantle N, Wolf FM, Mazmanian P, Taylor-Vaisey A. Impact of formal continuing medical education. Do conferences, workshops, rounds, and other traditional continuing education activities change physician behavior or health care outcomes? *Journal of the American Medical Association* 1999;**282**:867–74.
364. Davis DA, Thomson MA, Oxman AD, Haynes RB. Evidence for the effectiveness of CME. A review of fifty randomised controlled trials. *Journal of the American Medical Association* 1992;**268**:1111–17.
365. Davis DA, Thomson MA, Oxman AD, Haynes RB. Changing physician performance: a systematic

- review of continuing medical education strategies. *Journal of the American Medical Association* 1995;**274**:700–5.
366. Hunter E, Nicol M. Systematic review: evidence of the value of continuing professional development to enhance recruitment and retention of occupational therapists in mental health. *British Journal of Occupational Therapy* 2002;**65**:207–15.
367. Stajkovic AD, Luthans F. A meta-analysis of the effects of organizational behavior modification on task performance, 1975–95. *Academy of Management Journal* 1997;**40**:11–22.
368. Allen TD, Eby LT, Poteet ML, Lentz E, Lima L. Career benefits associated with mentoring for protegee: a meta-analysis. *Journal of Applied Psychology* 2004;**89**:127–36.
369. Arthur J, Day EA, McNelly TL, Edens PS. A meta-analysis of the criterion-related validity of assessment center dimensions. *Personnel Psychology* 2003;**56**:125–54.
370. Fidler V, Nap R, Miranda DR. The effect of a managerial-based intervention on the occurrence of out-of-range-measurements and mortality in intensive care units. *Journal of Critical Care* 2004;**19**:130–4.
371. Lundstrom M, Edlund A, Karlsson S, Brannstrom B, Bucht G, Gustafson Y. A multifactorial intervention program reduces the duration of delirium, length of hospitalization, and mortality in delirious patients. *Journal of the American Geriatric Society* 2005;**53**:622–8.
372. Cohran J, Larson E, Roach H, Blane C, Pierce P. Effect of intravascular surveillance and education program on rates of nosocomial bloodstream infections. *Heart and Lung* 2006;**25**:161–4.
373. Kelleghan SI, Salami C, Padilla S, McCord M, Mermilliod G, Canola RN, *et al.* An effective continuous quality improvement approach to the prevention of ventilator-associated pneumonia. *American Journal of Infection Control* 1993;**21**:322–30.
374. Rosenthal VD, Guzman S, Safdar N. Effect of education and performance feedback on rates of catheter-associated urinary tract infection in intensive care units in Argentina. *Infection Control and Hospital Epidemiology* 2004;**25**:47–50.
375. Won S, Chou H, Hsieh W, Chen C, Huang S, Tsou K, *et al.* Handwashing program for the prevention of nosocomial infections in a neonatal intensive care unit. *Infection Control and Hospital Epidemiology* 2004;**25**:742–6.
376. Rosenthal VD, Guzman S, Pezzotto SM, Crnich CJ. Effect of an infection control program using education and performance feedback on rates of intravascular device-associated bloodstream infections in intensive care units in Argentina. *American Journal of Infection Control* 2003;**31**:405–9.
377. Salahuddin N, Zafar A, Sukhyani L, Rahim S, Noor MF, Hussain K, *et al.* Reducing ventilator-associated pneumonia rates through a staff education programme. *Journal of Hospital Infection* 2004;**57**:223–7.
378. Zack JE, Garrison T, Trovillion E, Clinkscale D, Coopersmith CM, Fraser VJ, *et al.* Effect of an education program aimed at reducing the occurrence of ventilator-associated pneumonia. *Critical Care Medicine* 2002;**30**:2407–12.
379. Lawrence SJ, Shadel BN, Leet TL, Hall JB, Mundy LM. An intervention to improve antibiotic delivery and sputum procurement in patients hospitalized with community-acquired pneumonia. *Chest* 2002;**122**:913–19.
380. Saunders DG, Lynch AB, Grayson M, Linz D. The inventory of beliefs about wife beating: the construction and initial validation of a measure of beliefs and attitudes. *Violence and Victims* 1987;**2**:39–57.
381. Soeken K, Parker B, McFarlane J, Lominak MC. The Abuse Assessment Screen: a clinical instrument to measure frequency, severity, and perpetrator of abuse against women. In Campbell J (ed.). *Beyond diagnosis: changing the health care response to battered women and their children*. Newbury Park, CA: Sage; 1998. pp 195–203.
382. Gosden T, Forland F, Kristiansen IS, Sutton M, Leese B, Giuffrida A. Impact of payment method on behaviour of primary care physicians: a systematic review. *Journal of Health Services and Research Policy* 2001;**6**:44–55.
383. Chaix-Couturier C, Durand-Zaleski I, Jolly D, Durieux P. Effects of financial incentives on medical practice: results from a systematic review of the literature and methodological issues. *International Journal for Quality in Health Care* 2000;**12**:133–42.
384. Gosden T, Forland F, Kristiansen IS, Sutton M, Leese B, Giuffrida A. Impact of payment method on behaviour of primary care physicians: a systematic review. *Journal of Health Services and Research Policy* 2001;**6**:44–55.
385. Gosden T, Pedersen L, Torgerson D. How should we pay doctors? A systematic review of salary payments and their effect on doctor behaviour. *Quarterly Journal of Medicine* 1999;**92**:47–55.

386. Steiner A, Robinson R. Managed care: US research evidence and its lessons for the NHS. *Journal of Health Services and Research Policy* 1998;**3**:173–84.
387. Sempowski IP. Effectiveness of financial incentives in exchange for rural and underserved area return-of-service commitments: systematic review of the literature. *Canadian Journal of Rural Medicine* 2004;**9**:82–88.
388. Giuffrida A, Gosden T, Forland F, Kristiansen IS, Sergison M, Leese B, *et al.* Target payments in primary care: effects on professional practice and health care outcomes. *Cochrane Database of Systematic Reviews* 1999;**4**:CD000531.
389. De Groot T, Kiker DS. A meta-analysis of the non-monetary effects of employee health management programs. *Human Resource Management* 2003;**42**:53–69.
390. Stajkovic AD, Luthans F. Behavioral management and task performance in organizations: conceptual background, meta-analysis, and test of alternative models. *Personnel Psychology* 2003;**56**:155–94.
391. Doucouliagos C. Worker participation and productivity in labor-managed and participatory capitalist firms: a meta-analysis. *Industrial and Labor Relations Review* 1995;**49**:58–77.
392. Wiersma UJ. The effects of extrinsic rewards in intrinsic motivation: a meta-analysis. *Journal of Occupational and Organizational Psychology* 1992;**65**:101–14.
393. Forsberg E, Axelsson R, Arnetz B. Financial incentives in health care. The impact of performance-based reimbursement. *Health Policy* 2001;**58**:243–62.
394. Lee S, Cowie S, Slobodian P. Payment by salary or fee-for-service. Effect on health care resource use in the last year of life. *Canadian Family Physician* 1999;**45**:2091–6.
395. Armour BS, Friedman C, Pitts MM, Wike J, Alley L, Etchason J. The influence of year-end bonuses on colorectal cancer screening. *American Journal of Management of Care* 2004;**10**: 617–24.
396. Ruchholtz S, Waydhas C, Aufmkolk M, Täger G, Piepenbrink K, Stolke D, *et al.* Interdisciplinary quality management in the treatment of severely injured patients. Validation of a QM system for the diagnostic and therapeutic process in early clinical management. *Unfallchirurg* 2001;**104**:927–37.
397. Forster DH, Krause G, Gastmeier P, Ebner W, Rath A, Wischniewski N, *et al.* Can quality circles improve hospital-acquired infection control? *Journal of Hospital Infection* 2000;**45**:302–10.
398. Kyriacou DN, Ricketts V, Dyne PL, McCollough MD, Talan DA. A 5-year time study analysis of emergency department patient care efficiency. *Annals of Emergency Medicine* 1999;**34**:326–35.
399. Leininger SM. One year later: did the quality circle of geriatric hip fracture care achieve quality outcomes? *Nursing Case Management* 1999;**4**:263–7.
400. Smither JW, London M, Reilly RR. Does performance improve following multisource feedback: A theoretical model, meta-analysis, and review of empirical findings. *Personnel Psychology* 2005;**58**:33–66.
401. Rodgers R, Hunter JE. Impact of management by objectives on organizational productivity. *Journal of Applied Psychology* 1991;**76**:322–36.
402. Kraiger K, Ford JK. The relation of job knowledge, job performance, and supervisory ratings as a function of ratee race. *Human Performance* 1990;**3**:269–79.
403. Heneman RL. The relationship between supervisory ratings and results-oriented measures of performance: a meta-analysis. *Personnel Psychology* 1986;**39**:811–26.
404. Appelbaum E, Blatt R. *The new American workplace*. Ithaca, NY, ILR Press; 1994.
405. Ichniowski C, Kochan T, Levine D, Strauss G. What works at work: overview and assessment. *Industrial Relations* 1996;**35**:299–333.
406. Goetz AM, Kedzuf S, Wagener M, Muder RR. Feedback to nursing staff as an intervention to reduce catheter-associated urinary tract infections. *American Journal of Infection Control* 1999;**27**:402–4.
407. Nettleman MD, Antoni T, Fredrickson M, Pfaller M. Assigning responsibility: using feedback to achieve sustained control of methicillin-resistant *Staphylococcus aureus*. *The American Journal of Medicine* 1991;**91**:S228–32.
408. Spierer M, Sims HW, Micklitsch CN, Lewis BE. Assessment of patient satisfaction as part of a physician performance evaluation: the Fallon Clinic experience. *Journal of Ambulatory Care Management* 1994;**17**:1–7.
409. Wagner J, Gooding R. Shared influence and organizational behavior: a meta-analysis of situational variables expected to moderate participation–outcome relationships. *Academy of Management Journal* 1987;**30**:524–41.
410. Zottoli M, Wanous J. Recruitment source research: current status and future directions. *Human Resource Management Review* 2000;**10**:353–382.

411. Phillips J. Effects of realistic job previews on multiple organizational outcomes: a meta-analysis. *Academy of Management Journal* 1998;**41**:673–90.
412. Hackman JR, Oldham G. Motivation through the design of work: Test of a theory. *Organizational Behaviour and Human Performance* 1976;**16**:250–79.
413. Wall TD, Clegg CW. A longitudinal field study of group work redesign. *Journal of Occupational Behavior* 1981;**2**:31–49.
414. Armstrong-Stassen M, Wagar TH, Cattaneo RJ. Work-group membership (in)stability and survivors' reactions to organizational downsizing. *Journal of Applied Social Psychology* 2004;**34**:2023–44.
415. Wall TD, Kemp NJ, Jackson PR, Clegg CW. Outcome of autonomous workgroups: a long-term field experiment. *Academy of Management Journal* 1986;**29**:280.
416. Pearson CAL. Autonomous workgroups: an evaluation at an industrial site. *Human Relations* 1992;**45**:905–36.
417. Banker RD, Field JM, Schroeder RG, Sintia KK. Impact of work teams on manufacturing performance: a longitudinal field study. *Academy of Management Journal* 1996;**39**:867.
418. Cordery JL, Mueller WS, Smith LM. Attitudinal and behavioral effects if autonomous group working: a longitudinal field study. *Academy of Management Journal* 1991;**34**:464.
419. Kirchmeyer C. Demographic similarity to the work group: a longitudinal study of managers at the early career stage. *Journal of Organizational Behavior* 1995;**16**:67–83.
420. Goldberg DP. *The detection of psychiatric illness by questionnaire. Maudsley Monograph No. 21*. Oxford: Oxford University Press; 1972.
421. Clegg CW, Wall TD. A note on some new scales for measuring psychological well-being at work. *Journal of Occupational Psychology* 1981;**54**:221–5.
422. Hackman JR, Oldham GR. *The Job Diagnostic Survey: an instrument for the diagnosis of jobs and the evaluation of job redesign projects. Technical Report No. 4*. New Haven, CT: Department of Administrative Sciences, Yale University; 1974.
423. Jick TD. *Process and impacts of a merger: individual and organizational perspectives*. Unpublished PhD thesis, Cornell University, Ithaca, NY.
424. Lodahl T, Kejner M. The definition and measurement of job involvement. *Journal of Applied Psychology* 1965;**49**:24–33.
425. Moorman RH, Blakely GL, Niehoff BP. Does perceived organizational support mediate the relationship between procedural justice and organizational citizenship behavior? *Academy of Management Journal* 1998;**41**:351–7.
426. Coupland C, Blyton P, Bacon N. A longitudinal study of the influence of shop floor work teams on expressions of 'us' and 'them'. *Human Relations* 2005;**58**:1055–81.
427. Campbell DJ. Task complexity: a review and analysis. *Academy of Management Review* 1988;**13**:40–52.
428. Schaubroeck J, Ganster DC, Kemmerer BE. Job complexity, 'type A' behavior, and cardiovascular disorder: a prospective study. *Academy of Management Journal* 1994;**37**:426.
429. Kalimo R, Pahkin K, Mutanen P, Toppinen-Tanner S. Staying well or burning out at work: work characteristics and personal resources as long-term predictors. *Work and Stress* 2003;**17**:109.
430. Elo A-L, Leppanen A, Lindstrom K, Ropponen T. *OSQ. Occupational Stress Questionnaire: user's instructions*. Helsinki: Institute of Occupational Health; 1992.
431. Hackman JR, Oldham G. *Work redesign*. Reading, MA: Addison-Wesley; 1980.
432. House JS. *Occupational stress and the mental and physical health of factory workers*. Ann Arbor, MI: Institute for Social Research; 1980.
433. Karasek R. Job demands, job decision latitude, and mental strain: implications for job redesign. *Administrative Science Quarterly* 1979;**24**:285–307.
434. De Langeff AH, Taris TW, Kompier MAJ, Houtman ILD, Bongers PM. The relationships between work characteristics and mental health: examining normal, reversed and reciprocal relationships in a 4-wave study. *Work and Stress* 2004;**18**:149–66.
435. Moyle P. Longitudinal influences of managerial support on employee well-being. *Work and Stress* 1998;**12**:29–49.
436. Moyle P, Parkes K. The effects of transition stress: a relocation study. *Journal of Organizational Behavior* 1999;**20**:625.
437. Smulders PGW, Nijhuis FJN. The Job Demands–Job Control Model and absence behaviour: results of a 3-year longitudinal study. *Work and Stress* 1999;**13**:115–31.

438. Nielsen ML, Rugulies R, Christensen KB, Smith-Hansen L, Bjorner JB, Kristensen TS. Impact of the psychosocial work environment on registered absence from work: a two-year longitudinal study using the IPAQ cohort. *Work and Stress* 2004;**18**:323–35.
439. De Croon EM, Sluiter JK, Blonk RWB, Broersen JPP, Frings-Dresen MHW. Stressful work, psychological job strain, and turnover: a 2-year prospective cohort study of truck drivers. *Journal of Applied Psychology* 2004;**89**:442–54.
440. Holman D, Wall TD. Work characteristics, learning-related outcomes, and strain: a test of competing direct effects, mediated, and moderated models. *Journal of Occupational Health Psychology* 2002;**7**:283–301.
441. Taris TW, Kompier MAJ, De Lange AH, Schaufeli WB, Schreurs PJ. Learning new behaviour patterns: a longitudinal test of Karasek's active learning hypothesis among Dutch teachers. *Work and Stress* 2003;**17**:1.
442. Johnson JV, Stewart W, Hall EM, Fredlund P, Theorell T. Long-term psychosocial work environment and cardiovascular mortality among Swedish men. *American Journal of Public Health* 1996;**86**:324–31.
443. O'Brien GE. *Psychology of work and unemployment*. Chichester: Wiley; 1986.
444. Axtell C, Holman D, Wall T, Waterson P, Harrington E, Unsworth K. Shopfloor innovation: facilitating the suggestion and implementation of ideas. *Journal of Occupational and Organisational Psychology* 2000;**73**:265–85.
445. Warr PB. The measurement of well-being and other aspects of mental health. *Journal of Occupational Psychology* 1990;**63**:193–210.
446. Setterlind S, Larsson G. The stress profile: a psychosocial approach to measuring stress. *Stress Medicine* 1995;**11**:85–92.
447. Daniels K, Guppy A. Occupational stress, social support, job control, and psychological well-being. *Human Relations* 1994;**47**:1523–44.
448. Goldberg D, Williams P. *A user's guide to the General Health Questionnaire: GHQ*. Windsor, ON: NFER-Nelson; 1988.
449. Parkes KR. *Human factors, shift work, and alertness in the offshore oil industry. Report OTH 92–389*. London: HMSO; 1993.
450. Jia LX, Schaubroeck J, Lam SSK. Psychological and immunological effects of worker control on coping with job demands: a longitudinal study. *Academy of Management Proceedings* 2000;OB:1–16.
451. Smith CS, Tisak J, Hahn SE, Schnieder RA. The measurement of job control. *Journal of Organizational Behavior* 1997;**18**:225–37.
452. Maslach C, Jackson SE, Schwab RL. Maslach Burnout Inventory*/Educators Survey (MBI-ES). In Maslach C, Jackson SE, Leiter MP (eds). *Maslach Burnout Inventory*. 3rd Edn. Palo Alto, CA: Consulting Psychologists Press; 1996.
453. Parker SK, Wall TD. *Job and work design: organizing work to promote well-being and effectiveness*. London: Sage Publications; 1998.
454. Parker SK. Enhancing role breadth self-efficacy: the roles of job enrichment and other organizational interventions. *Journal of Applied Psychology* 1993;**83**:835–52.
455. Campion MA, McClelland CL. Follow-up and extension of the interdisciplinary costs and benefits of enlarged jobs. *Journal of Applied Psychology* 1993;**78**:339–51.
456. Rissen D, Melin B, Sandsjo L, Dohns I, Lundberg U. Psychophysiological stress reactions, trapezius muscle activity, and neck and shoulder pain among female cashiers before and after introduction of job rotation. *Work and Stress* 2002;**16**:127–37.
457. Blocher E. Performance Effects of different audit staff assignment strategies. *Accounting Review* 1979;**54**:563–73.
458. Axtell CM, Parker SK. Promoting role breadth self-efficacy through involvement, work redesign and training. *Human Relations* 2003;**56**:113.
459. Laschinger HKS, Finegan JE, Shamian J, Wilk P. A longitudinal analysis of the impact of workplace empowerment on work satisfaction. *Journal of Organizational Behavior* 2004;**25**:527–45.
460. Orpen C. The effects of job enrichment on employee satisfaction, motivation, involvement, and performance: a field experiment. *Human Relations* 1979;**32**:189.
461. Hall DT, Goodale JG, Rabinowitz S, Morgan MA. Effects of top-down departmental and job change upon perceived employee behavior and attitudes: a natural field experiment. *Journal of Applied Psychology* 1978;**63**:62–72.
462. Bhagat RS, Chassie MB. Effects of job changes in job characteristics on some theory-specific attitudinal outcomes: results from a naturally

- occurring quasi-experiment. *Human Relations* 1980;**33**:297.
463. Griffin RW. Objective and social sources of information in task redesign: a field experiment. *Administrative Science Quarterly* 1983;**28**:184–200.
464. Griffin RW. Effects of work redesign on employee perceptions, attitudes, and behaviors: a long-term investigation. *Academy of Management Journal* 1991;**34**:425–435.
465. Morgeson FP, Campion MA. Minimizing tradeoffs when redesigning work: evidence from a longitudinal quasi-experiment. *Personnel Psychology* 2002;**55**:589–612.
466. Locke EA, Sirota D, Wolfson AD. An experimental case study of the successes and failures of job enrichment in a government agency. *Human Relations* 1976;**32**:701–11.
467. Houkes I, Janssen PP M, de Jonge J, Bakker AB. Specific determinants of intrinsic work motivation, emotional exhaustion and turnover intention: a multisample longitudinal study. *Journal of Occupational and Organizational Psychology* 2003;**76**:427–50.
468. Meyer JP, Bobocel DR, Allen NJ. Development of organizational commitment during the first year of employment: a longitudinal study of pre- and post-entry influences. *Journal of Management* 1991;**17**:716.
469. Hammer TH, Landau JC, Stern RN. Absenteeism when workers have a voice: the case of employee ownership. *Journal of Applied Psychology* 1981;**66**:561–73.
470. Barnett RC, Brennan RT, Raudenbush SW, Pleck JH, Marshall NL. Change in job and marital experience and change in psychological distress: a longitudinal study of dual-earner couples. *Journal of Personality and Social Psychology* 1995;**69**:839–50.
471. Taris TW, Bok IA, Calje DG. On the relation between job characteristics and depression: a longitudinal study. *International Journal of Stress Management* 1998;**5**:157–67.
472. Sims HP Jr, Szilagyi AD. Job characteristic relationships: individual and structural moderators. *Organizational Behavior and Human Performance* 1976;**17**:211–30.
473. Weiss DJ, Dawis RV, England GW, Lofquist LH. *Manual for the MSQ*. Minneapolis, MN: University of Minnesota; 1967.
474. Seashore SE, Lawler EE III, Mirvis P, Cammann C. *Observing and measuring organizational change: a guide to field practice*. New York: Wiley; 1982.
475. Warr P, Cook J, Wall T. Scales for the measurement of some work attitudes and aspects of psychological well-being. *Journal of Occupational Psychology* 1979;**52**:129–48.
476. Van Veldhoven M, Meijman T. [*Measuring psychosocial workload by means of a questionnaire. Questionnaire on the Experience and Evaluation of Work*]. Amsterdam: NIA; 1994.
477. Meyer JP, Allen NJ. Testing the “side-bet theory” of organizational commitment: some methodological considerations. *Journal of Applied Psychology* 1984;**69**:372–78.
478. Derogatis LR. *The SCL-90-R*. Baltimore, MD: Clinical Psychometrics; 1975.
479. Barnett RC, Marshall NL, Raudenbush S, Brennan RT. Gender and the relationship between job experiences and psychological distress: a study of dual-earner couples. *Journal of Personality and Social Psychology* 1993;**64**:794–806.
480. Rooijen L. van Widows’ bereavement: stress and depression after 1.5 years. In Sarason IG, Spielberger CD (eds). *Stress and anxiety*. Vol. 6. Washington, DC: Hemisphere; 1979.
481. Lubin B. Adjective checklists for the measurement of depression. *Archives of General Psychiatry* 1965;**12**:57–62.
482. Saks AM, Ashforth BE. The role of dispositions, entry stressors, and behavioral plasticity theory in predicting. *Journal of Organizational Behavior* 2000;**21**:43.
483. Fried Y, Slowik LH, Shperling Z, Franz C, Ben-David HA, Avital N, et al.. The moderating effect of job security on the relation between role clarity and job performance: a longitudinal field study. *Human Relations* 2003;**56**:787–805.
484. Saks and Ashforth
485. Cammann C, Fichman M, Jenkins GD Jr, Klesh JR. Assessing the attitudes and perceptions of organizational members. In Seashore SE, Lawler EE III, Mirvis PH, Cammann C (eds). *Assessing organizational change: a guide to methods, measures, and practices*. New York, NY: Wiley; 1983. pp. 71–138.
486. Allen NJ, Meyer JP. The measurement and antecedents of affective, continuance and normative commitment to the organization. *Journal of Occupational Psychology* 1990;**63**:1–18.
487. Mael F, Ashforth BE. Alumni and their alma mater: a partial test of the reformulated model of organizational identification. *Journal of Organizational Behavior* 1992;**13**:103–23.

488. Colarelli SM. Methods of communication and mediating processes in realistic job previews. *Journal of Applied Psychology* 1984;**69**:633–42.
489. Ashforth BE. The experience of powerlessness in organizations. *Organizational Behavior and Human Decision Processes* 1989;**43**:207–42.
490. Patchen M. *Participation, achievement and involvement on the job*. Englewood Cliffs, NJ: Prentice-Hall; 1970.
491. House RJ, Levanoni E, Schuler RS. An empirical examination of the construct validity of the rizzo, house and lirtzman role scales: toward a clarification of the nature of role conflict. Paper presented at the Annual Mid-West Meeting of the Academy of Management, Columbus, OH, 1982.
492. Bravo MJ, Peiro JM, Rodriguez I, Whitely WT. Social antecedents of the role stress and career-enhancing strategies of newcomers to organizations: a longitudinal study. *Work and Stress* 2003;**17**:195–217.
493. Bachman P, O'Maley P, Johnston J. *Adolescence to adult change and stability in the lives of young men*. Ann Arbor, MI: University of Michigan Press; 1978.
494. Penley L, Gould S. *Measuring career strategies: the psychometric characteristics of the Career Strategies Inventory*. San Antonio, TX: Centre for Studies in Business, Economics and Human Resources, University of Texas; 1981.
495. Bauer TN, Dolen MR, Maertz J, Campion MA. Longitudinal assessment of applicant reactions to employment testing and test outcome feedback. *Journal of Applied Psychology* 1998;**83**:892–903.
496. Castilla EJ. Social networks and employee performance in a call center. *American Journal of Sociology* 2005;**110**:1243–83.
497. Meglino BM, DeNisi A, Youngblood SA, Williams KJ. Effects of realistic job previews: a comparison using an enhancement and a reduction preview. *Journal of Applied Psychology* 1988;**73**:259–66.
498. Hinrichs JR. An eight-year follow-up of a management assessment. *Journal of Applied Psychology*, 1978;**63**:596–601.
499. Chatman JA. Matching people and organizations: selection and socialization in public accounting firms. *Administrative Science Quarterly* 1991;**36**:459–84.
500. Browne JH, Warnock SH, Boykin NJ. Predicting success of police officer applicants using weighted application blanks. *Journal of American Academy of Business, Cambridge* 2005;**6**:26–31.
501. Maertz J, Bauer TN, Mosley J, Posthuma RA, Campion MA, Talya NBT. Do procedural justice perceptions in a selection testing context predict applicant attraction and intention toward the organization? *Journal of Applied Social Psychology* 2004;**34**:125–45.
502. Porter LW, Smith FJ. *The etiology of organizational commitment*. Unpublished manuscript, University of California at Irvine, Irvine, CA; 1970.
503. Rizzo JR, House RJ, Lirtzman SI. Role conflict and ambiguity in complex organizations. *Administrative Science Quarterly* 1970;**15**:150–63.
504. Macan TH, Avedon MJ, Paese M, Smith DE. The effects of applicants' reactions to cognitive ability tests and an assessment center. *Personnel Psychology* 1994;**47**:715–38.
505. Smither JW, Reilly RR, Millsap RE, Pearlman K, Stoffey RW. Applicant reactions to selection procedures. *Personnel Psychology* 1993;**46**:49–76.
506. O'Reilly CA, Chatman J, Caldwell DF. People and organizational culture: a Q-sort approach to assessing person-organization fit. *Academy of Management Journal* 1991;**34**:487–516.
507. Kunin T. The construction of a new type of attitude measure. *Personnel Psychology* 1955;**8**:65–78.
508. Van Maanen J, Schein EH. Towards a theory of organizational socialization. In Staw BM (ed.). *Research in organizational behavior*. Greenwich, CT: JAI Press; 1979.
509. Jones GR. Socialization tactics, self-efficacy, and newcomers' adjustments to organizations. *Academy of Management Journal* 1986;**29**:262–79.
510. Cooper-Thomas HD, Van Vianen A, Anderson N. Changes in person-organization fit: the impact of socialization tactics on perceived and actual P-O fit. *European Journal of Work and Organizational Psychology* 2004;**13**:52–78.
511. Ashforth BK, Saks AM. Socialization tactics: longitudinal effects on newcomer adjustment. *Academy of Management Journal* 1996;**39**:149.
512. Waung M. The effects of self-regulatory coping orientation on newcomer adjustment and job survival. *Personnel Psychology* 1995;**48**:633.
513. Klein HJ, Weaver NA. The effectiveness of an organizational-level orientation training program in the socialization of new hires. *Personnel Psychology* 2000;**53**:47–66.

514. Wesson MJ, Gogus CI. Shaking hands with a computer: an examination of two methods of organizational newcomer orientation. *Journal of Applied Psychology* 2005;**90**:1018–26.
515. Cable DM, Parsons CK. Socialization tactics and person–organization fit. *Personnel Psychology* 2001;**54**:1–23.
516. Mowday RT, Steers EF, Porter LW. The measurement of organizational commitment. *Journal of Vocational Behavior* 1979;**14**:224–47.
517. Chao GT, O’Uary-Kelly AM, Wolf S, Klein HJ, Gardner PD. Organizational socialization: its content and consequences. *Journal of Applied Psychology* 1994;**79**:730–43.
518. Dunham R, Herman J. Development of female faces scale for measuring job satisfaction. *Journal of Applied Psychology* 1975;**60**:629–31.
519. West MA. A measure of role innovation at work. *British Journal of Social Psychology* 1987;**26**:83–5.
520. Cable D, Judge TA. Interviewers’ perceptions of person–organization fit and organizational selection decisions. *Journal of Applied Psychology* 1997;**82**:562–77.
521. Saks AM, Ashforth BE. Organizational socialization: making sense of the past and present as a prologue for the future. *Journal of Vocational Behavior* 1997;**51**:234–79.
522. Narayanan VK, Nath R. Hierarchical level and the impact of flextime. *Industrial Relations* 1982;**21**:216–30.
523. Dunham RB, Pierce JL, Castaneda MB. Alternative work schedules: two field quasi-experiments. *Personnel Psychology* 1987;**40**:215–42.
524. Latack JC, Foster LW. Implementation of compressed work schedules: participation and job redesign as critical factors for employee acceptance. *Personnel Psychology* 1985;**38**:75.
525. Markham SE, Dansereau J, Alutto JA. On the use of shift as an independent variable in absenteeism research. *Journal of Occupational Psychology* 1982;**55**:225–31.
526. Posthuma RA, Campion MA. When do multiple dimensions of procedural justice predict agreement to publicly endorse your employer in recruitment advertisements? *Journal of Occupational and Organisational Psychology* 2005;**78**:431–45.
527. Dunham RB, Pierce JL. Attitudes toward work schedules: construct definition, instrument development and validation. *Academy of Management Journal* 1986;**29**:170–82.
528. Pierce JL, Newstrom JW. Employee responses to flexible work schedules: an interorganization, inter-system comparison. *Journal of Management* 1982;**8**:9–25.
529. Parker SK, Griffin MA, Sprigg CA, Wall TD. Effect of temporary contracts on perceived work characteristics and job strain: a longitudinal study. *Personnel Psychology* 2002;**55**:689–719.
530. Caplan RD, Cobb S, French JRP Jr, Van Harrison RV, Pinneau SR Jr. *Job demands and worker health: main effects and occupational differences*. Washington DC: US Department of Health, Education and Welfare; 1975.
531. Adam J. Operations change interactions in a service environment: attitudes, behaviors, and profitability. *Journal of Operations Management* 1981;**2**:63–73.
532. Price JL, Mueller CW. A causal model of turnover for nurses. *Academy of Management Journal* 1981;**24**:543–65.
533. D’Arcimoles CH. Human resource policies and company performance: a quantitative approach using longitudinal data. *Organization Studies* 1997;**18**:857.
534. Vogus TJ, Welbourne TM. Structuring for high reliability: HR practices and mindful processes in reliability-seeking organizations. *Journal of Organizational Behavior* 2003;**24**:877–903.
535. Ivancevich JM. Longitudinal study of the effects of rater training on psychometric error in ratings. *Journal of Applied Psychology* 1979;**64**:502–8.
536. Cash RW, Vellema CK. Conceptual versus competency approach in human relations training programs. *Personnel and Guidance Journal* 1979;**58**:91.
537. Rautalinko E, Lisper HO. Effects of training reflective listening in a corporate setting. *Journal of Business and Psychology* 2004;**18**:281–99.
538. Leivo A. Field study of the effects of a self-implemented feedback program on housekeeping performance. *International Journal of Industrial Ergonomics* 2005;**35**:471–85.
539. Green P, Skinner D. Does time management training work? An evaluation. *International Journal of Training and Development* 2005;**9**:124–39.
540. Eden D, Gelter D, Gewirtz A, Gordon-Terner R, Inbar I, Liberman M, et al. Implanting Pygmalion

- leadership style through workshop training: seven field experiments. *Leadership Quarterly* 2000;**11**:171.
541. Jacob BA, Lefgren L. The impact of teacher training on student achievement. *Journal of Human Resources* 2004;**39**:50–79.
542. Yarnall J. Line managers as career developers: rhetoric or reality? *Personnel Review* 1998;**27**:378.
543. Sturges J, Guest D, Conway N, Davey KM. What difference does it make? A longitudinal study of the relationship between career management and organizational commitment in the early years at work. *Academy of Management Proceedings* 2001:B1–B6.
544. Martin G, Pate J, McGoldrick J. Do HRD investment strategies pay? Exploring the relationship between lifelong learning and psychological contracts. *International Journal of Training and Development* 1999;**3**:200.
545. Kossek EE, Roberts K, Fisher S, DeMarr B. Career self-management: a quasi-experimental assessment of the effects of a training intervention. *Personnel Psychology* 1998;**51**:935–62.
546. Sanchez JI, Medkik N. The effects of diversity awareness training on differential treatment. *Group and Organization Management* 2004;**29**:517–36.
547. Schweiger DM, Goulet PK. Facilitating acquisition integration through deep-level cultural learning interventions: a longitudinal field experiment. *Organization Studies* 2005;**26**:1477–99.
548. Tannenbaum SI, Mathieu JE, Salas E, Cannon-Bowers JA. Meeting trainees' expectations: the influence of training fulfillment on the development of commitment, self-efficacy, and motivation. *Journal of Applied Psychology* 1991;**76**:759–69.
549. Saks AM. The relationship between the amount and helpfulness of entry training and work outcomes. *Human Relations* 1996;**49**:429–51.
550. Coyle-Shapiro J. The impact of a TQM intervention on teamwork: a longitudinal assessment. *Employee Relations* 1995;**17**:63–74.
551. Murray B, Raffaele GC. Single-site, results-level evaluation of quality awareness training. *Human Resource Development Quarterly* 1997;**8**:229–45.
552. Carkhuff RR. *The development of human resources*. New York, NY: Holt, Rinehart and Winston; 1971.
553. Smith PC. The development of a method of measuring job satisfaction: the Cornell Studies. In Fleishman EA (ed.). *Studies in personnel and industrial psychology*. Homewood, IL: Dorsey Press; 1967. pp. 335–43.
554. Cook J, Wall T. New work attitude measure of trust, organizational commitment and personal need non-fulfilment. *Journal of Occupational Psychology* 1980;**53**:39–52.
555. Sanchez JI, Brock P. Outcomes of perceived discrimination among Hispanic employees: is diversity management luxury or a necessity? *Academy of Management Journal* 1996;**39**:704–19.
556. Ashford SJ, Lee C, Bobko P. Content, causes, and consequences of job insecurity: a theory-based measure and substantive test. *Academy of Management Journal* 1989;**32**:803–29.
557. Chatterjee S, Lubatkin MH, Schweiger DM, Weber Y. Cultural differences and shareholder value in related mergers: linking equity and human capital. *Strategic Management Journal* 1992;**13**:319–34.
558. Lubatkin M, Schweiger DM, Weber Y. Top management turnover in related M&As: an additional test of the theory of relative standing. *Journal of Management* 1999;**25**:55–67.
559. McIntire SM, Levine EL. Task specific self-esteem: an empirical investigation. *Journal of Vocational Behavior* 1984;**25**:290–303.
560. Lawler EE. *Pay and organizational development*. Reading, MA: Addison-Wesley; 1981.
561. House RJ, Levanoni E, Schuler RS. An empirical examination of the construct validity of the rizzo, house and lirtzman role scales: toward a clarification of the nature of role conflict. Paper presented at the Annual Mid-West Meeting of the Academy of Management, Columbus, OH, 1982.
562. Fairbrother G, Hanson KL, Friedman S, Butts GC. The impact of physician bonuses, enhanced fees, and feedback on childhood immunization coverage rates. *American Journal of Public Health* 1999;**89**:171–75.
563. Petty MM, Singleton B, Connell DW. An experimental evaluation of an organizational incentive plan in the electric utility industry. *Journal of Applied Psychology* 1992;**77**:427–36.
564. Buchko AA. Employee ownership, attitudes, and turnover: an empirical assessment. *Human Relations* 1992;**45**:711–33.
565. Arthur JB, Jelf GS. The effects of gainsharing on grievance rates and absenteeism over time. *Journal of Labor Research* 1999;**20**:133–45.

566. Bhattacharjee D. The effects of group incentives in an Indian firm: evidence from payroll data. *LABOUR: Review of Labour Economics and Industrial Relations* 2005;**19**:147–73.
567. Yukl GA, Latham GP. Consequences of reinforcement schedules and incentive magnitudes for employee performance: problems encountered in an industrial setting. *Journal of Applied Psychology* 1975;**60**:294–8.
568. Begley T, Lee C. The role of negative affectivity in pay-at-risk reactions: a longitudinal study. *Journal of Applied Psychology* 2005;**90**:382–8.
569. Lazear EP. Performance pay and productivity. *American Economic Review* 2000;**90**:1346–61.
570. Brown KA, Huber VL. Lowering floors and raising ceilings: a longitudinal assessment of the effects of an earnings-at-risk plan on pay satisfaction. *Personnel Psychology* 1992;**45**:279–311.
571. Brown S. Dynamic implications of absence behaviour. *Applied Economics* 1994;**26**:1163.
572. Johnston MW, Griffeth RW, Burton S, Carson PP. An exploratory investigation into the relationship between promotion and turnover: a quasi-experimental longitudinal study. *Journal of Management* 1993;**19**:33.
573. Schwarzwald J, Koslowsky M, Shalit B. A field study of employees' attitudes and behaviors after promotion decisions. *Journal of Applied Psychology* 1992;**77**:511–14.
574. Lam SSK, Schaubroeck J. The role of locus of control in reactions to being promoted and to being passed over: a quasi experiment. *Academy of Management Journal* 2000;**43**:66–78.
575. Pergamit MR, Veum JR. What is a promotion? *Industrial and Labor Relations Review* 1999;**52**:581–601.
576. Pritchard RD, Jones SD, Roth PL, Stuebing KK, Ekeberg SE. Effects of group feedback, goal setting, and incentives on organizational productivity. *Journal of Applied Psychology* 1988;**73**:337–58.
577. Pritchard RD, Jones SD, Roth PL, Stuebing KK, Ekeberg SE. The evaluation of an integrated approach to measuring organizational productivity. *Personnel Psychology* 1989;**42**:69–115.
578. Knight D, Durham CC, Locke EA. The relationship of team goals, incentives, and efficacy to strategic risk, tactical implementation, and performance. *Academy of Management Journal* 2001;**44**:326–38.
579. Welbourne TM, Cable DM. Group incentives and pay satisfaction: understanding the relationship through an identity theory perspective. *Human Relations* 1995;**48**:711–26.
580. Heneman HG. Pay satisfaction. *Research in Personnel and Human Resources Management* 1985;**3**:115–39.
581. Rusbult CE, Farrell D. A longitudinal test of the investment model: the impact on job satisfaction, job commitment, and investments. *Journal of Applied Psychology* 1983;**68**:429–38.
582. Quinn R, Shepard L. *The 1973–74 quality of employment survey. Descriptive statistics*. Ann Arbor, MI: Survey Research Center of the Institute for Social Research; 1974.
583. Rusbult CE. Commitment and satisfaction in romantic associations: a test of the investment model. *Journal of Experimental Social Psychology* 1980;**16**:172–86.
584. Asch BJ. Do incentives matter? The case of Navy recruiters. *Industrial and Labor Relations Review* 1990;**43**:89–106.
585. Rosen C, Klein KJ, Young KM. *Employee ownership in America: the equity solution*. Lexington, MA: DC Heath; 1986.
586. Pearce JL, Perry JL. Federal merit pay: a longitudinal analysis. *Public Administration Review* 1983;**43**:315.
587. Pearce JL, Stevenson WB, Perry JL. Managerial compensation based on organizational performance: a time series analysis of the effects of merit pay. *Academy of Management Journal* 1985;**28**:261–78.
588. Kahn LM, Sherer PD. Contingent pay and managerial performance. *Industrial and Labor Relations Review* 1990;**43**:107–20.
589. Heneman HG, Schwab DP. Pay satisfaction: its multidimensional nature and measurement. *International Journal of Psychology* 1985;**20**:129–41.
590. Shaw JD, Gupta N. Pay fairness and employee outcomes: exacerbation and attenuation effects of financial need. *Journal of Occupational and Organizational Psychology* 2001;**74**:299–320.
591. Bluedorn A. A unified model of turnover from organizations. *Human Relations* 1982;**35**:135–53.
592. House R, Rizzo J. Role conflict and ambiguity as critical variables in a model of organizational behavior. *Organizational Behavior and Human Performance* 1972;**7**:467–505.

593. Kanungo RN. Measurement of job and work involvement. *Journal of Applied Psychology* 1982;**67**:341–9.
594. Hoppock R. *Job satisfaction*. New York, NY: Harper; 1935.
595. Seashore SE, Lawler EE III, Mirvis PH, Cammann C. *Assessing organizational change: a guide to methods, measures, and practices*. New York, NY: Wiley; 1983.
596. Schweiger DM, DeNisi A. Communication with employees following a merger: a longitudinal field experiment. *Academy of Management Journal* 1991;**1**:110–35.
597. Hennessey J, Perrewe PL, Hochwarter WA. Impact of benefit awareness on employee and organizational outcomes: a longitudinal field examination. *Benefits Quarterly* 1992;**8**:90–6.
598. Kinnunen U, Mauno S, Natti J, Happonen M. Organizational antecedents and outcomes of job insecurity: a longitudinal study in three organizations in Finland. *Journal of Organizational Behavior* 2000;**21**:443.
599. Cohen S, Kamarck T, Mermelstein R. *Journal of Health and Social Behavior* 1983;**24**:385–96.
600. House JS, Wells JA, Landerman LR, McMichael AJ, Kaplan BH. Occupational stress and health among factory workers. *Journal of Health and Social Behavior* 1979;**20**:139–60.
601. Schweiger DM, Ivancevich JM, Power FR. Executive actions for managing human resources before and after acquisition. *Academy of Management Executive* 1987;**1**:127–38.
602. Greenhalgh L, Rosenblatt Z. Job insecurity: towards conceptual clarity. *Academy of Management Review* 1984;**9**:438–48.
603. Bertera RL. The effects of workplace health promotion on absenteeism and employment costs in a large industrial population. *American Journal of Public Health* 1990;**80**:1101–5.
604. Astrup SJ, McGovern PM, Kochevar LK. The relationship between wellness participation and health care benefit utilization. *Benefits Quarterly* 1992;**8**:41–54.
605. Gilleskie DB, Lutz BF. The impact of employer-provided health insurance on dynamic employment transitions. *Journal of Human Resources* 2002;**37**:129–62.
606. Hammer LB, Neal MB, Newsom JT, Brockwood KJ, Colton CL. A longitudinal study of the effects of dual-earner couples' utilization of family-friendly workplace supports on work and family outcomes. *Journal of Applied Psychology* 2005;**90**:799–810.
607. Netemeyer RG, Boles JS, McMurrian R. Development and validation of work–family conflict and family–work conflict scales. *Journal of Applied Psychology* 1996;**81**:400–10.
608. Coch L, French JRP. Overcoming resistance to change. *Human Relations* 1948;**1**:512–532.
609. Morgeson FP, Campion MA, Maertz CP. Understanding pay satisfaction: the limits of a compensation system implementation. *Journal of Business and Psychology* 2001;**16**:133–50.
610. Kleinbeck U, Fuhrmann H. Effects of a psychologically based management system on work motivation and productivity. *Applied Psychology: An International Review* 2000;**49**:596.
611. Pearson CAL. Participative goal setting as a strategy for improving performance and job satisfaction: a longitudinal evaluation with railway track maintenance gangs. *Human Relations* 1987;**40**:473–88.
612. Pearson CAL. An assessment of extrinsic feedback on participation, role perceptions, motivation, and job satisfaction in a self-managed system for monitoring group achievement. *Human Relations* 1987;**44**:517–37.
613. Kleingeld A, van Tuijl H, Algera JA. Participation in the design of performance management systems: a quasi-experimental field study. *Journal of Organizational Behavior* 2004;**25**:831–51.
614. Lee M, Son B. The effects of appraisal review content on employees' reactions and performance. *International Journal of Human Resource Management* 1998;**9**:203–14.
615. Heneman HG, Schwab DP. Pay satisfaction: its multidimensional nature and measurement. *International Journal of Psychology* 1985;**20**:129–41.
616. Widmeyer WN, Brawley LR, Carron AV. The measurement of cohesion in sport teams: the group-environment questionnaire. London, ON: Sports Dynamics; 1985.
617. Luhtanen R, Crocker J. A collective self-esteem scale: self evaluation of one's social identity. *Personality and Social Psychology Bulletin* 1992;**18**:302–18.
618. Wagner U, Zick A. [Self definition and inter-group relations: The social identity approach]. In Poerzgen B, Witte EH (eds). *Selbstkonzept und Identität*. Braunschweig: Braunschweiger Studien

- zur Erziehung und Sozialwissenschaft; 1993. pp. 109–29.
619. Cammann C, Fichman M, Jenkins GD Jr, Klesh JR. Assessing the attitudes and perceptions of organizational members. In Seashore SE, Lawler EE III, Mirvis PH, Cammann C (eds). *Assessing organizational change: a guide to methods, measures, and practices*. New York, NY: Wiley; 1983. pp. 71–138.
620. Locke EA. Toward a theory of task motivation and incentives. *Organizational Behavior and Human Performance* 1968;**3**:157–89.
621. Reilly RR, Smither JW. A longitudinal study of upward feedback. *Personnel Psychology* 1996;**49**:599–612.
622. Walker AG, Smither JW. A five-year study of upward feedback: what managers do with their results matters. *Personnel Psychology* 1999;**52**:393.
623. Smither JW, London M, Reilly RR, Flautt R, Vargas Y, Kucine I. Discussing multisource feedback with raters and performance improvement. *Journal of Management Development* 2004;**23**:456–68.
624. Kim JS, Hamner WC. Effect of performance feedback and goal setting on productivity and satisfaction in an organizational setting. *Journal of Applied Psychology* 1976;**61**:48–57.
625. Ludwig TD, Geller ES. Assigned versus participative goal setting and response generalization: managing injury control among professional pizza deliverers. *Journal of Applied Psychology* 1997;**8**:253–61.
626. Komaki JL, Collins RL, Penn P. The role of performance antecedents and consequences in work motivation. *Journal of Applied Psychology* 1982;**67**:334–40.
627. Codding RS, Feinberg AB, Dunn EK, Pace GM. Effects of immediate performance feedback on implementation of behaviour support plans. *Journal of Applied Behavior Analysis* 2005;**38**:205–19.
628. Parsons CK, Herold DM, Leatherwood ML. Turnover during initial employment: a longitudinal study of the role of causal attributions. *Journal of Applied Psychology* 1985;**70**:337–41.
629. Arvey RD, Dewhirst HD, Brown EM. A longitudinal study of the impact of changes in goal setting on employee satisfaction. *Personnel Psychology* 1978;**31**:595–608.
630. Ivancevich JM. Effects of goal-setting on performance and job-satisfaction. *Journal of Applied Psychology* 1976;**61**:605–12.
631. Campbell DJ. The effects of goal-contingent payment on the performance of a complex task. *Personnel Psychology* 1984;**37**:23–40.
632. Taylor PJ, Pierce JL. Effects of introducing a performance management system on employees' subsequent attitudes and effort. *Public Personnel Management* 1999;**28**:423.
633. Murray RS. Managerial perceptions of two appraisal systems. *California Management Review* 1981;**23**:92.
634. Westin AF. Two key factors that belong in a macroergonomic analysis of electronic monitoring: employee perceptions of fairness and the climate of organizational trust or distrust. *Applied Ergonomics* 1992;**23**:35–42.
635. Markham SE, Scott KD, McKee GH. Recognizing good attendance: a longitudinal, quasi-experimental field study. *Personnel Psychology* 2002;**55**:639–60.
636. Fellows C, Mawhinney TC. Improving telemarketers' performance in the short-run using operant concepts. *Journal of Business and Psychology* 1997;**11**:411–24.
637. Kinicki AJ, Prussia GE, Bin J, Kee-Ryan FM. A covariance structure analysis of employees' response to performance feedback. *Journal of Applied Psychology* 2004;**89**:1057–69.
638. Porac JF, Nottenburg G, Eggert J. On extending Weiner's attributional model to organizational contexts. *Journal of Applied Psychology* 1981;**66**:124–6.
639. LeBaron CW, Chaney M, Baughman AL, Dini EF, Maes E, Dietz V, et al. Impact of measurement and feedback on vaccination coverage in public clinics, 1988–1994. *Journal of the American Medical Association* 1997;**278**:631–5.
640. Hackman JR, Oldham GR. Development of the Job Diagnostic Survey. *Journal of Applied Psychology* 1975;**60**:158–70.
641. US Department of Labor. *High performance work practices and firm performance*. Washington, DC: US Department of Labor; 1993.
642. Datta DK, Guthrie JP, Wright PM. Human resource management and labor productivity: does industry matter? *Academy of Management Journal* 2005;**48**:135–45.
643. Gittleman M, Horrigan M, Joyce M. "Flexible" workplace practices: evidence from a national representative survey. *Industrial and Labor Relations Review* 1998;**52**:99–115.

644. Barney JB. Firm resources and sustained competitive advantage. *Journal of Management* 1991;**17**:99–120.
645. Rauch A, Frese M, Utsch A. Effects of human capital and long-term human resources development and utilization on employment growth of small-scale businesses: a causal analysis. *Entrepreneurship: Theory and Practice* 2005;**29**:681–98.
646. Delery JE. Issues of fit in strategic human resource management: implications for research. *Human Resource Management Review* 1998;**8**:289–309.
647. Wood SJ, De Menzes L. Comparing perspectives on high involvement management and organizational performance across the British economy. *International Journal of Human Resource Management* 2008;**19**:639–83.
648. Arthur J. The link between business strategy and industrial relations systems in American steel minimills. *Industrial and Labor Relations Review* 1992;**45**:488–506.
649. Freeman RB, Kleiner MM. The last American shoe manufacturers: decreasing productivity and increasing profits in the shift from piece rates to continuous flow production. *Industrial Relations* 2005;**44**:307–30.
650. Shipton H, Fay D, West M, Patterson M, Birdi K. Managing people to promote innovation. *Creativity and Innovation Management* 2005;**14**:118–28.
651. Gomez-Mejia LR. The role of human resources strategy in export performance: a longitudinal study. *Strategic Management Journal* 1988;**9**:493–505.
652. Katz HC, Kochan TA, Gobeille KR. Industrial relations performance, economic performance, and QWL programs: an interplant analysis. *Industrial and Labor Relations Review* 1983;**37**:3–17.
653. Schuster M. The impact of union-management cooperation on productivity and employment. *Industrial and Labor Relations Review* 1983;**36**:415–430.
654. Workman M, Bommer W. Redesigning computer call center work: a longitudinal field experiment. *Journal of Organizational Behavior* 2004;**25**:317–37.
655. Kochan TA, Katz HC, McKersie RB (eds) *The transformation of American industrial relations*. Ithaca, NY: Cornell University Press; 1994.
656. Judge TA, Thoresen CJ, Bono JE, Patton GK. The job satisfaction-job performance relationship: a qualitative and quantitative review. *Psychological Bulletin* 2001;**127**:376–407.
657. Montori VM, Wilczynski NL, Morgan D, Haynes RB. Optimal search strategies for retrieving systematic reviews from Medline: analytical survey. *British Medical Journal* 2005;**330**:68–73.
658. Huque M. Experiences with meta-analysis in NDA submissions. *Proceedings of the Biopharmaceutical Section of the American Statistical Association* 1988;**2**:28–33.
659. Cook D, Sackett D, Spitzer W. Methodologic guidelines for systematic reviews of randomized control trials in health care from the Potsdam Consultation on Meta-analysis. *Journal of Clinical Epidemiology* 1995;**48**:167–71.
660. LaValley M. A consumer's guide to meta-analysis. *Arthritis Care and Research* 1997;**10**:208–13.
661. Geller N, Proschan M. Meta-analysis of clinical trials: a consumer's guide. *Journal of Biopharmaceutical Statistics* 1996;**6**:377–94.
662. Felson D. Bias in meta-analytic research. *Journal of Clinical Epidemiology* 1992;**45**:885–92.
663. CASP. Critical Appraisal Skills Programme. 10 questions to help you make sense of reviews. Oxford: Public Health Resource Unit; 2006.
664. MOOSE Group. Meta-analysis of observational studies in epidemiology: a proposal for reporting. *Journal of the American Medical Association* 2000;**283**:2008–12.
665. Ankem K. Approaches to meta-analysis: a guide for LIS researchers. *Library and Information Science Research* 2005;**27**:164–74.
666. Egger M, Smith GD. Meta-analysis: bias in location and selection of studies. *British Medical Journal* 1998;**316**:61–6.
667. Whitener E. Confusion of confidence intervals and credibility intervals in meta-analysis. *Journal of Applied Psychology* 1990;**75**:315–21.
668. Cohen J. *Statistical power analysis for the behavioral sciences*, 2nd edn. Hillsdale, NJ: Lawrence Erlbaum Associates; 1988.
669. Meyer JP, Stanley DJ, Herscovitch L, Topolnysky L. Affective, continuance and normative commitment to the organization: a meta-analysis of antecedents, correlates and consequences. *Journal of Vocational Behavior* 2002;**61**:20–52.
670. Colquitt JA, Conlon DE, Wesson MJ, Porter CO, Ng KY. Justice at the millennium: a meta-analytic review of 25 years of organizational justice research. *Journal of Applied Psychology* 2001;**86**:425–45.

671. Landy FJ. *Psychology of work behaviour*. Pacific Grove, CA: Brooks/Cole; 1989.
672. Warr P. *Work, happiness, and unhappiness*. London: Laurence Erlbaum Associates; 2007.
673. Carr JZ, Schmidt AM, Ford JK, DeShon RP. Climate perceptions matter: a meta-analytic path analysis relating molar climate, cognitive and affective states, and individual level work outcomes. *Journal of Applied Psychology* 2003;**88**:605–19.
674. Parker CP, Baltes BB, Young SA, Huff JW, Altmann RA, Lacost HA, *et al.* Relationships between psychological climate perceptions and work outcomes: a meta-analytic review. *Journal of Organizational Behaviour* 2003;**24**:389–416.
675. Ostroff C. The effects of climate and personal influences on individual behaviour and attitudes in organizations. *Organizational Behaviour and Human Decision Processes* 1993;**56**:56–90.
676. Jones AP, James LR. Psychological climate: dimensions and relationships of individual and aggregated work environment perceptions. *Organizational Behaviour and Human Performance* 1979;**23**:201–50.
677. Tourangeau AE, Doran DM, McGillis Hall L, O'Brien Pallas L, Pringle D, Tu JV, *et al.* Impact of hospital nursing care on 30-day mortality for acute medical patients. *Journal of Advanced Nursing* 2007;**57**:32–44.
678. Grembowski D, Paschane D, Diehr P, Katon W, Martin D, Patrick DL. Managed care, physician job satisfaction and the quality of primary care. *Journal of General Internal Medicine* 2005;**20**:271–7.
679. McGilton K, Irwin-Robinson H, Boscart V, Spanjevic L. Communication enhancement: nurse and patient satisfaction outcomes in a complex continuing care facility. *Journal of Advanced Nursing* 2006;**54**:35–44.
680. Priebe S, Fakhoury W, White I, Watts J, Bebbington P, Burns T, *et al.* Characteristics of teams, staff and patients: associations with outcomes of patients in assertive outreach. *British Journal of Psychiatry* 2004;**185**:306–11.
681. DiMatteo MR, Sherbourne CD, Hays RD, Ordway L, Kravitz RL, MGLynn EA, *et al.* Physicians' characteristics influence patients' adherence to medical treatment: results from the Medical Outcomes Study. *Health Psychology* 1993;**12**:93–102.
682. Goodell TT, Coding HVE. Outcomes of nurses' job satisfaction. *Journal of Nursing Administration* 1994;**24**:36–41.
683. Schneider B, Hanges PJ, Smith DB, Salvaggio AN. Which comes first: employee attitudes or organizational and financial market performance? *Journal of Applied Psychology* 2003;**88**:836–51.
684. Bernhardt KL, Donthu N, Kennett PA. A longitudinal analysis of satisfaction and profitability. *Journal of Business Research* 2000;**47**:161–71.
685. Koys DJ. The effects of employee satisfaction, organizational citizenship behaviour, and turnover on organizational effectiveness: a unit-level, longitudinal study. *Personnel Psychology* 2001;**54**:101–14.
686. Morrow PC, McElroy JC. Efficiency as a mediator in turnover-organizational performance relations. *Human Relations* 2007;**60**: 827–49.
687. Sparrow P, West M. Psychology and organizational effectiveness. In Robertson IT, Callinan M, Bartram D (eds). *Organizational effectiveness: the role of psychology*. Chichester: John Wiley & Sons; 2002.
688. Robertson A, Gilloran A, McGleew T, McKee K, McInley A, Wight D. Nurses' job satisfaction and the quality of care received by patients in psychogeriatric wards. *International Journal of Geriatric Psychiatry* 1995;**10**:575–84.
689. Leiter MP, Harvie P, Frizzell C. The correspondence of patient satisfaction and nurse burnout. *Social Science and Medicine* 1998;**47**:1611–17.
690. Mayer J, Faber M, Xu X. Seventy-five years of motivation measures (1930–2005): a descriptive analysis. *Motivation and Emotion* 2007;**31**:83–103.
691. Blau G. The measurement and prediction of career commitment. *Journal of Occupational Psychology* 1985;**58**:277–88.
692. Schaufeli WB, Bakker A, Salanova M. The measurement of work engagement with a short questionnaire: a cross-national study. *Educational and Psychological Measurement* 2006;**20**:1–16.
693. Maslach C, Jackson SE. The measurement of experienced burnout. *Journal of Occupational Behaviour* 1981;**2**:99–113.
694. Maslach C, Jackson SE. Burnout in organizational settings. *Applied Social Psychology Annual* 1984;**5**:133–53.
695. Koeske GF, Koeske RD. Construct validity of the Maslach Burnout Inventory: a critical review and reconceptualization. *Journal of Applied Behavioral Science* 1989;**25**:131.

696. Cordes CL, Dougherty TW. A review and an integration of research on job burnout. *Academy of Management Review* 1993;**18**:621–56.
697. Arthur NM. The assessment of burnout: a review of three inventories useful for research and counseling. *Journal of Counseling and Development* 1990;**69**:186–9.
698. Rousseau DM. *Psychological contract inventory technical report* [online]. Pittsburgh, PA. Carnegie Mellon University. URL: www.andrew.cmu.edu/user/rousseau/0_reports/PCI.pdf (accessed 21 November 2007).
699. Gilliland SW. The perceived fairness of selection systems: an organizational justice perspective. *Academy of Management Review* 1993;**18**:694–734.
700. Niehoff BP, Moorman RH. Justice as a mediator of the relationship between methods of monitoring and organizational citizenship behaviour. *Academy of Management Journal* 1993;**36**:527–56.
701. Hofman DA, Mark B. An investigation of the relationship between safety climate and medication errors as well as other nurse and patient outcomes. *Personnel Psychology* 2006;**59**:847–69.
702. Katz-Navon T, Naveh E, Stern Z. Safety climate in health care organizations: a multidimensional approach. *Academy of Management Journal* 2005;**48**:1075–89.
703. Flin R, Burns C, Mearns K, Yule S, Robinson EM. Measuring safety climate in health care. *Quality and Safety in Healthcare* 2006;**15**:109–15.
704. Sorra J, Nieva VF. Safety culture assessment: a tool for improving patient safety in health care organizations. *Quality and Safety in Health Care* 2003;**12**(Suppl. 2):17–23.
705. Marchington M, Zagelmeyer S. Linking HRM and performance – a never-ending search? *Human Resource Management Journal* 2005;**15**:3–8.
706. CIPD *Performance through people: the new people management. Postal survey report 2001*. URL: www.cipd.co.uk/subjects/corpsrtgty/busiperfm/perfthrpeo.htm (accessed 20 December 2007).
707. West MA, Guthrie JP, Dawson JF, Borrill CS, Carter MR. Reducing patient mortality in hospitals: the role of human resource management. *Journal of Organizational Behavior* 2006;**27**:983–1002.
708. Walton RE. From ‘control’ to ‘commitment’ in the workplace. *Harvard Business Review* 1985;**63**:77–84.
709. Birdi K, Clegg C, Patterson MG, Robinson A, Stride C, Wall T, *et al.* The impact of human resource and operational management practices on company productivity: a longitudinal study. *Personnel Psychology* 2008;**61**:467–501.
710. Iles V, Sutherland K. *Managing change in the NHS: organisational change, a review for health care managers, professionals and researchers*. London: SDO; 2001.
711. Godard J, Delaney JT. Reflections on the “high performance” paradigm’s implications for industrial relations. *Industrial and Labor Relations Review* 2000;**53**:482–502.
712. Wood S, Wall T. Human resource management and business performance. In Warr P (ed.). *The Psychology of Work*. Harmondsworth, UK: Penguin; 2002. pp. 351–74.
713. De Menezes LM, Wood S. *The reality of flexible work Systems in the UK*. London: Cass Business School; 2003.
714. Wright MA, Gardner TM. The human resource–firm performance relationship: methodological and theoretical challenges. In Holman D, Wall TD, Clegg CW, Sparrow P, Howard A (eds). *The new workplace: a guide to the human impact of modern working practices*. London: Wiley; 2003. pp. 271–90.
715. Department of Health. *Mental Health Information Strategy*. London: Department of Health; 2001.
716. Bartram D. *Review of personality assessment instruments (Level B) for use in occupational settings*. Leicester: British Psychological Society; 1995.
717. Michaels JA, Booth A. Pragmatic system for the grading of evidence and recommendations in clinical guidelines. *Journal of Clinical Excellence* 2001;**3**:139–43.
718. Woolf SH, Battista RN, Anderson GM, Logan AG, Wang E. Assessing the clinical effectiveness of preventive maneuvers: analytic principles and systematic methods in reviewing evidence and developing clinical practice recommendations. A report by the Canadian Task Force on Periodic Health Examination. *Journal of Clinical Epidemiology* 1990;**43**:891–905.
719. Sackett DL. Rules of evidence and clinical recommendations. *Canadian Journal of Cardiology* 1993;**9**:487–9.
720. Harris RP, Helfand M, Woolf SH, Lohr KN, Mulrow SM, Teutsch SM, *et al.* Current methods of the third US Preventive Services Task Force. *American Journal of Preventive Medicine* 2001;**20**(Suppl. 3): 21–35.
721. Guyatt G, Drummond R. *Users’ guide to the medical literature: essentials of evidence-based clinical practice*. Chicago, IL: AMA Press; 2001.

722. Muir Gray J. *Evidence-based healthcare*. Edinburgh: Churchill-Livingstone; 2001.
723. Easterby-Smith M, Thorpe R, Lowe A. *Management research: an introduction*. London: Sage; 1991.
724. Popay J, Rogers A, Williams G. Rationale and standards for the systematic review of qualitative literature in health services research. *Qualitative Health Research* 1998;**8**:341–51.
725. Oxman A. Systematic reviews: checklists for review articles. *British Medical Journal* 1994;**309**:648–51.
726. Goldstein IL. *Training in organizations*, 3rd edn. Pacific Grove, CA: Brooks-Cole; 1993.
727. Gerhart B, Milkovich GT. Employee compensation: research and practice. In Dunnette MD, Hough LM (eds). *Handbook of industrial and organizational psychology*, Vol. 3, 2nd edn. Palo Alto, CA: Consulting Psychologists Press; 1992. pp. 484–569.
728. Hartin W. Employment law. *Corporate Management* 1994;**46**:75–6.
729. Work and family. *Government Perspective* 1994;**6**:2.
730. Bakker T. *Doing well by doing good: the bottom line on workplace practices*. Washington, DC: Economic Policy Institute; 1999.
731. Delaney JT, Goddard J. An industrial relations perspective on the high-performance paradigm. *Human Resource Management Review* 2001;**11**:395–429.
732. Van Buren ME, Werner JM. High performance work systems. *Business and Economics Review* 1996;**12**: 15–22.
733. Egger M, Smith GD, Phillips AN. Meta-analysis: principles and procedures. *British Medical Journal* 1997;**315**:1533–37.
734. Higgins J, Thompson SG, Deeks JJ, Altman DG. Measuring inconsistency in meta-analysis. *British Medical Journal* 2003;**32**: 557–60.
735. Hardy R, Thompson S. Detecting and describing heterogeneity in meta-analysis. *Statistics in Medicine* 1998;**17**:841–56.
736. Hunter J, Schmidt F. *Methods of meta-analysis: correcting error and bias in research findings*. Beverley Hills, CA: Sage; 1990.
737. Hunter J, Schmidt F, Jackson G. *Meta-analysis: cumulating research findings across studies*. Beverley Hills, CA: Sage; 1982.
738. Judge TA, Ilies R. Relationship of personality to performance motivation: a meta-analytic review. *Journal of Applied Psychology* 2002;**87**:797–807.
739. Faragher EB, Cass M, Cooper CL. The relationship between job satisfaction and health: a meta-analysis. *Occupational and Environmental Medicine* 2005;**62**:105–12.
740. Hellman CM. Job satisfaction and intent to leave. *Journal of Social Psychology* 1997;**137**:677–89.
741. Brown SP, Peterson RA. Antecedents and consequences of salesperson job satisfaction: meta-analysis and assessment of causal effects. *Journal of Marketing Research* 1993;**30**:63–77.
742. Blegen MA. Nurses' job satisfaction: a meta-analysis of related variables. *Nursing Research* 1993;**42**:36–41.
743. Witt LA, Nye LG. Gender and the relationship between perceived fairness of pay or promotion and job satisfaction. *Journal of Applied Psychology* 1992;**77**:910–17.
744. Dalal RS. A meta-analysis of the relationship between organizational citizenship behavior and counterproductive work behavior. *Journal of Applied Psychology* 2005;**90**:1241–55.
745. LePine JA, Erez A, Johnson DE. The nature and dimensionality of organizational citizenship behavior: a critical review and meta-analysis. *Journal of Applied Psychology* 2002;**87**:52–65.
746. Harter JK, Schmidt FL, Hayes TL. Business-unit-level relationship between employee satisfaction, employee engagement, and business outcomes: a meta-analysis. *Journal of Applied Psychology* 2002;**87**:268–79.
747. Carsten JM, Spector PE. Unemployment, job satisfaction, and employee turnover: a meta-analytic test of the Muchinsky model. *Journal of Applied Psychology* 1987;**72**:374–81.
748. Irvine DM, Evans MG. Job satisfaction and turnover among nurses: integrating research findings across studies. *Nursing Research* 1995;**44**:246–53.
749. Tett RP, Meyer JP. Job satisfaction, organizational commitment, turnover intention, and turnover: path analyses based on meta-analytic findings. *Personnel Psychology* 1993;**46**:259–93.
750. Farrell D, Stamm CL. Meta-analysis of the correlates of employee absence. *Human Relations* 1988;**41**:211–27.
751. Petty MM, McGee GW, Cavender JW. A meta-analysis of the relationships between individual job

- satisfaction and individual performance. *Academy of Management Review* 1984;**9**:712–21.
752. Steel RP, Ovalle NK. A review and meta-analysis of research on the relationship between behavioral intentions and employee turnover. *Journal of Applied Psychology* 1984;**69**:673–86.
753. Scott KD, Taylor GS. An examination of conflicting findings on the relationship between job satisfaction and absenteeism: a meta-analysis. *Academy of Management Journal* 1985;**28**:599–612.
754. Cooper-Hakim A, Viswesvaran C, Cooper-Hakim A, Viswesvaran C. The construct of work commitment: testing an integrative framework. *Psychological Bulletin* 2005;**131**:241–59.
755. Colquitt JA, Lepine JA, Noe RA. Toward an integrative theory of training motivation: a meta-analytic path analysis of 20 years of research. *Journal of Applied Psychology* 2000;**85**:678–707.
756. Cohen A, Gattiker UE. Rewards and organizational commitment across structural characteristics: a meta-analysis. *Journal of Business and Psychology* 1994;**9**:137–57.
757. Cohen A, Hudecek N. Organizational commitment–turnover relationship across occupational groups: a meta-analysis. *Group and Organization Management* 1993;**18**:188–213.
758. Cohen A. Career stage as a moderator of the relationships between organizational commitment and its outcomes: a meta-analysis. *Journal of Occupational Psychology* 1991;**64**:253–68.
759. Mathieu JE, Zajac DM. A review and meta-analysis of the antecedents, correlates, and consequences of organizational commitment. *Psychological Bulletin* 1990;**108**:171–94.
760. Randall DM. The consequences of organizational commitment: methodological investigation. *Journal of Organizational Behavior* 1990;**11**:361–78.
761. Ferris KR, Aranya N. A comparison of two organizational commitment scales. *Personnel Psychology* 1983;**36**:87–98.
762. Meyer JP, Allen NJ. Commitment in the workplace: theory, research and application. Thousand Oaks, CA: Sage Publications; 1997.
763. Meyer JP, Allen NJ, Smith CA. Commitment to organizations and occupations: extension and test of a three-component conceptualization. *Journal of Applied Psychology* 1993;**78**:538–51.
764. Wright TA, Bonett DG. The moderating effects of employee tenure on the relation between organizational commitment and job performance: a meta-analysis. *Journal of Applied Psychology* 2002;**87**:1183–90.
765. Ricketta M. Attitudinal organizational commitment and job performance: a meta-analysis. *Journal of Organizational Behavior* 2002;**23**:257–66.
766. Melchior ME, Bours GJ, Schmitz P, Wittich Y. Burnout in psychiatric nursing: a meta-analysis of related variables. *Journal of Psychiatric and Mental Health Nursing* 1997;**4**:193–201.
767. Rosenthal R. *Meta-analytic procedures for social research* (revised edition). Newbury Park, CA: Sage; 1991.

Appendix I

Taken from original proposal to NCCSDO

Introduction

The research will be conducted by a team from the University of Sheffield, based at The Institute of Work Psychology (IWP) and the School of Health and Related Research (ScHARR): Malcolm Patterson, Jo Rick, Stephen Wood, Andrew Booth, Tony Smith, Malcolm Whitfield and two research associates. In line with the invitation to tender (ITT), a panel of around eight expert advisers will be recruited. The proposed project seeks to maximise the strengths of the two Institutes and to build particularly on the strong contribution that the IWP has made to the human resource management (HRM) field, empirically and theoretically, and ScHARR and Jo Rick have made to the development of systematic literature reviewing generally and particularly in the medical and health-related areas. The research design aims to achieve the objective of delivering a critical review of the evidence for the validity and reliability of measures of HRM, through an examination of the five objectives outlined in the tender document.

This section sets out the following:

- the research context and background to the study, including policy relevance and related research
- our understanding of the aims and objectives of the research and the associated research issues
- our proposed methodological approach and analytic methods to be used
- our proposed timetable for the research and the outputs we would produce from the research.

Background to the study

Appropriate HRM policies and practices are widely seen as vital if the NHS is to change the process of health care and improve outcomes for patients. The key issue is to identify what are appropriate, and the evidence on which this can be based. The Department of Health statement and the NHS's Modernisation Agency have repeatedly stressed the vital role of human resources, skill development, involvement, teamworking and

morale to the modernisation of the NHS and its models of patient care such as Protocol Based Care (NHS Modernisation Agency 2003). In the words of the Department of Health's website 'Successful human resources management improves efficiency through a culture that supports and develops its staff, allowing the workforce to share in the organisation's objectives'.

The desire to base the modernisation on evidence is confirmed by the Department's attempt to support its overall orientation with research findings. It thus, for example, offers the finding that patient mortality rates improve in acute hospitals where an HR director is on the Trust Board in support of its view that 'Human resources management is vital to the NHS'. In this way, the Department of Health and associated bodies are mirroring the more general emphasis on employee development and empowerment as the key to maximising the human resource's contribution to strategic objectives of organisations. It is this human capital approach to HRM that has been at the centre of the literature on HRM in the past decade. In the light of the centrality given it in the tender document, it will form the fulcrum of our research. First it will be a core part of the literature reviewed and it will form the starting point for identifying the other literatures and avenues that we need to include in the review. For example, the core of the HRM performance literature focuses on aggregates of practices, but we will need to extend to that which looks at single practices, for example payment systems.

In some overviews^{29,646,711,712} of the HRM performance literature there has been a stress on how the research is demonstrating a link between human capital approach and key organisational outcomes. If the evidence were perhaps as strong as these reviews or the authors of some individual studies might suggest, there would be little need for this research project. The studies are not so homogeneous, consistent in their results or without methodological weaknesses for us to conclude this. Indeed several recent reviews²⁹ have questioned the evenness of the results and highlighted the methodological issues in this area. The implication is that the field is young and there is a need to

take stock of the work so far before a further big investment is made in the area and particularly if the general models are to be considered in the under-researched service sectors like health care. The core background factors to this application are then (1) the salience being given to HRM as a major determinant of organisational performance; (2) the conclusions that research is supporting a link between HRM and performance; while, on the other hand (3), that there is a questioning of the homogeneity and robustness of the research evidence; and (4) the timeliness of taking a broad-ranging stock-take of the HRM field and its implications for health-care policy. We shall now expand on each of these factors.

The salience given to HRM in both health care and as a universal model

The key background to the study is then the growing attention over the past 20 years to HRM as a major contributor to organisation performance, even in capital or technological intensive industries. It is assumed to contribute both in its own right and as a support for such other modern management practices as total quality management and just-in-time (JIT). So, in the health context HRM adds to the human capital of the workforce and helps support new modes of organisation, technology and patient delivery. Its importance derives from an assumption that some forms of personnel management have greater effects on the development, skills and motivation of employees than others. Forms that are thought to have such effects, as the tender specification acknowledges, are indeed often labelled HRM. Alternative labels are the human capital, high-commitment, high-involvement and high-performance approaches. For ease of presentation we shall refer to the specific model as the high-involvement model and use HRM when a potentially more all-embracing concept of personnel management is being referred to.

Much of the attention given to the high-involvement or -commitment HRM system has been advocacy. Contrasting it with a traditional Taylorist or Fordist approach, academics (e.g. Pfeffer,² Kochan and Osterman,³ Walton¹) have been at the forefront of publicising high-involvement management as a progressive form of management that can remove past restrictions to economic efficiency and achieve high-quality performance, and thus sharpen the competitive edge of Western organisations and improve public sector delivery. The argument is that there is a unique set of practices or approach to management

that will, regardless of the context, outperform all others, either eternally or at this particular historical conjuncture. Outside of the human resource (HR) and organisational behaviour arenas, in the strategy literature, the resource-based theory of the firm^{5,6} has also highlighted the way in which human resources and the knowledge embodied in them may be decisive for the long-term competitive advantage of firms, while in the operations management literature⁷⁻¹⁰ the emphasis is on how HR practices and the knowledge and skills of workers are decisive for the successful exploitation of lean production¹¹ and other modern management methods (see, for example, Dean and Bowen¹² on total quality management).

Research supports the core thesis

The second background factor is the widely expressed view that the main research studies in the HRM area have confirmed that high-involvement management does positively affect organisational performance. The basic hypothesis that underlies much of this work is that: *high-involvement HR systems will have positive effects on organisational performance*. As academics have sort to move beyond advocacy of high-involvement systems, they have focused on testing this hypothesis. A spate of research studies in the 1990s were motivated by this. Many concluded that high-involvement HR systems do perform best.¹³⁻²⁰ Several overviews of the studies^{21,22} concluded on the basis of the first few studies that the universalistic hypothesis is supported. The increasing use of the term 'high-performance' model to describe the set of practices might be seen as implying that the matter is indeed settled, much as a drug might be named by the disease it is known to cure. Overviews have tended to present the studies in a rather homogeneous way, largely assuming that it can be taken for granted they have been studying the same phenomenon and the results are broadly the same. These reviews have led to the conclusion that the main issue now is to explain the link between high-involvement management performance, i.e. assess the mechanisms between them or get inside the black box between the system and the outcome. A second issue might be the extent to which the link will be found in all contexts, and particularly in service industries such as health care. The majority of the early studies were in manufacturing, and it is significant that one of the few early studies in services²⁴ found evidence of a contingent relationship between the human capital approach and performance. In the past few years there have been more studies that have either been in the service sector or included it in their study^{15,25-27} and

the results have been mixed. Studies specifically on health care are emerging. For example, West *et al.*'s study²⁸ has investigated the link between HRM and patient mortality.

The debate is far from over

A third background to the study is the increasing realisation that the portrayal of the studies as providing conclusive evidence for a universal link between HRM and performance is premature, and that there is a clear need to delve more deeply both in to the studies and the reality of high-involvement management and its links to other aspects and methods of management. The reviews so far have not used the systematic review methods we propose to adopt, hence the timeliness of the project.

There are eight reasons for extending the debate:

1. The results of the various studies are neither as clear-cut nor as uniform as some have concluded (see Wood²⁹ and particularly his table 1 for summary of the main results). Within studies, there is unevenness in the findings between performance measures. While some results point to universal effects, others do not. Moreover, in many studies only the universal hypothesis has been tested, so one cannot rule out the contingency argument that the effects of high-involvement management on performance are contingent on a third factor, either a dimension of the context or the strategy of the organisation, even when a positive link between high-performance management and performance has been found.
2. A variety of other hypotheses have been tested, including the contingency hypotheses that high-involvement management works best when used in conjunction with other quality or lean practices. The results of these in some cases question the universal thesis.
3. There is considerable variability across studies in the practices included either in the model of high-involvement management or the set of practices used to test its link to performance. Some of the differences are terminological, perhaps reflecting disciplinary biases or a quest to differentiate one's wares. But a core difference within the literature can be identified. On the one hand are those who see the core of high-involvement management as changes in work organisation, job design and employee involvement methods (and particularly idea capturing) with the other practices as supports to help motivate and equip people to work in a new more flexible and proactive way. On the other hand are those who do not prioritise the task system but treat high-involvement management as entailing the use of the whole gamut of sophisticated personnel management methods and conceive them as primarily operating through people's commitment and sense of whether they are being treated fairly and consistent with their psychological contract. The two approaches need not affect greatly the practices researchers include in their studies, but the first would not treat them in an undifferentiated way. Nonetheless, the inclusion of job design and work organisation practices is one major source of diversity between the studies. The other is incentive systems with some studies treating them as part of high-involvement management or at least performance management, others as contradicting it.
4. The vast majority of studies are based on reported use of a practice and do not assess its effectiveness or differentiate between its mere existence and its effective implementation. For example, appraisals may be conducted but the extent to which they are done well or whether they are mainly for control or payment purposes rather than development or employee involvement purposes is not considered.
5. It is not always clear whether high involvement or performance management is being defined simply as the combined use of the best practice in each domain of human resources, a synergistic set of practices, or by a more fundamental managerial orientation.⁷¹³ In fact the discussion so far has begged the question of how we define and identify a system. Most studies have defined an HR system a priori, often with little theoretical justification, as the emphasis has been on testing the high involvement–performance link rather than first investigating the relationship between practices or the nature of any systems. Researchers have measured HRM on the basis of differentiating organisations by their usage of a set of practices, the precise means varying between studies. They then correlate the measure with performance measures. The problem of simply aggregating practices to provide an overall measure is that each practice is treated implicitly as if it were equally important. With only a few exceptions (e.g. Patterson *et al.*³³ forthcoming), studies have provided insufficient information about which individual

- or subset of practices has the strongest effects and which may be marginal or even irrelevant. In one case¹³ where this was done and it was shown that only some of the practices affect performance, and, moreover, that their strength varied between industrial context, the authors still framed their conclusions in terms of an overall (high-performance work) system yielding superior performance. Aggregating practices does not allow one to test whether the effects are synergistic and begs the question of whether the pattern of association between practice use reflects a single underlying orientation [which, in statistical terms, would be implied if a one-factor model could be fitted to the data (see, for example, Wood and de Menezes²⁶ and Wood²⁹].
6. Despite the differences in focus and measures, most of the studies share a basic research design, which has a number of weaknesses. These include:
 - i. The use of cross-sectional designs – limiting causal inference (i.e. do HRM practices promote performance, or does better performance encourage greater investment in HRM?).
 - ii. Reliance on a single data source (e.g. CEO or HRM Director) for information on HRM practices and performance – resulting in measures of unknown reliability and susceptible to common-method bias (see, for example, the debate between Huselid and Becker⁴² and Gerhart *et al.*⁴³ on the reliability of measures based on single respondents).
 - iii. Many but not all include small samples, low response rates and a concentration on a limited range of sectors – limiting generalisability.
 7. There has been insufficient theoretical discussion or empirical exploration of the mechanisms or intervening variables that might explain any link between HRM and performance. Labels such as high commitment and involvement imply certain mechanisms that are concerned with the extent to commitment or engagement on the part of the work force, which is mirrored in the importance given to morale in statements about the modernisation of health care. Much of the theoretical justification that precedes the empirical studies, however, implies that skills, knowledge and learning might be as important, independent of attitude change. While some studies have sought to include intervening variables these have either centred

on intermediate HR outcomes (e.g. labour turnover in Huselid¹⁸) or concentrated on commitment and satisfaction (e.g. Patterson *et al.*,³⁶ Wright *et al.*³⁷). Several authors hint at, but do not explore in depth, other mechanisms, for example Guest and Conway³⁸ imply procedural justice. The emphasis in statements on the modernisation of health care, in addition to morale and staff development, is on achieving what might be termed the strategic integration of individuals into the organisation so that they both understand and share the goals that achieving patient care entail and consequently orientate their behaviour towards common visions. Studies outside the narrow confines of the HRM studies, particularly building on the job redesign and lean production literature, point to the importance of the kinds of attitudes that advocates of total quality management and other modern management methods highlight, for example quality consciousness (e.g. Peccei and Wood³⁹) continuous improvement orientation (Coyle-Shapiro⁴⁰) or flexible work orientation (Parker *et al.*⁴¹).

8. The majority of studies have concentrated on a narrow range of HRM practices in isolation, the exception being those that have included TQM in their analysis (e.g. MacDuffie,²⁰ Patterson *et al.*,³³ de Menezes and Wood⁷¹³), but there is a general failure to assess the effectiveness of HRM and related practices relative to both other key elements of management such as leadership and practices further afield, such as R&D expenditure.

Taking stock of the HRM performance area

The fourth background factor is the clear need to appraise the area in depth prior to developing further studies. Despite the diversity in the studies and the limitations of their methodology, the studies thus far have provided a foundation from which broader and more methodologically appropriate studies can be designed. There is sufficient promise in the body of evidence to consider major investments in the area. However, it is timely to invest in detailed assessment of what we know and can take from the studies so far. If an exercise is treated as the foundation for both good HRM practice and the next stage of research, it will need, however, to go beyond simply assessing the studies. As we have implied, they have been limited. Assessing their precise limits will be part of the analysis of them. But, as we have implied, some of the limits are clear:

1. The focus has been on the practices–performance link to the neglect of both theoretical discussion and research on the nature of the association between the practices.
2. The mechanisms or intervening variables that might explain any links have been insufficiently explored, theoretically or empirically, and what discussion there has been has been limited.
3. The precise performance variables that one would expect particular HR practices to have been linked to have not been spelt out.
4. Research studies have not tended to be designed to test multiple competing hypotheses.
5. How the high-involvement management model links to other elements of management practice and theory and particularly leadership corporate governance has been neglected.

In order to overcome these weaknesses any taking-stock exercise should be broad ranging, well beyond the narrow confines of the recent HRM performance studies. There is also a need to examine in more depth the applicability of practices to all settings and how they may have to be adapted in specific service organisations. Health care provides an excellent example to aid this.

The importance for policy of finding out if there is a link between a given model of HRM and performance is self-evident. But the above implies that the key issues are: is any relationship general or specific? Is it an underlying orientation towards development and involvement or is it certain key practices that is key? If the latter, are there a few critical ingredients or is there a holistic set that react together synergistically? Is HRM largely a support for operational practices? If there is a link, which are the key performance measures that are most affected by HRM? And, above all, why and what are the mediating variables? If the crucial thing is internal consistency between practices and ensuring policy is realised through them, is HRM simply one of a number bundle that works, as the configuration approach implies? In the health-care case, the additional question is the extent to which ideas like lean production can be readily translated to the health-care context, and where there has been a conscious attempt how successful has it been. All these issues are entailed in the five objectives of the study as proposed in the tender document.

Research objectives and issues

The next section (Objectives for the research) considers each of the research objectives and

the likely literature available to provide relevant evidence. We then consider the main research issues and associated implications for the design of the methodology.

Objectives for the research

This research aims to deliver an up-to-date, comprehensive and authoritative critical review of scientific evidence in relation to the reliability and validity of measures of HRM. Specifically, the research comprises the following five subsections for which the research must make explicit the evidence in order to achieve its objectives.

Describe HRM methods and measure the fidelity with which they may be implemented (Objective 1)

We understand this objective of the research is concerned with identifying the main methods of HRM, how widespread is their use, the fidelity with which they are implemented (i.e. the degree to which HRM policy is put into practice), and how that fidelity can be assessed. This is potentially a very wide literature with different approaches to the definition and measurement of specific HRM methods. The implications for this research are discussed below (see The scale of the relevant literature).

Review the reliability of measures of particular intermediate outcomes (intended outcomes of HRM that may effect patient care indirectly, e.g. morale, absences from work, stress) (Objective 2)

We understand this research objective is concerned with the robustness and utility of measures of a number of intermediate outcomes, i.e. the results of HRM methods that can impact on patient care. Such an exercise inevitably involves the cataloguing of intermediate outcomes. These are likely to be wide-ranging and, in some instances (e.g. stress measures), command a substantial literature in their own right. Additionally, as we have argued above, we will consider as broad a range of intermediate variables are possible. We extend from the current concern with commitment and involvement to other individual-level outcomes, such as stress, morale and procedural fairness, as well as newer 'outcomes', such as proactivity. Clearly, dealing with such a potentially vast and uneven literature and deciding what it is feasible, pragmatic and desirable to include in relation to the current study has major implications for the research methodology and these are discussed below (see The state of the relevant literature).

Review of the literature on the correlation of intermediate outcomes to each other (Objective 3)

We understand this objective of the research to be concerned with establishing the extent to which individual measures of intermediate outcomes contribute unique information. An important issue to note here is that whilst the general literature may indicate a high degree of correlation between certain intermediate outcome measures, it is possible that these measures will behave differently when considered in relation to specific HRM methods or final outcomes (relevant to research Objectives 4 and 5).

Interrogation of the literature investigating the correlation of intermediate outcomes with final outcomes (be these business or patient centred) (Objective 4)

We understand this objective of the research to require evidence on two levels:

- the correlation (i.e. level of association) between the presence of certain intermediate outcomes (e.g. improvements in morale) and the presence of certain final outcomes (e.g. improvements in clinical quality standards), and, where possible,
- evidence of a causal link between intermediate outcomes and final outcomes (i.e. evidence that improvements in morale led to improved clinical quality standards).

Some evidence exists (of a cross-sectional nature) that demonstrates associations between, for example, job satisfaction (intermediate outcome) or self-reported stress (intermediate outcome) and organisational performance (final outcome). However, limited evidence about the impact of both types of outcome can be drawn from cross-sectional studies. The research concerned with cause and effect is likely to be a relatively small literature with only a limited number of studies of a longitudinal design and sufficiently robust as to demonstrate the intermediate–final outcome link causally.

The issues for the research to address are thus:

- how to ensure that all such longitudinal research is identified, and
- how to clearly distinguish the level of evidence identified and the type of conclusions that can be drawn in the report.

See below (The scale of the relevant literature) for a description of our proposed approach to rating the evidence on quality criteria and the conclusions that can be drawn from different types of evidence.

Investigation of the sensitivity of intermediate outcomes to individual HRM methods alone or in conjunction with each other (Objective 5)

As with Objective 4 of the research, we understand this element of the study to be concerned with evidence both of the association between the presence of HRM methods and intermediate outcomes, as well as with evidence of any causal link between changes in HRM methods and intermediate outcomes. That is the extent to which there is evidence that, for example, changes in HRM practices cause reductions in self-reported stress. As for the previous subsection of the research, there is a large body of cross-sectional research detailing evidence of the co-existence of specific HRM methods and intermediate outcomes. However, research of the type that can provide evidence of the extent to which HRM methods bring about specific intermediate outcomes is much more limited and likely to amount to only a few studies in total. Once again, the same implications for the research are identified and these are discussed more fully below (see The scale of the relevant literature).

Research issues and methodological solutions

Thinking through the research objectives in the ITT there are a number of technical and scientific issues that this research will need to overcome:

- nature of evidence sought
- scale of the relevant literature
- state of the relevant literature
- ensuring work is free from bias.

Each of these research issues is discussed in turn and the implications for the design of the methodology are highlighted.

The nature of the evidence sought

The five inter-related objectives of this project call for a comprehensive review of the literature in relation to a number of different questions. Answering the research questions posed in the ITT demands evaluations of different types of evidence from different sources. *Table 62* summarises the information/evidence needs for all five subsections of the research.

TABLE 62 *The information needs*

Research subsection	Source of information
Types of HRM methods	Project team, expert advisor panel, interviewees, literature search
Fidelity with which implemented	Project team, expert advisor panel, interviewees, literature search
Types of intermediate outcomes	Project team, expert advisor panel, interviewees, literature search
Reliability and validity of intermediate outcome measures	Expert advisor panel, systematic review
Evidence for the impact of HRM methods on intermediate outcomes	Expert advisor panel, systematic review
<i>Types of final outcome</i>	<i>Project team, expert advisor panel, interviewees, literature search</i>
<i>Reliability and validity of measures of final outcome if appropriate</i>	<i>Expert advisor panel, systematic review</i>
Evidence for the impact of intermediate outcomes on final outcomes	Expert advisor panel, systematic review

Italics indicate that an awareness of the issues in these areas is implicit, if not specified in the tender document.

The range of evidence needs has several implications for the research design:

- a process that keeps the review firmly focused on the research objectives
- clear and efficient strategies for identifying relevant evidence within the literature
- clear rationale for including or excluding studies from the review
- clarification about the type of evidence being drawn into the analysis and the conclusions that can be drawn.

The scale of the relevant literature

The scale of the literature pertaining to this study is immense. Searches on a single database for the term 'HRM and performance' alone would typically produce in excess of 500 peer-reviewed references. The grey literature (i.e. relevant articles that have not undergone a peer review process, or individual case studies) may also be significant.

Additionally, many of the relevant intermediate outcomes for this research (e.g. stress, job satisfaction, morale) command extensive literatures in their own right. A search on the relevant databases for each intermediate outcome area would be likely to generate a list of references, in some cases, reaching the thousands. For example, a recent review of Psychosocial Hazard (Stressor) Measures,⁴⁹ which looked specifically at the reliability and validity of measures of stress, identified in excess of 3000 original sources of potential relevance, which, when checked against criteria for content, elicited in excess of 150 usable articles.

One potential strategy for dealing with the scale of the literature, as recommended in the ITT, is the use of existing systematic reviews of the literature. Where they exist, we will seek to use such sources; however, it is inevitable that in some areas there will be no such reviews, or that they will be out of date or of poor quality and it will be necessary to resort to original sources. A key requirement of the methodology for this research, therefore, is the need for expertise in the most sophisticated systems for data retrieval and synthesis of evidence.

A further consideration in dealing with a literature of this scale is to have sophisticated and transparent rationale for the scoping and targeting of content relevant literature. In order to deliver this we propose to use an approach based on the medical model of systematic reviews,^{49,50} which members of the team have successfully used in similar previous studies. Implicit in the proposed approach is the use of a standard proforma to apply relevance criteria to each potential source of evidence. This is an efficient and reliable method of rapidly identifying the most important articles from a large body of literature. The approach is described fully in the methodology (see Methodological approach, below).

The state of the relevant literature

The literature relating to the research objectives, particularly Objectives 2–5, is likely to be very uneven in terms of size, depth, availability of reviews and type of questions covered. For example, in certain areas, recent, comprehensive systematic reviews of the reliability of intermediate outcomes measures (Objective 2) exist (e.g. Stressor

measures, Rick *et al.*⁵⁰). Equally, cross-sectional studies reporting on the presence of specific HRM practices, such as job design or training, and intermediate outcomes, such as job satisfaction, are relatively plentiful (Objective 5). In contrast, longitudinal studies demonstrating causality between, for example, organisational commitment and final outcomes, such as, for example labour productivity, are relatively scarce (Objective 4) as would be studies of specific HRM practices and 'new' intermediate outcomes such as proactivity (Objective 5).

A further consideration here is that, dependent on the availability of evidence, the research subsections call for the comparison of very different types of evidence. For example, the methodology will need to make consistent comparisons across systematic reviews, meta-analyses, traditional reviews, empirical peer-reviewed articles, case studies and grey literature. A further complication inherent in the nature of HRM research is that the approaches often combine very different types of data. For example, studies show the use of different measures of individual HRM practices, variation in HRM system composition across studies, variation in the techniques researchers use to combine HRM practices into coherent groups, different levels of analysis (e.g. HRM and organisational performance data at workplace, business and corporate level, and intermediate data at individual and organisational level) and a combination of objective and self-report measures of, for example, performance (Wall and Wood;⁷¹² Wright and Gardner⁷¹⁴).

In order to ensure consistency in approach when comparing such different types of evidence and data, we will develop a system for recording the various types of research design, types of data collected and the quantity of data identified in each source of evidence. This will be based on existing classifications, but be tailored to the issues and complexities of the HRM literature. Such an approach is implicit within the systematic review process.

Aside from proforma for reviewing each individual source of evidence, a primary concern of this review is to establish what can be said about each of the five subsections of the research overall on the basis of theoretical and empirical knowledge. This should not only reflect the state of the literature overall, but should identify any uncertainties in the evidence base, drawing attention to areas where the evidence is strong or weak, or where there is no reliable evidence.

Our judgement is that it will be possible to provide easily accessible information about the quality and quantity of evidence in relation to each of the main relationships of interest within each research subsection through the development of quality ratings for the review. This is an approach that has been used previously to aid the assimilation of wide-ranging evidence about different subjects (see, for example, the Department of Health⁷¹⁵ publication on selection of appropriate mental health interventions and the British Psychological Society review of Level B measures, Bartram *et al.*⁷¹⁶). We feel that this will be particularly useful for Objectives 4 and 5 of the research, where the ITT specifies that the intended audiences are general (and will not necessarily be research literate).

The research team (e.g. Michaels and Booth⁷¹⁷) are aware of the existence of numerous such schemes that have been used to classify the literature in this way.⁷¹⁷⁻⁷²² Rather than invent yet another variation, we would attempt to identify an appropriate existing classification of strength of evidence, based on the type of question being asked and the type of evidence being used to address it. Critical elements of such a classification would include whether the research is theoretical, observational or experimental, the overall robustness of the study design (where experimental) and whether there is homogeneity or heterogeneity of results. Such a grading system would be agreed on completion of the criteria and identification of the key relationships of interest. However, for the purposes of illustration, the system might (for illustrative purposes only) resemble the following:

- theoretical knowledge suggests X (*)
- one cross-sectional study or several with varying results (**)
- several cross-sectional studies with the same results or one longitudinal study (***)
- several longitudinal studies with conflicting results (****)
- several longitudinal studies with consistent results (*****)
- randomised controlled trial(s) (*****).

Selection of an appropriate classification system might well vary according to the different levels of evidence sought in relation to the research subsections specified in the ITT.

Ensuring the research is free from bias

A major task for the researchers undertaking this review is to demonstrate that the work is conducted in a way that is free from bias. Previous research by

members of this team in the area of reviews (e.g. the psychosocial hazards research by Rick *et al.*⁴⁹), has highlighted the need for explicit, transparent criteria to be developed for literature reviews. These criteria should reflect generally agreed standards within research and should be developed in line with the specific aims and objectives of the project. It must also be possible to demonstrate that these criteria are applied by the researchers in a systematic way (e.g. through checks including inter-rater reliability). This ensures that the review process is as free from bias as it is possible to make it, and that any other researchers conducting the same task with the same criteria would achieve similar results. This further reinforces the arguments for adopting a systematic review process in line with the approach that we will propose here.

In addition to using a systematic approach to the review process, we propose to establish a panel of experts to contribute to specific stages of the research. Expert advisers would be appointed on the basis of their expert knowledge of the HRM literature and/or their knowledge of the health sector and/or the contribution they can make (through experience) to developing the appropriate processes for conducting this type of review. The rationale is twofold:

- It provides an efficient way of assessing leading edge knowledge on HRM methods and literature, the context for this research and the best procedural approaches for conducting this type of review.
- Given the immature nature of the evidence base, it seeks to achieve consensus in the processes for identifying the best evidence available in relation to the research questions specified in the ITT.

Such a consultative approach should ensure that the processes developed for conducting the research are as free from bias as possible, and as relevant as possible to the focus of this research.

The next section describes the proposed methodological stages for this research.

Methodological approach

Systematic literature reviews

The literature review will be conducted according to established evidence-based principles developed in medicine and allied health fields, as a systematic way of pulling together and assessing the quality

of evidence around a given research question and making recommendations for practice. This approach involves a number of stages:

- formulating specific, answerable questions for each of the research subsections
- devising the most parsimonious search strategies for identifying relevant data
- developing inclusion and exclusion criteria (based on relevance to the research questions and minimum quality standards) for sifting all identified sources of evidence
- developing review proforma for assessing the quality of evidence in each data source (passing the inclusion/exclusion criteria sift) in relation to the specific review questions
- synthesising the assessments for each specific review question
- summarising and drawing conclusions on the evidence in relation to each.

Each of these stages is described fully below. A potential difficulty of this approach is that often the available evidence about any question is small in quantity, of poor quality or inconsistent. For this reason the review will demonstrate a sensitivity to the particular requirements of systematic reviews of the management literature.^{56,723} This will recognise the need to consider the best available evidence, even where rigorous experimental studies are not available, and, if necessary, where no empirical evidence exists, resorting to the best theoretical approaches. In doing so, the collaborating team will draw on their considerable experience of different types of integrative synthesis of evidence-based approaches to general management topics.^{49,50} They will draw on systematic reviews of the health management literature (National Institute of Clinical Studies⁸⁰) in order to inform an appropriate methodology.

Research stages

We envisage a methodology comprising the following stages.

Establish expert advisor panel

One of the first steps in the project will be to establish the expert adviser panel, which will have an number of roles:

1. helping to identify experts for the interviews
2. contributing to the list of HRM practices
3. suggesting additions to the identified literature for each subsection of the research

4. helping to develop the inclusion/exclusion criteria for each subsection of the research
5. helping to define appropriate rating criteria for each element of the study.

Three expert advisers have already expressed willingness to fulfil this duty (we would wish to approach a further five people should the contract be awarded):

- Professor Kevin Daniels, who has expertise in HRM, particularly in relation to intermediate outcomes and as a journal editor (*Journal of Occupational and Organizational Psychology*, JOOP) has an excellent overview of the literature in this area.
- Dr Rob Briner, who has extensive knowledge of the data on intermediate outcomes and links between intermediate and final outcomes. Dr Briner is also a journal editor (*Human Relations*), so brings considerable knowledge of the current literature in this area to the project.
- Dr Olga Tregaskis, who has worked for many years in international HRM. Her research focuses on multinationals, national training and employment regulations, flexible working, and training and development. Dr Tregaskis is the UK representative on the Academy of Management International Management Division, an international network of HRM academics, and thus brings to the project an understanding of both European and North American research on this subject and excellent links with the international HRM academic community.

Both Professor Daniels and Dr Briner have worked on previous systematic literature reviews conducted by the Institute for Employment Studies and therefore also have expertise in developing appropriate tools for the review (i.e. setting appropriate inclusion/exclusion criteria and developing tailored quality rating criteria).

In addition to an expert panel we would also seek at this stage in the research to create links with other research groups who are working on the same or related questions. Specifically, the Service Delivery and Organisation (SDO) commissioned research on the effects of work and stress on outcomes for patients, and the Policy Research Programme commissioned research on HR interventions and outcomes in the NHS. As well as any others, in the UK or abroad, who can be identified by the expert advisers.

Objective 1: Catalogue of methods of HRM and fidelity with which they have been applied

This will require close and iterative work between the literature-searching team and the subject experts to generate an exhaustive list of methods of HRM. This list will be generated through interviews with experts, by textual analysis of sample HR policies, and by thematic analysis of a select but wide-ranging purposive sample of existing reviews, traditional and systematic, of the HRM literature. The expert advisers will be asked to identify for each method the best evidence available about the fidelity with which methods have been implemented, looking beyond published articles and books to include unpublished literature and research groups in the area.

This will include identifying the experts' general perspective on questions such as the body of evidence in relation to both single and combinations of HRM methods and the range of measures for assessing the fidelity with which methods have been implemented. Pre-existing frameworks (such as Wright and Gardener⁷¹⁴) classifying levels of implementation in HRM methods will also be used to provide further insight into how methods have been put into practice.

Objectives 2–4

In contrast with the theoretical sampling required for Objective 1, the remaining research objectives will be addressed via a series of systematic reviews. The application of scientific methods limits bias in the identification, appraisal and synthesis of all relevant studies that address a specific focused question. In particular, where logistic constraints such as those required for completion of this report exist and where data are plentiful, it is most efficient to conduct a 'review of reviews'. This means that, rather than examining all the primary papers cited in reviews or replicating synthesis of data from these papers the reviewers critically examine conclusions drawn by the authors of these reviews.

Wherever possible, we will use existing systematic reviews of the literature for each of the Objectives 2–5 of the study.

Review of reviews

Systematic searches will be conducted through identified keywords on databases such as Web of Science, MEDLINE, PsychLit and the Emerald suite of management databases. This will be done at two levels:

- the macro level (for terms such as HRM, HR practices, personnel, staff recruitment, staff development)
- the micro level for specific HRM methods as identified in Part I of the research (e.g. worker participation, training, job security, promotion, teamworking, incentives); intermediate outcomes (e.g. morale, stress, proactivity, commitment); and final outcomes (e.g. performance, organisational performance, turnover, productivity, retention, clinical standard, patient care).

These computer searches will be supplemented by citation searching (to detect research studies that share a common ancestry) and related-article features to allow the generation of related concepts. Hand-searching and examination of relevant journals (examples include: *Academy of Management Journal*, *European Journal of Innovation Management*, *Health Care Management Review*, *Health Services Research*, *International Journal of Human Resource Management*, *Journal of Healthcare Management*, *Journal of Management Development*, *Journal of Managerial Psychology* and *Journal of Organizational Behavior*) will be supplemented by tightly focused searches of the internet using advanced search features.

New systematic reviews

We anticipate that Objectives 3 and 4 of the research in particular will require in-depth appraisal and analysis of existing reviews together with the conduct of a new review. The theoretical framework for the new review will divide the mechanisms identified into those where the evidence base derives from within the health literature, those where the literature originates from general management and those where both literatures are represented. Each item of evidence identified will be assessed both for the strength of its signal regarding application to HRM in health organisations and its noise regarding limitations of research design.⁷³ A systematic literature review will be conducted using accepted systematic literature search techniques for the years 1995–2004. Online searches of relevant computerised bibliographic databases will be undertaken using comprehensive permutations of key words representing mechanisms and key words depicting outcomes. Databases to be searched will again include: MEDLINE, PsycInfo, the Emerald databases and Web of Science.

The expert advisors will identify key researchers in the area. These researchers will be contacted by

e-mail, introducing the project, informing them of publications already identified and asking them for the references for other relevant published or unpublished evidence. This request will be followed up by up to two reminders as necessary.

Towards the end of the project a brief supplementary search for recent journal articles and publications will be conducted to ensure an up-to-date bibliography and evidence base.

As the need is for transparent criteria, it is essential that our methodology in identifying and reviewing evidence is both explicit and objective. We therefore propose to conduct this review by adhering strictly to predetermined criteria for assessing published work. Such criteria will reflect generally agreed standards within research, developed to meet the specific aims and objectives of the project (e.g. Popay *et al.*,⁷²⁴ Oxman⁷²⁵). In demonstrating that these criteria have been applied in a systematic way this will ensure that the review process is as free from bias as is possible, ensuring reproducibility for complementary projects or subsequent work.

The methodology for the literature review process will involve four main stages, each building on the previous one. Unlike many reviews where the search processes are conducted early in the project and then retrieved materials passed on to the review team, the iterative nature of the project combined with the task dependencies arising from Objectives 1–5, will require ongoing interaction with the expert advisers needing to be consulted at each stage. For example, the compiled bibliography will be circulated to the expert panel on a number of occasions with a request for additional evidence omitted from the list. Further items will thus be added to the database, and the updated bibliography circulated again asking the experts to check for omissions.

Summary of stages of review for Objectives 2–4

For each substantive review, the following stages will be undertaken:

- formulation of specific questions to be answered
- development of inclusion and exclusion criteria based on the relevance of the articles to the review questions and minimum quality criteria
- development of review criteria for assessing the quality of evidence
- training of review team and piloting of criteria

- conduct of review and data extraction
- synthesis of data and analysis of results.

Bibliographic software

The reference management software package REFERENCE MANAGER will be used for this review. This package allows direct transfer of references from the electronic databases. References will be coded according to source of the reference, whether the paper is for inclusion, and, if so, to which of the objectives it will likely contribute. This system of coding will ensure that lists of publications can be easily retrieved according to topic area or purpose within the review.

Objective 5: to assess the sensitivity of intermediate outcomes to individual HRM practices

By this stage of the review it is anticipated that the team will have identified points of theoretical saturation. For each combination of methods and outcomes (intermediate and final) they will identify methods where there is:

- strong evidence, either for or against, yielded by systematic reviews
- strong evidence, either for or against, from primary studies
- indicative evidence only, either for or against, from observational studies, case studies, grey literature
- no evidence.

This review will thus alert readers to the extent and nature of the strengths and weaknesses in the evidence discussed in relation to individual studies and the field more broadly.

Intended approach to data extraction and analysis for research Objectives 2–5

Once inclusion and quality rating criteria have been developed, training of the review team will take place to ensure consistency of approach. The aim of this training will be to anticipate queries and to develop a protocol for tackling issues as they arise during the review. For example, several papers will be selected and each member of the review team will review the papers separately. The inter-rater reliability will be calculated, and training and documentation expanded, until ratings show an acceptably high level of agreement. In addition, areas of disagreement will be discussed

within the team and resolved prior to completion of the reviews. While this approach necessarily deviates from idealised conditions of quantitative review, whereby two reviewers extract data for every included paper, we believe that this approach is justified by the nature of the evidence types being considered. In contrast with formal meta-analysis, there is little empirical methodological research to indicate incremental benefits for dual data extraction and analysis where non-quantitative research is being examined. However, all issues or queries arising from the extraction or analysis will be referred for a second opinion (either to another researcher or a member of the expert panel), and where a candidate homogeneous quantitative subset is identified these papers will be subject to dual extraction and analysis.

Initially, evidence tables containing such details as citation, setting, study type, level, scope/variables, outcomes/results and comments will be produced by the research associates. These will then be subjected to detailed analysis and quantitative/qualitative review by the experts on the review team.

Timetable and milestones

There is as yet, no fixed start date for the project. We would be able to start immediately and propose the timetable and milestones as in *Table 63*.

Project outputs

The primary output of this project will be a written report presenting the results of work on each of the five objectives in separate chapters in recognition of the different target audiences for each subsection. This report will thus include the conventional sections on recommendations for practice (where such evidence exists to support these) and recommendations for future research. In addition it will follow the brief in the tender document by extending its consideration more widely to policy implications. In addition to the research report, the research team will identify the most appropriate avenues for dissemination of the work. The outputs of the research will be submitted to relevant peer reviewed health-related journals such as *Health Service Management*, and more general management and organisational behaviour journals such as *Human Resource Management Journal*, *Journal of Occupational and Organizational Psychology* and *Journal of Organizational Behavior*. Articles and news features will also be submitted to non-peer-reviewed journals such as *Health Service*

TABLE 63 *Timetable*

Activity	Timeframe [month(s)]
Appoint expert panel	1
Recruit research associates	1–3
Identification of HRM methods and measures of fidelity	2–5
Findings from subsection I of the research – HRM methods and measures of fidelity	6
Review of reliability of measures of intended outcomes of HRM	5–11
Review of the correlation of intermediate outcomes to each other	5–11
Draft outputs from subsections II and III of the research for comment and feedback	12–15
Review of the relationship between intermediate outcomes and final outcomes	12–19
Review of the sensitivity of intermediate outcomes to individual HRM policies	12–19
Synthesis of overall report to NHS	19–24

Journal and *SDO Newsletter*. We will also undertake presentations of research plans and objectives, intermediate findings and overall final findings at conferences, seminars and professional meetings, such as SDO conferences, Public Health Association Conference, British Psychological Society

Occupational Psychology Conference, European Academy of Occupational Health Psychology, European Association of Work and Organisational Psychology, and the Academy of Management Conference.

Appendix 2

HRM practice categories and definitions

HR category	Definition
Work design	<p>Organisations have particular functions to accomplish if they are to meet their objectives. Those functions comprise a number of tasks, which are then grouped to form jobs undertaken by individuals. Job incumbents typically are trained to carry out their prescribed tasks, and given a certain degree of discretion over how they do so. 'Job design' refers to the outcome of this process and may be defined as the specification of the content and methods of jobs</p> <p>Other terms often used as synonymous for job design include 'work design' and 'job' or 'work structuring'. 'Work organisation' is also frequently used to encompass job design, but usually signifies broader perspective linking jobs more explicitly to their organisational context</p> <p>Within the field of organisational behaviour job design has specifically focused on properties of the job, referred to as 'job characteristics', such as the variety of tasks in jobs and the amount of discretion job incumbents have in completing those tasks</p>
Staffing: Recruitment/ selection/placement/ working hours/staffing levels/skill mix	<p>Traditionally, recruitment has been conceptualised as the organisational process that precedes selection. More specifically, recruitment has been described as the process of generating pools of applicants for job vacancies; selections as the process of choosing from among those applicants. Recruitment has been regarded as an attraction activity, selections as a screening or winnowing activity</p> <p>More recently, recruitment and selection have come to be regarded as less distinct activities</p>
Training and development	<p>When learning events are planned in a systematic fashion and are related to events in the work environment, they are called training programmes. From this point of view, the training process is defined as the systematic acquisition of skills, rules, concepts or attitudes, which results in improved performance in the work environment (Goldstein 1993⁷²⁶)</p> <p>Most training programmes have the following stages:</p> <p><i>Need assessment:</i> Consists of a series of analyses that assess the organisation, the job and the person performing the job in order to provide input for the design and evaluation of the training system. This stage requires determination of which tasks are required on the job and which knowledge, skills and abilities are necessary to learn to perform those tasks</p> <p><i>Training environment:</i> Once the tasks, knowledge, skills and abilities and objectives have been specified, the next step is designing the environment to achieve the objectives. Training is a delicate process that requires a supportive learning environment. The training process must be designed to facilitate the learning of the knowledge, skills and abilities required to perform the tasks that the trainee needs for successful job performance</p> <p><i>Training evaluation:</i> The number of different types of objectives that organisations hope training programmes can achieve varies widely. However, the true efficacy of any training programme lies in how the programme is evaluated against pre-determined objectives. The evaluation process centres around two procedures – establishing measures of success (criteria) and using research designs to determine what changes have occurred during the training and transfer process. Criteria must be established for both the evaluation of trainees at the conclusion of the training programme and the evaluation of on-the-job performance</p>
Compensation and rewards	<p>Pay can be in cash or benefits, such as health care, a paid vacation or a company car. Payment systems vary within and across organisations in their mix. Some organisations pay all employees a base salary whereas others use variable pay where some portion of employees' pay is uncertain. For example, performance-related pay refers to a number of pay programmes that link pay to the individual, group and organisation level performance measures. Pay programmes that influence pay mix are merit pay, incentive pay, gainsharing, profit-sharing and stock options. Pay can also be described in terms of its level, i.e. how much organisations pay for specific jobs, and in terms of its structure which refers to the nature of pay differentials within an organisation. Payment systems can influence attitudes and behaviours of employees, and which employees are attracted to the organisation and which decide to leave</p>

HR category	Definition
Communication	<p>Through communication, organisations and their members exchange information, form understandings, coordinate activities, exercise influence, socialise, and generate and maintain systems of beliefs, symbols and values. Communications has been called the “‘nervous system” of an organised group’ and the ‘glue’ that holds organisations together</p> <p>Due to the complexity of the organisational communication process and the many levels at which communication occur, there is no generally agreed theory of organisational communication. Different positions have been advanced on several issues</p> <p>There are at least two positions on the role of communication in organisations. One regards communication as a subprocess that plays an important role in other organisational processes. For example, communication serves as a channel for the exercise of leadership or for the maintenance of interorganisational linkages. The other position argues that communication is the process that constitutes the organisation and its activities. Rather than being a subsidiary to key phenomena such as leadership, communication is regarded as the medium through which these phenomena and, more generally, organisations are created and maintained</p> <p>Organisations have two distinct communication systems: formal and informal. The formal communications system is a part of the organisational structure and includes supervisory relationships, work groups, permanent and <i>ad hoc</i> committees, and management information systems. The informal communication system emerges from day-to-day interaction among organisational members. Ties in the informal network are based on proximity, friendship, common interests and political benefits more than formal job duties. The informal system includes the ‘grapevine’ and the ‘rumour mill’</p>
Employee/family friendly	<p>The term ‘work and family’ or the ‘family friendly workplace’ is one that recognises the non-workplace family responsibilities of its employees, and develops and implements policies that allow employees to simultaneously fulfil work and family responsibilities. Different commentators propose different definitions, usually accompanied by a list of policies that allegedly meet their criteria. Hartin (1994: 76),⁷²⁸ for example, describes ‘family-friendly’ policies as those ‘designed to minimise the impact of work on family life’ and identifies the ‘family-friendly’ policies currently in force as varieties of leave for maternity or paternity, sickness, emergencies and compassionate reasons; career breaks and extended leave; flexitime, part-time work and rostered days off. Gary Johns, Assistant Minister for Industrial Relations in 1994 in Australia, identified family-friendly work policies ‘as flexible working arrangements, permanent part-time work, job-sharing, career break schemes, paid or unpaid family leave, and assistance with child care and elder care responsibilities that can help workers balance their work and family responsibilities’ (Work and Family 1994⁷²⁹)</p>
Single status/status harmonisation/status differentials	<p>Single status refers to the provision of common terms and conditions of employment to all employees of a single enterprise. It means, essentially, that all workers of whatever grade will share the same set of employment benefits (pension, sick pay, annual leave, parental and maternity provisions) and be paid through the same mechanism (e.g. annual salary). Single status contrasts with the traditional ‘status divide’ between hourly paid manual workers and salaried staff, and may arise either from trade union negotiating pressure or from a desire on the part of the employer to foster teamwork and commitment. The achievement of single status can be costly and for this reason there may be incomplete harmonisation of employment conditions across the workforce hierarchy</p> <p>Harmonisation is referred to as movement away from separate terms and conditions of employment for manual hourly paid and white-collar salaried employees, towards single status, i.e. common basic terms and conditions of employment. Harmonisation most frequently affects holiday and leave entitlement, redundancy pay and occupational pensions. It may also have a symbolic element involving the use of common restaurant and car-parking facilities or a standard company uniform</p>
Employee representation/involvement/participation	<p>Employee involvement has been used to describe a wide range of practices in organisations. Common to all these practices is the attention paid to increasing employee influence over how their work is carried out or over other areas of organisational policy and practice</p>
Appraisal/performance management	<p>There is no universally accepted definition of performance management, and it is sometimes used simply to refer to ‘performance appraisal’ or to ‘performance-related pay’. However, it is increasingly coming to mean a general, integrated HR strategy that seeks to create a shared vision of the purpose, aims and values of the organisation, to help each individual employee understand and recognise their part in contributing to them, and, in so doing, to manage and enhance the performance of both individuals and the organisation. Typically, elements of such a strategy will include developing the ‘mission statement’ and business plan, objective setting and other methods of performance measurement, appraisal, performance-related pay and various approaches to enhancing internal communication</p>

HR category	Definition
Higher-level concept (HPWP/HPWS)	<p>Organising the work process so that non-managerial employees have the opportunity to contribute discretionary effort is the central feature of an HPWP. HPWPs emphasise the devolution of the gathering and processing of information to the level of non-managerial employees, who act on and use the information for problem-solving and decision-making.</p> <p>No one has consistently defined, or even uniformly named, HPWPs (Bakker 1999,⁷³⁰ Becker and Gerhart 1996;²³ Delaney and Goddard 1997;⁷³¹ Wood 1999³⁵). They have been called HPWSs, alternate work practices, and flexible work practices (Delaney and Goddard 2001⁷³¹). Despite the name variances, many of these programmes share common elements, including rigorous recruitment and selection procedures, incentives based upon performance, and extensive training programmes focused on the needs of the business (Becker <i>et al.</i> 1997¹⁵³). Essentially HPWPs require heavy investment in human capital that is intended to enhance employee skills, knowledge, motivation and flexibility with the expectation that the employer is providing employees the ability and the opportunity to provide input into workplace decisions (Van Buren and Werner 1996⁷³²). Companies expect this empowerment to enable employees to adapt quickly and readily to rapidly changing product and labour market conditions, and to improve operational efficiency and firm performance (Becker and Huselid 1998;¹⁶ Cappelli and Neumark 2001¹⁴⁹)</p>
HPWP, high-performance work practice; HPWS, high-performance work system.	

Appendix 3

HRM practice categories and associated terms from the literature

	HRM practice categories	Example terms for HRM practices from the literature
1	Work design	Team working Job design Job rotation Work characteristics, job control, job demands
2	Staffing, recruitment and selection	Computer-based orientation programme Employee referrals as a hiring practice Use of WABs Orientation programme Selection processes; employee perceptions of selection processes
3	Training and development	Cultural learning interventions Time management training Feedback training Cultural diversity awareness training Training in reflective communication Teacher training in probation schools Lifelong learning and training Quality awareness training
4	Compensation and reward	Labour–management cooperation and trust Compensation system, merit pay, bonus plans Group incentives Economic incentives Incentives, performance awards; special act or service awards; quality step increases; time-off awards Promotion Contingent rewards Incentives: Financial bonus; enhanced fees Gain-sharing
5	Communication	Communication briefings Communication briefs Communication skills Contact among team members Feedback Goal communication Opportunity to participate/communication Reinforcement schedule and feedback function Two-way communication
6	Family friendly/work–life balance	WIF, FIW Utilisation of available workplace support Employer-provided health insurance Work–life balance

	HRM practice categories	Example terms for HRM practices from the literature
7	Single status/harmonisation	None
8	Employee involvement	Employee participation in the job evaluation process PPM system
9	Appraisal/performance management	Performance feedback Performance appraisal feedback PMS; participation in implementation of a PMS Goal setting, goals and personal projects, goal setting and appraisal Supervision: No supervision; direct human supervision; and computer monitoring Positive attendance improvement programme; recognition programme: Personal attention; public celebration; use of mementoes; time-framed recognition; clarity of expectations; source of acknowledgement Performance management Appraisal; participation; goals Reinforcement schedule and feedback function
10	Higher-level concept (HPWP/HPWS)	Opportunity to participate/communication; skills; incentives; appraisal systems; PRP; flexible employment practices

FIW, family interfering with work; HPWP, high-performance work practice; HPWS, high-performance work system; PMS, performance management system; PPM, participative productivity management; PRP, performance-related pay; WAB, weighted application blank; WIF, work interfering with family.

Appendix 4

Guidance on monitoring implementation fidelity

This guidance highlights the necessary components and steps that need to be satisfied or followed if a policy is to be implemented as it should be, and so have its intended effect.

There should be a policy document describing the practice

There is a greater chance of high implementation fidelity if the description is simple, but the document should provide as many of the following details of the practice as possible:

- whom the practice is to cover (all staff or only certain staff)
- who is to deliver it or be responsible for its implementation (e.g. line manager, HR staff)
- when, how often and for how long the practice should be delivered.

There should be strategies to help implementation of the practice

- Training for those delivering the practice.
- Documents, manuals or guidance for those delivering the practice.
- Ongoing support for those delivering the practice.

There should be some monitoring of compliance

- Monitoring to ensure that those responsible for the delivering the practice are doing so.
- Monitoring to ensure that the practice being delivered is in accordance with the written policy in terms of those covered by it, its frequency and duration.
- By preference, this monitoring should consist of independent observation of the policy in practice, but may also include employee perceptions and experience of the practice.

There should be strategies in place to ensure continued implementation in the long term

- Training for new members with responsibility for delivering the practice.
- Ongoing support for and monitoring of those delivering the practice.
- Long-term monitoring to ensure that the practice being delivered is in accordance with the written policy in terms of those covered by it, its frequency and duration.

Appendix 5

Implementation fidelity checklist

This checklist assesses how well a policy is being implemented in an organisation (Questions C1–4 and E1–4). The checklist also records information on moderators of implementation to help explain the level of implementation achieved (Questions D1–9). Section F collates the data from sections B–E. This is a tool for anyone who wants to evaluate the fidelity with which a written policy has been implemented (this could be academic researchers, HR managers or staff, line managers or employees).

A. What is the source of the following information about the policy?

Policy document	<input type="checkbox"/>	Company records	<input type="checkbox"/>
Interviews with / questionnaires to single HR manager	<input type="checkbox"/>	OR several HR staff	<input type="checkbox"/>
Interviews with / questionnaires to line manager(s)	<input type="checkbox"/>	OR employees	<input type="checkbox"/>

POLICY

B. Do you have a written policy on _____

If so, fill in a separate list for each practice relating to that policy (eg. different types of appraisal, training, payment systems)

PRACTICE

C. What is the practice? _____

1. According to this written policy, how often should the practice take place?

2. According to this policy, who should be covered by this practice?

All staff	Some staff	Don't know
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If some staff, who are they?

3. According to this policy, what are the various elements of this practice? (eg. appraisal: to be by line manager; to be 1 hour; to offer employee opportunity for feedback)

4. Which of these elements of this practice are 'core', that is, are considered essential to the practice having its desired effect?

4.a. How have the 'core' elements of the practice been decided?

D. What strategies exist(ed) to facilitate implementation of the policy?

1. Who is responsible for delivering the practice?

HR staff	Line managers	Other
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. Did the people responsible for delivering the practice receive any training?

Yes	No	Don't know
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Details

2.a. If there was training, who delivered the training?
(eg. HR professionals)

3. Were guidelines or a manual provided for people responsible for delivering the practice?

Yes	No	Don't know
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Details

4. Were the people affected by the practice involved in its development or their opinion asked about the practice?

Yes	No	Don't know
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Details

5. Was the quality of delivery by people responsible for delivering the practice monitored?
(eg. feedback, performance monitoring)

Yes	No	Don't know
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Details

6. Was there any ongoing support provided to the people responsible for delivering the practice?
(eg. support services, helplines, technical help)

Yes	No	Don't know
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Details

7. Did the practice require any new facilities or materials, and if so, were they made available?

Yes	No	Don't know
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Details

Are any strategies in place to sustain full implementation over time?

8. Is there formal training for new members of staff responsible for delivering the practice?

Yes	No	Don't know
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Details

If there is training, who delivers the training?
(eg. HR professionals)

9. Are guidelines or a manual provided for new members of staff responsible for delivering the practice?

Yes	No	Don't know
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Details

E. Is the policy being implemented as planned or intended?

This needs to be assessed by a combination of independent observation of staff or company records and data collection from managers and employees. The benchmark for the answers to these questions is provided by the answers to Questions C1–4.

1. What is the source of the following information about implementation?

Independent observation by researchers	<input type="checkbox"/>	Company records	<input type="checkbox"/>
Interviews with / questionnaires to HR staff by researchers	<input type="checkbox"/>	By HR staff	<input type="checkbox"/>
Interviews with / questionnaires to line managers by researchers	<input type="checkbox"/>	By HR staff	<input type="checkbox"/>
Interviews with / questionnaires to employees by researchers	<input type="checkbox"/>	By HR staff	<input type="checkbox"/>

2. Is the practice implemented as often as required?

Always	Most of the time	Sometimes	Rarely	Never	Don't know
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. Are all eligible employees covered by the practice?

Yes	No	Don't know
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If No, how many / what percentage are actually covered by the practice?

If a practice is only called upon irregularly, how many eligible employees have called on the practice when they wished or were required to do so? (eg. parental leave, working from home)

4. Are the other elements of the practice, as described in Question C3, being implemented?

1	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
2	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
3	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
4	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
5	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>

5. Have the designated 'essential' elements of the practice been implemented?

1	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
2	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
2	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>

F. Results

1. Is the policy being implemented as intended?

Fully	Mostly	Only in part	Not at all	Cannot tell
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. How many measures has the organisation taken to facilitate implementation?

Very many	Quite a lot	Some	Very few	None	Don't know
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. Can the number of facilitation strategies help to explain the level of implementation?

Yes	No	Cannot tell
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. Does the quality of delivery help to explain the level of implementation?

Yes	No	Cannot tell
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. Does participant responsiveness help to explain the level of implementation?

Yes	No	Cannot tell
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix 6

Patient outcomes search strategy

Typical patient outcomes search filter
(MEDLINE):

**Database: Ovid MEDLINE
<1966 to May Week 1 2006>**

Search strategy

1. (patient\$ adj2 safety).tw. (4712)
2. exp SAFETY/ (28534)
3. exp PATIENTS/ (35451)
4. 2 and 3 (249)
5. exp Infection Control/ (34544)
6. hospital acqui\$ infection\$.tw. (980)
7. MRSA.tw. (4671)
8. risk management/ (9191)
9. exp Patients/ (35451)
10. 8 and 9 (118)
11. (risk management adj5 patient\$).tw. (168)
12. 1 or 4 or 5 or 6 or 7 or 10 or 11 (44413)
13. exp Patient-Centered Care/ (3744)
14. exp Patient Participation/ (10587)
15. patient-cent?red care.tw. (413)
16. (patient\$ adj3 choice\$).tw. (6048)
17. or/13–16 (20034)
18. exp Waiting Lists/ (4289)
19. (waiting adj3 (time\$ or list\$)).tw. (6131)
20. (patient\$ adj5 (delay\$ or cancel\$)).tw. (12190)
21. or/18–20 (20497)
22. exp Patient Satisfaction/ (28719)
23. (patient\$ adj3 satisf\$).tw. (19017)
24. 22 or 23 (40517)
25. (patient\$ adj5 quality of life).tw. (17451)
26. exp “Quality of Life”/ (54173)
27. exp PATIENTS/ (35451)
28. 26 and 27 (1335)
29. 25 or 28 (18557)
30. exp MORTALITY/ (174087)
31. mortality.tw. (230754)
32. exp SURVIVAL/ (2334)
33. survival.tw. (320503)
34. or/30–33 (596061)
35. exp “Length of Stay”/ (33765)
36. exp Patient Discharge/ (11491)
37. exp Patient Readmission/ (4097)
38. length of stay.tw. (11433)
39. ((hospital or patient\$) adj5 readmi\$).tw. (2949)
40. ((hospital or patient\$) adj5 discharg\$).tw. (31848)
41. or/35–40 (75104)
42. 12 or 17 or 21 or 24 or 29 or 34 or 41 (777098)

Appendix 7

Typical HRM and longitudinal search filters

Database: Ovid MEDLINE <1966 to November Week 3 2005>

Search strategy

1. exp Personnel Management/ (84372)
2. (human resource\$ or HRM).tw. (2180)
3. ((HR and (organization\$ or staff\$ or employ\$))
not (hazard\$ or ratio\$)).tw. (2020)
4. ((high performance or high involvement or
high commitment) adj2 work).tw. (29)
5. or/1-4 (87742)

Database: Ovid MEDLINE <1966 to May Week 1 2006>

Search strategy

1. exp Longitudinal Studies/ (539439)

2. longitudinal\$.tw. (71367)
3. exp Retrospective Studies/ (248824)
4. retrospective study.tw. (39390)
5. exp Prospective studies/ (209208)
6. prospective study.tw. (56189)
7. quasi-experimental.tw. (1827)
8. (follow-up\$ or follow\$ up).tw. (346566)
9. repeat\$ measure\$.tw. (12546)
10. (post-test or posttest or (pre adj5 post)).tw.
(24056)
11. (T1 or T2 or T3).tw. (73071)
12. baseline.tw. (148159)
13. (Over time or time period).tw. (55619)
14. interrupted time series.tw. (234)
15. predict\$ design\$.tw. (64)
16. exp Case Control/
17. exp Cohort studies/
18. or/1-17

Appendix 8

Example Business Source Premier and PsycInfo search filters

Business Source Premier (Ebsco)

- S1 (DE "PERSONNEL management"- exploded)
(154567 records)
- S2 TI (human resource* or HRM) Or AB (human resource* or HRM) (27272 records)
- S3 TI HR Or AB HR (13945 records)
- S4 TI (high commitment work or high involvement work or high performance work) Or AB (high commitment work or high involvement work or high performance work) (209 records)
- S5 TI (organisation* or organisation* or staff* or employ*) Or AB (organisation* or organisation* or staff* or employ*) (603395 records)
- S6 (S1 OR S2 OR S3 OR S4 OR S5) (813114 records)
- S7 TI (longitudinal* or quasi-experimental or retrospective study or prospective study or followup or follow-up) Or AB (longitudinal* or quasi-experimental or retrospective study or prospective study or followup or follow-up) (11694 records)
- S8 TI (follow* up or repeat* measure* or baseline or post-test or posttest) Or AB (follow* up or repeat* measure* or baseline or post-test or posttest) (9196 records)
- S9 TI (T1 or T2 or T3 or over time or time period or interrupted time series or predict* design) Or AB (T1 or T2 or T3 or over time or time period or interrupted time series or predict* design) (18559 records)
- S10 (S7 OR S8 OR S9) (39449 records)
- S11 (S6 AND S10) (1323 records)

PsycINFO

1. explode 'Personnel-Management' in DE (14118 records)
2. HRM* or Human resource manag* or Human resourc* or high perf* high commitment* (4538 records)
HRM* or Human resource manag* or Human resourc* or high perf* high commitment* or personnel managem* (14831 records)
HRM* or Human resource manag* or Human resourc* or high perf* high commitment* or explode personnel management (17336 records)
3. explode 'Longitudinal-Studies' in DE (14229 records)
4. 'Repeated-Measures' in DE (260 records)
explode 'Prospective-Studies' in DE (264 records)
5. Retrospective stud* (1702 records)
explode 'Retrospective-Studies' in DE (243 records)
6. 'Followup-Studies' in DE (12282 records)
7. (explode 'Longitudinal-Studies' in DE) or ('Repeated-Measures' in DE) or (explode 'Prospective-Studies' in DE) or (Retrospective stud*) or (explode 'Retrospective-Studies' in DE) or ('Followup-Studies' in DE) (28266 records)
8. (HRM* or Human resource manag* or Human resourc* or high perf* high commitment* or explode personnel management) and ((explode 'Longitudinal-Studies' in DE) or ('Repeated-Measures' in DE) or (explode 'Prospective-Studies' in DE) or (Retrospective stud*) or (explode 'Retrospective-Studies' in DE) or ('Followup-Studies' in DE) (213 records)
9. 1 or 2 or 3 or 4 (25082 records)
10. 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 (57459)
11. 13 and 14 (289 records)

Appendix 9

Discussion of bias in meta-analyses

Publication bias

The tendency for academic journals to publish only studies with significant results means that any meta-analysis based on a limited search of the literature may be open to publication bias because smaller studies demonstrating no effect, or a negative effect, may be being omitted.⁶⁶² This form of bias is the most researched.^{61,666} The failure to conduct a comprehensive multimethod literature search of various sources, including so-called 'grey literature', i.e. unpublished studies and research published in sources other than peer-reviewed journals, increases the likelihood of this publication bias. The potential for relevant, published literature or evidence to be missed is also increased. If this occurs, the meta-analysis may be affected by so-called publication bias. This is because a limited literature search may only find those studies listed in one or two of the most popular databases or catalogued with a particular keyword or term. Consequently, other, equally relevant and potentially important studies listed in other databases and catalogued using slightly different terms may therefore be missed. The findings of any analysis based on such a limited literature search would therefore be compromised because it would not represent all of the relevant and available evidence on the topic. The checklist therefore makes an evaluation of the degree of potential search or publication bias in the included meta-analyses and reviews.

Selection bias

In order to guard against inconsistency in the selection of studies, meta-analyses need to develop and apply explicit inclusion criteria. The more specific and detailed the criteria, the more likely it is that only primary research studies satisfying these criteria will be included, and therefore the more consistent and homogeneous the sample included in the analysis.⁶⁶² The checklist therefore includes an evaluation of stated inclusion criteria in order to assess the potential degree of any selection bias in the analysis.

Extractor bias

The extraction of data for the meta-analysis should be 'explicit, unbiased and reproducible' (Cook *et al.*⁶⁵⁹) If only a single reviewer is involved in coding or extracting data from studies for a meta-analysis or review, or if no assessment is made of the consistency between two or more reviewers performing coding or data extraction (e.g. inter-rater reliability score), then there is an increased likelihood of bias or error entering the analysis because the data on which it is based may not have been recorded consistently.⁶⁶² The potential degree of this so-called extractor bias is therefore assessed by the checklist.

Quality appraisal

A major source of bias also resides in the methodological quality of included studies. Giving equal weight to studies of very different quality may have an adverse effect on the validity of the findings of a meta-analysis; this is emphasised in all of the literature evaluating meta-analyses.⁶⁵⁹⁻⁶⁶² If there is variation in the methodological quality of included studies then there is an increased likelihood of a 'false-positive' conclusion or Type II error (that there is an effect, when in fact there is not), if, for example, less rigorous or methodologically robust studies have provided the larger effect sizes in the meta-analysis. On the other hand, these less rigorous studies might also potentially obscure the results of the higher-quality studies and give a 'false-negative' conclusion, or Type I error (indicating no effect, when there is one).⁷²⁵ The failure to conduct some form of quality assessment means that either these less rigorous studies cannot be excluded or sensitivity analyses cannot be performed to gauge the effect on the overall effect size found by the analysis of studies of different quality. The checklist developed for this report therefore evaluates whether a quality assessment of included studies had been performed, in order to assess whether potential bias or error may have been introduced into the meta-analysis or review from this source. However, no meta-analysis in this field conducted such an

evaluation, so it exists as a potential source of bias in every meta-analysis or review included in this paper.

Analysis

Random effects models give a more conservative, cautionary, and therefore reliable, estimate of effects sizes, that is the size of the relationship between two variables. Fixed effects models should only be used for meta-analyses where there is clear homogeneity between effects sizes. A meta-analysis should therefore test for the homogeneity or heterogeneity of effect sizes in order to determine the most appropriate effects model.^{665,667,733} If a Q-statistic/chi-squared statistic or credibility interval indicates heterogeneity (i.e. if the Q-statistic or chi-squared statistic is significant or the credibility interval includes 0) then the analysis needs to use a random effects model. In the absence of any such test, a random effects model should be used. However, it is always preferable to use a random effects model because this test is only capable of detecting heterogeneity when the heterogeneity of effect sizes is large, and the number of studies is neither too small nor too large.^{733–735} The failure to use the appropriate model might mean that the overall effect size reported is more precise than the data can actually support. However, almost all of the meta-analyses included in this report used the random effects model of Hunter and Schmidt⁷³⁶ and Hunter *et al.*⁷³⁷ The checklist therefore records whether this model has been used, but reports the potential presence of potential bias only if neither

this model nor some other appropriately selected random effects model has been used.

Moderator or sensitivity analysis

Sensitivity analysis (sometimes called ‘moderator analysis’) is used to test assumptions about the findings of the analysis by exploring the effect of excluding certain studies from the analysis, or by comparing the results for different subgroups. For example, by excluding studies with the smallest sample sizes, it is possible to determine whether the analysis is subject to publication bias.⁷³³ Or, by excluding studies of poorer quality, it can be assessed how far study quality affects the results. The outcome is a more robust analysis that has tested assumptions that might affect its findings.^{659,662,733} For meta-analyses relating to intermediate outcomes, a sensitivity analysis might involve either comparing the results of overall correlations with those for particular measures of a concept only. For example, Lodahl and Kejner’s⁴²⁴ measure of job involvement has 20- and six-item scales, and a sensitivity or moderator analysis would examine results for overall and more specific measures of job involvement.¹⁸⁹ The performance of such an analysis permits a more rigorous assessment of the findings of the meta-analysis. The meta-analytic process advocated by Hunter and Schmidt and Hunter *et al.*^{736,737} requires the performance of such moderator analyses, so many of the included meta-analyses have tested the robustness of their results in this way.

Appendix 10

Checklist to assess bias in meta-analyses

Study	Potential degree of bias (tick, circle, or highlight)
Data collection	
Search strategy/terms given	
Alternative terms that could have been used?	
<i>If comprehensive strategy given with alternative terms</i>	Low
<i>If basic strategy given</i>	Moderate
<i>If no strategy or terms given</i>	High
Databases searched	
PsycINFO	
ABI/INFORM	
Others	
<i>If 3 or more</i>	Low
<i>If 2</i>	Moderate
<i>If 1 or less</i>	High
Grey literature sources	
Dissertation abstracts	
Conference abstracts	
Others	
<i>If 1 or more</i>	Low
<i>If none</i>	High
Other methods	
Hand-searching	
Reference tracking	
Contacting authors	
<i>If done 2 or 3</i>	Low
<i>If done 1</i>	Moderate
<i>If done none</i>	High
Test for publication bias (e.g. funnel plot or other)	Bias depends on findings
<i>Specific criteria</i>	Low
<i>No information on criteria</i>	High
Coding (data extraction)	
<i>Inter-rater reliability or consistency score or done by more than 1 analyst</i>	Low
<i>1 analyst only, no information or can't tell</i>	High
Quality assessment	
<i>Formal appraisal of included studies</i>	Low
<i>Only certain journals used (peer-reviewed)</i>	Moderate
<i>No quality assessment at all</i>	High

Study	
Data collection	Potential degree of bias (tick, circle, or highlight)
Analysis	
Test for homogeneity of between study effects' sizes	
<i>Chi-squared statistic or Q-statistic or credibility interval</i>	Low
<i>No test</i>	High
Appropriate effects model used	
Hunter and Schmidt ⁷³⁶ (random effects model adjusting for sampling error and reliability of measures, but no other heterogeneity)	Low
Other random effects model	Low
Fixed effects	Moderate
Unknown	High
Robustness of analysis	
Sensitivity or moderator analysis performed (e.g. by measure, population etc.)	
Yes	Yes
No	High
Overall summary	
Data collection (greater effort to achieve comprehensive information retrieval means reduced potential for publication bias)	
<i>If 3 or more lows</i>	Low
<i>If 2 lows</i>	Moderate
<i>If 1 low, 2 moderates, 1 high</i>	Moderate
<i>If 3 or more moderates</i>	Moderate
<i>If 2 or more highs</i>	High
<i>(If test for publication bias has been done, findings of this override above comments)</i>	
Inclusion criteria (greater effort to select relevant studies means reduced potential for selection bias)	Low or high
Coding (extractor bias)	Low or high
Quality assessment	
	Low
	Moderate
	High
Analysis	
<i>If random effects model used</i>	Low
<i>If fixed effects model used after test for heterogeneity demonstrated homogeneity between studies</i>	Moderate
<i>If fixed effects model used after test for heterogeneity demonstrated heterogeneity between studies</i>	High
Sensitivity analysis	
Yes	Low
No	High

Appendix II

Assessment of bias for included meta-analyses

So far we have provided overviews of the meta-analytic results of the intercorrelations among the intermediate outcomes, and correlations between the intermediate outcomes and employee behaviours. Next is a more detailed breakdown of the meta-analyses from which the overviews are constructed. Description, quality appraisal and results of the included meta-analyses for each intermediate outcome are provided below.

Motivation

Correlations with other intermediate outcomes **Studies**

No meta-analyses of motivation satisfied the inclusion criteria.

Correlations with behaviours **Studies**

The literature search identified 55 studies, one of which met the inclusion criteria:⁷³⁸

- Judge and Ilies⁷³⁸ conducted a meta-analysis of 65 studies with 78 samples, reporting data on correlations between two facets of motivation (goal setting and expectancy) and a single dimension of OCB (conscientiousness).

Critical appraisal of meta-analyses

Publication and extractor bias were high in the meta-analysis of Judge and Ilies,⁷³⁸ although selection bias was low. Moderator analyses were performed by testing for the effect of setting on the results.

Results

This moderate quality meta-analysis found a medium correlation between goal setting and conscientiousness (0.28) and a small correlation between expectancy and conscientiousness (0.23). However, any conclusions should be drawn with caution, as the findings are from only one meta-analysis.

Job satisfaction

Correlations with other intermediate outcomes **Studies**

The literature search identified 121 studies, four of which met the inclusion criteria:

- Faragher *et al.*⁷³⁹ conducted a meta-analysis of 485 studies, reporting data on correlations between job satisfaction and burnout. The analysis did not require studies only to have used a particular measure or measures of job satisfaction for them to be included.
- Hellman⁷⁴⁰ conducted a meta-analysis of 50 studies, reporting adjusted correlation coefficients for the relationship between job satisfaction and turnover intentions. The analysis did not specify the scales used to measure either variable.
- Brown and Peterson⁷⁴¹ performed a meta-analysis of 59 studies and reported corrected correlation coefficients for the relationships between job satisfaction and organisational commitment, propensity to leave (turnover intentions), work motivation and job involvement.
- Finally, Blegen⁷⁴² conducted a meta-analysis of 48 studies, reporting adjusted correlation coefficients for the relationship between job satisfaction and both commitment and fairness. The analysis did not specify the scales used to measure either variable.

Also, Witt and Nye⁷⁴³ conducted a meta-analysis on their own sample of 56 correlations using their own composite measure. Although correlation coefficients between 'global' satisfaction and perceived fairness of pay or promotion across a sizeable number of samples were reported, this was not a cross-study meta-analysis and so has been excluded from this review.

Critical appraisal of meta-analyses

Three out of the four meta-analyses that satisfied the inclusion criteria for this review were of relatively high quality. The studies of Faragher *et*

*al.*⁷³⁹ and Blegen⁷⁴² were of high quality as they only had one potential source of serious bias, while the potential for other types of bias was only low. Faragher *et al.*⁷³⁹ was subject to low publication and selection bias, and was only vulnerable to high extractor bias in the coding of studies. Moderator analyses were performed by testing the effect on the results of using both fixed and random effects models. Blegen⁷⁴² had relatively high publication bias because a specific search was conducted to identify unpublished studies, but details of all other aspects of the literature search are extremely vague. However, potential selection and extractor bias was low; a test for homogeneity was performed and a random effects model was used; and moderator analyses were performed by testing the effect of setting and publication date on the results.

The meta-analysis of Brown and Peterson⁷⁴¹ was of similar, relatively high quality: it had low selection and extractor bias, but there was potentially a moderate amount of publication bias. This meta-analysis used a fixed effects model rather than a random effects model, testing for homogeneity, which revealed consistency across effect sizes; although they did perform moderator analyses by testing for the effect of different populations and different measures.

Finally, the quality of the meta-analysis by Hellman⁷⁴⁰ was very low: publication, selection, and extractor bias were all high (no details were given of any of these processes) and no information was given about the effects model used, although moderator analyses were performed.

Correlations with behaviours Studies

The literature search identified 121 studies, 14 of which met the inclusion criteria:

- Dalal⁷⁴⁴ conducted a meta-analysis of 38 studies with 49 samples, reporting data on correlations between job satisfaction and an overall score for OCB.
- LePine *et al.*⁷⁴⁵ conducted a meta-analysis of 37 studies (37 samples) and reported data on correlations between satisfaction and an overall score for OCB.
- Harter *et al.*⁷⁴⁶ conducted a meta-analysis of 42 studies across 36 organisations conducted by the Gallup Organization. They reported data on correlations between job satisfaction and turnover (measured as a dimension of business unit performance).

- Judge *et al.*⁶⁵⁶ carried out a meta-analysis of 254 studies comprising 312 independent samples, and reported data on correlations between job satisfaction and job performance.
- Organ and Ryan¹⁶² conducted a meta-analysis of 55 studies (55 samples), reporting data on correlations between satisfaction and five dimensions of OCB (altruism, civic virtue, courtesy, sportsmanship and compliance, but not conscientiousness).
- Brown and Peterson,⁷⁴¹ as mentioned in the section on job satisfaction correlations with other intermediate outcomes, above, performed a meta-analysis of 59 studies and, in addition to the correlations between job satisfaction and the intermediate outcome variables of interest, reported corrected correlation coefficients for the relationships between job satisfaction and both performance and turnover.
- Carsten and Spector⁷⁴⁷ conducted a meta-analysis of 47 studies examining the relationship between job satisfaction and employee turnover.
- The meta-analyses performed by Irvine and Evans,⁷⁴⁸ comprising 11 studies, and by Tett and Meyer,⁷⁴⁹ comprising 155 studies (178 samples), both examined the relationship between job satisfaction and turnover.
- The meta-analysis of Farrell and Stamm⁷⁵⁰ was based on 72 studies and reported correlations between job satisfaction and two absence variables (total time lost and absence frequency).
- Iaffaldano and Muchinsky¹⁵⁷ reported a meta-analysis of correlations from 74 studies on various aspects of job satisfaction and its relationship to performance. Petty *et al.*⁷⁵¹ performed a similar meta-analysis on the same variables based on 31 studies, but focused specifically on individual level job satisfaction and performance.
- Steel and Ovalle⁷⁵² conducted a meta-analysis of 34 studies and reported data on correlations between job satisfaction and turnover, while the meta-analysis of Scott and Taylor⁷⁵³ examined the relationship between job satisfaction and absenteeism in 23 studies (114 correlations).

Critical appraisal of meta-analyses

The methodological quality of the meta-analyses included in this report ranged from very good to very poor. One meta-analysis was of very high quality,⁶⁵⁶ six meta-analyses were of relatively high,^{157,162,741,744,745,749} one was of moderate quality⁷⁴⁷ and five were of only low quality.^{748,750–753}

The rigorous meta-analysis carried out by Judge *et al.*⁶⁵⁶ was superior to the other analyses involving job satisfaction in this section. Although only one electronic database was searched, potential publication bias was low because searches of unpublished literature, hand-searches of 21 journals and reference tracking of previous meta-analyses took place. Furthermore, the potential for publication bias is acknowledged and a test carried out by Judge *et al.*⁶⁵⁶ suggests limited effects on the results. Potential selection bias was low as inclusion criteria were clear, although no information about the number of reviewers involved or about inter-rater reliability was given. Extractor bias was also low, with inter-rater reliability reported for the coding process. The random effects model of Hunter and Schmidt⁷³⁶ was used and a test for the homogeneity of effect sizes was performed. Moderator analyses, again superior to those of the other meta-analyses included, were also performed, testing for the effects not only of different measures of satisfaction and performance, but also of study design and quality. In particular, these moderator analyses tested for the effects of longitudinal versus cross-sectional studies and of high-ranked versus low-ranked journals or sources; no other meta-analyses distinguish these factors.

The meta-analyses of Dalal⁷⁴⁴ and Organ and Ryan¹⁶² were both good methodologically. In both cases, there was moderate publication bias because only a small number of databases or grey literature sources were searched, but otherwise selection and extractor bias were low. Both studies also performed sensitivity analyses. LePine *et al.*⁷⁴⁵ had moderate potential publication bias because grey literature was searched and relevant authors contacted, but had low selection bias because inclusion criteria were clear. LePine *et al.*⁷⁴⁵ also performed a test for homogeneity, used a random effects model for the analysis, and performed moderator analyses by testing for the effect on the results of using different measures of OCB and measuring different dimensions of this concept. Only extractor bias was high.

The meta-analysis of Tett and Meyer⁷⁴⁹ was of moderate to high quality. The literature search could have been more comprehensive, as only one bibliographical database was searched, but multiple methods were used, a specific search was made for unpublished studies, and the potential for some publication bias in the included sample of studies was acknowledged. Potential selection bias was low. A test for homogeneity was performed and a random effects model used for the analysis.

Sensitivity analyses were also performed to test the robustness of the findings by evaluating the impact on effect sizes of different outcome measures.

The meta-analysis of Brown and Peterson⁷⁴¹ was of relatively high quality (for details, see Correlations with other intermediate outcomes, above).

The meta-analysis of Laffaldano and Muchinsky¹⁵⁷ was also of relatively high quality. There was moderate potential publication bias because only one database and no sources of grey literature were searched, although supplementary literature searching methods were used. Selection and extractor bias were both low because inclusion criteria were specific and detailed, and the reliability of the coding was tested and an inter-rater reliability score reported. No test of homogeneity of effect sizes was performed, but a random effects model was used. Sensitivity analyses were performed to assess the effect on the results of year of publication and the different measures of job satisfaction and performance used by the included studies.

Moderate quality meta-analyses

The meta-analysis of Carsten and Spector⁷⁴⁷ was of moderate quality. Potential publication bias was moderate as there were no sources of grey literature and only one database was searched, although supplementary literature searching methods were used. Selection bias was low because inclusion criteria were specific and detailed, but no details were provided about the coding process so potential extractor bias was high. A test of homogeneity of effect sizes was performed, and a random effects model was used, but the sensitivity analysis by occupational group alone was limited.

Low quality meta-analyses

The meta-analysis of Petty *et al.*⁷⁵¹ had a number of substantial weaknesses. The literature search was extremely limited, consisting only of hand-searching a number of journals, so the potential for publication bias was high. Extractor bias was also high: no information was given about the coding of the included studies. Potential selection bias, however, was low because clear inclusion criteria were given. There was no test for homogeneity of effect sizes, but a random effects model was used and moderator analyses were performed based on the different measures of job satisfaction, such as the JDI.

The meta-analysis of Irvine and Evans⁷⁴⁸ was also of poor quality. A test for homogeneity was performed

and a random effects model was used, but there was a high degree of publication and extractor bias, and a moderate degree of selection bias. Although sensitivity analyses were performed, these results were not related to job satisfaction.

The analysis of Scott and Taylor⁷⁵³ was of similar low quality. The potential for publication bias was high because the details of the literature search consisted of no more than the statement that, 'A comprehensive review of the ... literature uncovered 23 studies'. Inclusion criteria were limited, and potential extractor bias was high. However, although no test for homogeneity was performed, a random effects model was used and sensitivity analyses were performed, based on different measures of absenteeism.

The meta-analyses by Harter *et al.*⁷⁴⁶ Farrell and Stamm⁷⁵⁰ and Steel and Ovalle⁷⁵² were methodologically weaker. In Harter *et al.*⁷⁴⁶ publication bias was high because studies were only included if they were undertaken by the Gallup Organization. Some selection criteria were applied to the small pool of available studies, although these were limited, and no information was given on coding of data, so extractor bias may be high also. However, the form of analysis was good: a random effects model was used and subgroup analyses were performed.

In the other two analyses, extractor bias was high in both because no information was given on how the coding process was performed. Publication bias was moderate in Farrell and Stamm⁷⁵⁰ because databases were searched and other information retrieval methods, such as reference-tracking and hand-searching of journals, were used, but no grey literature sources were searched. Publication bias was high in Steel and Ovalle⁷⁵² because the literature search performed was even more limited. However, selection bias was low in Farrell and Stamm⁷⁵⁰ and Steel and Ovalle⁷⁵² because inclusion criteria were given. Neither analysis tested for homogeneity of effect sizes, although both did use a random effects model. Both analyses performed sensitivity analysis based on the occupation status of the sample, but Steel and Ovalle⁷⁵² conducted an additional analysis based on time to turnover.

Results

Generally, the high-quality meta-analyses reporting correlations with intermediate outcomes found job satisfaction to have a moderate to high positive association with perceptions of fairness, organisational commitment, job involvement and

motivation. The high-quality meta-analysis of Farragher *et al.*⁷³⁹ found a large, positive correlation between low job satisfaction and burnout (0.48). There were medium to large negative correlations with turnover intentions in two studies, although one of these meta-analyses was of very low quality.⁷⁴⁰

A relatively large number of meta-analyses reporting correlations between job satisfaction and employee behaviours were included in this review, therefore only those of high or moderate quality will be included here. Three meta-analyses reported small to medium positive relationships between job satisfaction and overall measures of OCB, and three reported small to medium negative associations between job satisfaction and turnover. The rigorous meta-analysis by Judge *et al.*⁶⁵⁶ found a moderate positive relationship between job satisfaction and performance (0.30), while two other studies found positive but small correlations.

Organisational commitment

Correlations with other intermediate outcomes

Studies

The literature search identified 40 studies, 10 of which met the inclusion criteria.^{175,176,754-761} An additional meta-analysis that satisfied these criteria was identified by reference-tracking of included meta-analyses.⁶⁶⁹ The definition of organisational commitment used by these studies is within the broad definition outlined in Chapter 4:

- The various meta-analyses performed by Cooper-Hakim and Viswesvaran⁷⁵⁴ were based on findings from 997 articles, which included correlations between organisational commitment and career commitment, job satisfaction and turnover intentions. The primary studies used many different measures to measure these correlates.
- Meyer *et al.*⁶⁶⁹ conducted a meta-analysis of 155 samples from both published and unpublished studies. The meta-analysis reported correlations between organisational commitment and the following intermediate outcomes of interest: justice, occupational commitment, job satisfaction and pay satisfaction. The analysis only included data from studies that used one or more of the commitment measures (affective, continuance or normative) developed by Allen and Meyer,⁷⁴¹ Meyer and Allen^{174,477,762} or Meyer *et al.*⁷⁶³

- Colquitt *et al.*⁷⁵⁵ performed a meta-analysis of 106 studies, reporting correlations between organisational commitment and job involvement.
- The meta-analysis of Mathieu and Zajac⁷⁵⁹ was based on 124 studies (174 independent samples) and reported correlations with the following behavioural or attitudinal outcomes of interest to this study: motivation, professional/occupational commitment, and job satisfaction. This meta-analysis did not specify particular measures as an inclusion criterion, but 132 of the samples assessed attitudinal commitment, 28 assessed calculative commitment, and 14 either combined the two or assessed another type of commitment.
- Cohen and Gattiker⁷⁵⁶ conducted a meta-analysis of 27 studies (31 samples) examining correlations with pay satisfaction, a dimension of job satisfaction. Once again, this meta-analysis did not specify particular measures as an inclusion criteria.
- Wallace¹⁷⁶ conducted a meta-analysis of 25 studies (25 samples) and reported data on correlations with organisational commitment only. Particular measures were not specified as inclusion criteria.
- Cohen⁷⁵⁸ conducted a meta-analysis of 30 studies (41 samples) and reported data on correlations with turnover intentions, although no particular measures were specified as inclusion criteria.
- Randall⁷⁶⁰ conducted a meta-analysis of 35 studies (35 samples), but reported no data on correlations between organisational commitment and the intermediate outcomes of interest to this study.
- The meta-analyses of Cohen¹⁷⁵ and Cohen and Hudecek⁷⁵⁷ also did not correlate organisational commitment with any outcomes of interest.
- Finally, Ferris and Aranya⁷⁶¹ reported correlations between different organisational commitment scales and intention to quit, job satisfaction and professional commitment. However, this was an analysis of their own sample, rather than a meta-analysis of two or more samples.

Critical appraisal of meta-analyses

None of the meta-analyses that satisfied the inclusion criteria for this review were of high quality, but the methodological quality of several was moderate.

The meta-analyses of Cooper-Hakim and Viswesvaran,⁷⁵⁴ Meyer *et al.*,⁶⁶⁹ Colquitt *et al.*,⁷⁵⁵ Wallace,¹⁷⁶ and Mathieu and Zajac⁷⁵⁹ were all of similar moderate quality. Only extractor bias was high in the analysis of Meyer *et al.*⁶⁶⁹ because information was not given on coding of the studies. Publication and selection bias were low, and moderator analysis was used to test the effect on the results of using different measures of organisational commitment. The potential for selection bias was high in the meta-analysis of Mathieu and Zajac⁷⁵⁹ but the scope for publication and extractor bias was low, and moderator analyses were performed by type of commitment. The meta-analysis of Wallace¹⁷⁶ was of similar quality. It was also subject to low publication and selection bias, but the potential for extractor bias was high. However, moderator analyses were performed by testing for the effect on the results of the professionalism, position or occupation of the sample, and for the scale used.

In the meta-analysis of Cooper-Hakim and Viswesvaran,⁷⁵⁴ the potential for selection bias was low and both data collection and coding were high quality, so publication and extractor bias were low. No test for homogeneity was performed, but an appropriate random effects model was used. No moderator analysis was performed to test the robustness of the results. The meta-analysis of Colquitt *et al.*⁷⁵⁵ was of slightly lower quality, having low selection and extractor bias, but high publication bias because it consisted only of a hand-search of named journals and contacting experts in the field: there was no search of electronic databases or sources of grey literature. No test of homogeneity was performed, but the random effects model of Hunter and Schmidt⁷³⁶ was used. No moderator analyses were performed.

Methodologically, the weakest meta-analyses were conducted by Cohen⁷⁵⁸ and Cohen and Gattiker.⁷⁵⁶ Extractor bias was high in both because no information was given on how the coding process was performed. Selection bias was high in Cohen⁷⁵⁸ because no information was given, and publication bias was also high because the only information provided on how this meta-analysis identified included studies was the performance of 'both manual and computer-assisted searches of social science, psychology and managerial literature'. Publication, selection and extractor bias were all high in Cohen and Gattiker.⁷⁵⁶ However, moderator analyses were performed by both meta-analyses.

Correlations with behaviours Studies

The literature search identified 40 studies, 11 of which met the inclusion criteria.^{162,175,744,745,754,757-760,764,765} Three additional meta-analyses that satisfied these criteria were identified by reference tracking of included meta-analyses.^{669,750,752}

- The meta-analyses performed by Cooper-Hakim and Viswesvaran,⁷⁵⁴ as mentioned in the previous section, were based on findings from 997 articles, which included correlations between organisational commitment and turnover, in addition to the correlations with intermediate outcomes described previously. Dalal⁷⁴⁴ conducted a meta-analysis of 38 studies (49 samples), and reported data on correlations between organisational commitment and an overall score for the six dimensions of OCB. This meta-analysis did not specify particular measures or characteristics of measures as inclusion criteria.
- Meyer *et al.*⁶⁶⁹ conducted a meta-analysis of 155 samples and, in addition to the correlations with intermediate outcomes mentioned above, reported correlations between organisational commitment and OCB.
- LePine *et al.*⁷⁴⁵ conducted a meta-analysis of 37 studies (37 samples), reporting data on correlations between organisational commitment and an overall score for the six dimensions of OCB (altruism, civic virtue, courtesy, sportsmanship, compliance and conscientiousness).
- The meta-analysis of Riketta⁷⁶⁵ was based on 93 published studies (111 independent samples) and reported correlations between attitudinal organisational commitment and job performance.
- Organ and Ryan¹⁶² conducted a meta-analysis of 55 studies (55 samples). They reported data on correlations between organisational commitment and five dimensions of OCB (altruism, civic virtue, courtesy, sportsmanship, and compliance, but not conscientiousness).
- Cohen⁷⁵⁸ conducted a meta-analysis of 30 studies (41 samples) and reported data on correlations with turnover and performance, alongside the correlation mentioned previously in relation to organisational commitment and intermediate outcomes. This meta-analysis did not specify particular measures as an inclusion criterion.
- The meta-analysis of Mathieu and Zajac,⁷⁵⁹ as mentioned in the previous section, was

based on 124 studies (174 independent samples). Correlations between organisational commitment and both turnover and job performance (as rated by others) were reported.

- Randall⁷⁶⁰ conducted a meta-analysis of 35 studies (35 samples) and, despite including no data in relation to correlations with the intermediate behaviours of interest, reported correlations between organisational commitment and the final outcomes of performance, attendance and remaining in the organisation (the last two being the inverse of the absence and turnover variables).
- The meta-analyses of Cohen¹⁷⁵ and Cohen and Hudecek⁷⁵⁷ both reported corrected correlations from 24 studies (36 samples) for turnover and organisational commitment.
- The meta-analysis of Farrell and Stamm⁷⁵⁰ was based on 72 studies and reported correlations between organisational commitment and the absence variables of total time lost and absence frequency.
- Steel and Ovalle⁷⁵² conducted a meta-analysis of 34 studies and reported data on correlations between organisational commitment and the final outcome of turnover.
- The analysis of Wright and Bonett⁷⁶⁴ was not a true meta-analysis because it only reported the correlation coefficients of organisational commitment and performance in identified studies, rather than providing an overall corrected correlation.

Critical appraisal of meta-analyses

One of the meta-analyses that satisfied the inclusion criteria for this review was of high quality,⁷⁶⁵ but the methodological quality of many was good or moderate.

The meta-analysis of Riketta⁷⁶⁵ was of high quality: publication, selection and extractor bias were all low, and although no search was performed to identify unpublished material, a clear rationale for this was given. A test for homogeneity was performed and a random effects model was used for the analysis. Moderator analyses were also performed, including population, type of performance, and different performance and commitment measures.

The meta-analyses of Dalal⁷⁴⁴ and Organ and Ryan¹⁶² were both good methodologically. Publication bias was moderate in both because only a small number of databases or grey literature sources were searched. Selection and extractor

bias were both low, and each study also performed moderator analyses.

Potential publication bias was only moderate in the study of LePine *et al.*,⁷⁴⁵ as grey literature was searched and relevant authors were contacted. Inclusion criteria were clear, so selection bias was low. A test for homogeneity was performed and a random effects model was used. Moderator analyses were also performed by testing for the effect on the results of using different measures of OCB and measuring different dimensions of this concept. Only extractor bias was high.

The meta-analyses of Cooper-Hakim and Viswesvaran,⁷⁵⁴ Meyer *et al.*,⁶⁶⁹ and Mathieu and Zajac⁷⁵⁹ were all of moderate quality. Details of biases in these analyses are described in the previous section.

Randall⁷⁶⁰ had low publication bias (a test was performed to demonstrate this) and selection bias, but high extractor bias because no information was provided on how the coding was performed. This meta-analysis used a random effects model and performed moderator analyses to test for the effect on the results of excluding different commitment and performance measures, and certain populations, from the analysis.

The weaker meta-analyses, methodologically, were conducted by Cohen and Hudecek,⁷⁵⁷ Cohen,^{175,758} Farrell and Stamm⁷⁵⁰ and Steel and Ovalle.⁷⁵² Extractor bias was high in all because information was not given on how the coding process was performed. Publication bias was moderate in Cohen and Hudecek,⁷⁵⁷ Cohen,¹⁷⁵ and Farrell and Stamm⁷⁵⁰ because databases were searched, and other information retrieval methods, such as reference-tracking and hand-searching of journals, were used, but no grey literature sources were searched. Publication bias was high in Steel and Ovalle⁷⁵² because the literature search performed was so limited. However, selection bias was low in Cohen,¹⁷⁵ Farrell and Stamm⁷⁵⁰ and Steel and Ovalle⁷⁵² because inclusion criteria were given. Selection bias was high in Cohen and Hudecek⁷⁵⁷ and Cohen⁷⁵⁸ because no information regarding inclusion criteria was reported. As mentioned previously, publication bias was also high in Cohen⁷⁵⁸ because very little information was provided with regard to how studies to be included in the meta-analysis were identified. However, some moderator analyses, based on the age, tenure, profession or time to turnover of the sample population, were performed.

The analyses of Cohen and Hudecek⁷⁵⁷ and Cohen¹⁷⁵ essentially reported the same data.

Results

A relatively high number of organisational commitment meta-analyses were included for review, so we report just on those studies of reasonable quality (although still with multiple sources of bias). Organisational commitment had a large negative relationship with turnover intentions and a large positive association with job satisfaction, organisational support, and motivation (although this last relationship is from a small number of studies in a single meta-analysis). There are moderate to high positive associations with organisational justice and job involvement.

Similarly, with regards meta-analyses reporting associations between organisational commitment and behaviours, only those studies of reasonable quality have been included here. Organisational commitment had small to moderate positive correlations with OCB, small positive correlations with performance, and a small to moderate negative association with turnover.

Professional/occupational commitment

Correlations with other intermediate outcomes

Studies

The literature search identified three studies, two of which met the inclusion criteria.^{176,177} The definition of professional commitment used by these studies falls within the broad definition outlined in Chapter 4:

- Lee *et al.*¹⁷⁷ conducted a meta-analysis of 76 studies (77 samples), reporting data on correlations between professional commitment and the following intermediate outcomes of interest: job satisfaction, burnout and organisational commitment. The inclusion criteria required a consistent definition of occupation commitment, so only studies using specified scales were included.
- Wallace¹⁷⁶ conducted a meta-analysis of 25 studies (25 samples) and reported data on correlations with organisational commitment only. This meta-analysis did not specify particular measures as inclusion criteria, but almost one-half of the included studies used a version of the organisational commitment questionnaire (OCQ), with the word 'organisation' being substituted with the word 'professional'.

Critical appraisal of meta-analyses

These two meta-analyses were both of moderate quality. The study of Lee *et al.*¹⁷⁷ was good. It was subject to only moderate publication bias, low selection and extractor bias, and moderator analyses were performed by testing the effect on the results of whether the sample was professional or non-professional. The meta-analysis of Wallace¹⁷⁶ was of only slightly lower quality. It was also subject to low publication and selection bias, but the potential for extractor bias was high. However, moderator analyses were performed, testing for the effect on the results of the professionalism, position or occupation of the sample, and for the scale used.

Correlations with behaviours Studies

The literature search identified three studies, two of which met the inclusion criteria:^{177,754}

- Lee *et al.*⁷⁴¹ conducted a meta-analysis of 76 studies (77 samples). Alongside the intermediate outcomes already discussed, data on correlations between professional commitment and the organisational behaviours of supervisor-rated performance and turnover were reported.
- The multiple meta-analyses conducted by Cooper-Hakim and Viswesvaran⁷⁵⁴ were based on findings from 997 articles. Correlations between occupational commitment and both turnover and performance were reported.

Critical appraisal of meta-analyses

Both of the meta-analyses included were of moderate quality. The study of Lee *et al.*¹⁷⁷ was of good quality (see previous section for further details). The potential for selection bias in the study of Cooper-Hakim and Viswesvaran⁷⁵⁴ was low to moderate because the inclusion criteria were limited and not specific. Publication and extractor bias were also low, as both data collection and coding were of high quality. Although a test for homogeneity was not performed, an appropriate random effects model was used. Moderator analyses were not performed.

Results

The meta-analyses of both Lee *et al.*¹⁷⁷ and Wallace¹⁷⁶ found large positive correlations between professional commitment and organisational commitment. Lee *et al.*¹⁷⁷ also reported a strong positive association with job satisfaction (0.44) and a strong negative association with burnout (-0.44), although it is important to acknowledge that these data came from a single meta-analysis only,

albeit of good quality. In relation to organisational behaviours, Lee *et al.*¹⁷⁷ and Cooper-Hakim and Viswesvaran⁷⁵⁴ reported professional commitment to have a weak negative association with turnover, and a very weak to weak positive relationship with performance.

Engagement

Correlations with other intermediate outcomes

Studies

No meta-analyses of engagement satisfied the inclusion criteria.

Correlations with behaviours Studies

The literature search identified one study that met the inclusion criteria:⁷⁴⁶

- Harter *et al.*⁷⁴⁶ conducted a meta-analysis of 42 studies across 36 organisations conducted by the Gallup Organization. They reported data on correlations between engagement and turnover (measured as a dimension of business unit performance).

Critical appraisal of meta-analysis

In terms of methodology, this was a low-quality meta-analysis. Publication bias was high because only studies undertaken by the Gallup Organization were included. Some selection criteria were applied to the small pool of available studies, although these were limited. Information was not given on coding of data, so extractor bias may have been high. However, the form of analysis was good: a random effects model was used, and subgroup analyses were performed.

Results

This meta-analysis found a moderate negative correlation between engagement and employee turnover (-0.30), with turnover considered to be a consequence of engagement. Nevertheless, these findings should be treated with caution, as the meta-analysis was of low quality.

Burnout

Correlations with other intermediate outcomes

Studies

The literature search identified 37 studies, two of which met the inclusion criteria.^{186,766} The definition of burnout used by these studies is within the broad definition outlined in Chapter 4:

- Lee and Ashforth¹⁸⁶ conducted a meta-analysis of 61 studies (61 samples). They reported data on correlations between the three dimensions of burnout, namely emotional exhaustion, depersonalisation and personal accomplishment (based on the Maslach Burnout Inventory, MBI), and the intermediate outcomes of job satisfaction, organisational commitment, job involvement and turnover intentions.
- Melchior *et al.*⁷⁶⁶ conducted a meta-analysis of nine studies. The small number of studies is due to the inclusion criteria: the studies included in this meta-analysis had to be composed of nurses engaged in psychiatric patient care. Further, the only variable of interest in this meta-analysis with reported data on correlations was job satisfaction, and the mean corrected correlation statistic for this variable was based on three studies only. Two of these studies used the MBI as their measure of burnout, and one used the Tedium Measure of Pines *et al.*²⁵⁰

Critical appraisal of meta-analyses

The meta-analyses of Melchior *et al.*⁷⁶⁶ and Lee and Ashforth¹⁸⁶ were both of low-to-moderate quality. Both used a random effects model, although neither tested for homogeneity of effect sizes. The potential degree of publication, selection and extractor bias in both studies was moderate only: some effort was taken to identify all relevant studies, to select relevant studies, and extract data with limited bias or error, but more could have been done. Also, neither study performed a moderator or sensitivity analysis, so the robustness of the findings was not tested.

Correlations with behaviours Studies

The literature search identified 37 studies, one of which met the inclusion criteria:⁴⁶

- Taris⁴⁶ conducted a meta-analysis of 16 studies, reporting correlations between two of the dimensions of burnout (emotional exhaustion and depersonalisation) and OCB.

Critical appraisal of meta-analyses

The meta-analysis of Taris⁴⁶ was of low quality. There was a high degree of potential publication bias because only a single database was searched, and no other methods of information retrieval were used. However, potential selection bias was low because clear inclusion criteria were given, but no information was given on coding and the analyst

had only a single author so extractor bias was high. A random effects model was used, but, again, there was no test for homogeneity of effect sizes and no moderator analyses were performed.

Results

The meta-analyses of both Melchior *et al.*⁷⁶⁶ and Lee and Ashforth¹⁸⁶ reported medium to large negative relationships between the burnout (overall burnout and the dimensions of emotional exhaustion and depersonalisation for each study, respectively) and job satisfaction. Although only reported by Lee and Ashforth,¹⁸⁶ the correlations between burnout (emotional exhaustion and depersonalisation) and organisational commitment were negative and of moderate strength, while positive moderate to strong relationships with turnover intentions and negative very small to very large associations with job involvement were also reported. Taris⁴⁶ found weak to moderate negative associations between two dimensions of burnout and OCB. Nevertheless, the conclusions drawn must be treated with caution, as these meta-analyses had multiple sources of bias.

Job involvement

Correlations with other intermediate outcomes Studies

The literature search identified eight studies, two of which met the inclusion:^{189,754}

- Brown¹⁸⁹ conducted a meta-analysis of 212 studies (249 independent samples). The meta-analysis reported correlations between job involvement and the following intermediate outcomes of interest: organisational commitment, turnover intentions, job satisfaction and pay satisfaction. The primary studies used many different measures to measure these correlates.
- Cooper-Hakim and Viswesvaran⁷⁵⁴ carried out multiple meta-analyses based on findings from 997 articles. Correlations were reported between job involvement and organisational commitment, career commitment, job satisfaction and turnover intentions. The primary studies used many different measures to measure these correlates.

Critical appraisal of meta-analyses

The meta-analyses that satisfied the inclusion criteria for this review were all were of reasonable and comparable methodological quality. The analysis of Brown¹⁸⁹ was of slightly higher quality

than the two other meta-analyses: there was a moderate degree of publication bias because only one database of peer-reviewed journals and no grey literature sources were searched, but the search strategy was good and both hand-searching of journals and reference tracking were performed. The inclusion criteria were also limited, introducing moderate potential selection bias, but coding was rigorous so the potential for extractor bias was low. Brown,¹⁸⁹ unlike Cooper-Hakim and Viswesvaran,⁷⁵⁴ also performed a moderator analysis (to test the effect of different measures of job involvement) and, therefore, the findings of Brown¹⁸⁹ are the most robust in this group of studies.

The potential for selection bias in the meta-analysis of Cooper-Hakim and Viswesvaran⁷⁵⁴ was moderate because the inclusion criteria were limited and unspecific, whereas both publication and extractor bias were low because data collection and coding were of high quality. Although no test for homogeneity was performed, an appropriate random effects model was used.

Correlations with behaviours Studies

The literature search identified eight studies, two of which met the inclusion criteria.^{189,754} A further meta-analysis was identified by reference-tracking:⁷⁵⁰

- Brown,¹⁸⁹ as mentioned in the previous section, conducted a meta-analysis of 212 studies (249 independent samples), reporting correlations between job involvement and the following organisational behaviours of interest: performance, absence and turnover.
- The various meta-analyses performed by Cooper-Hakim and Viswesvaran⁷⁵⁴ were based on findings from 997 articles, which reported, in addition to the correlations mentioned previously in relation to intermediate outcomes, correlations between job involvement and turnover.
- The meta-analysis of Farrell and Stamm⁷⁵⁰ was based on 72 studies and reported correlations between job involvement and the absence variables of total time lost and absence frequency.

Critical appraisal of meta-analyses

The meta-analyses that satisfied the inclusion criteria for this review were all were of reasonable

and comparable methodological quality. The analysis of Brown¹⁸⁹ was of slightly higher quality than the two other meta-analyses (see previous section for critical appraisal details).

Farrell and Stamm⁷⁵⁰ had moderate publication bias because several techniques were used to find the evidence and databases were searched, although database names were not given. However, no searches of formal grey literature sources were reported. Inclusion criteria were given, so selection bias was low, but extractor bias was high because no information was provided on the coding process. A random effects model was used, and some moderator analyses were performed, based on the occupational status of the sampled population.

In the meta-analyses of Cooper-Hakim and Viswesvaran,⁷⁵⁴ both publication and extractor bias were low, as data collection and coding were of high quality, and the potential for selection bias was low to moderate because the inclusion criteria were limited and none specific. No test for homogeneity was performed, but an appropriate random effects model was used. Moderator analyses were not performed beyond the focus on the different dimensions of the measurement of organisational commitment.

Results

Large positive correlations were found between job involvement and overall organisational commitment, while medium to large positive correlations were found between job involvement and satisfaction. Turnover intentions were reported to have a moderate negative association with job involvement.

Small negative relationships were reported with turnover and small to large negative relationships were found with absence. Brown¹⁸⁹ also reported a very small positive correlation between job involvement and performance. However, conclusions drawn from these findings must be treated with caution, as all meta-analyses were subject to multiple biases.

Turnover intentions

No meta-analyses of turnover intentions satisfied the inclusion criteria for intermediate outcomes or organisational behaviours.

Organisational justice

Correlations with other intermediate outcomes

The literature search identified 23 studies, only two of which met the inclusion criteria.^{202,670} The definition of justice or fairness used by these studies falls within the broad definition outlined in Chapter 4:

- Cohen-Charash and Spector²⁰² conducted a meta-analysis of 190 studies (190 samples). They reported data on correlations between perceived distributive and procedural justice and the following intermediate outcomes of interest: job satisfaction (intrinsic, extrinsic and pay), trust, turnover intentions and organisational commitment. The inclusion criteria required the use of 'specific measures of perceived ... justice', but these were not named.
- The meta-analysis of Colquitt *et al.*⁶⁷⁰ was performed on 183 studies (183 samples), and reported correlations on the following attitudinal and behavioural outcomes of interest: organisational commitment, job satisfaction and trust. Studies need not have used particular measures of justice to be included.

Witt and Nye⁷⁴³ conducted a meta-analysis on their own sample of 56 correlations using their own composite scale, and so this study was excluded.

Critical appraisal of meta-analyses

Neither of the two meta-analyses included were of high quality in terms of methodology. The meta-analysis of Cohen-Charash and Spector²⁰² had low publication and selection bias, but extractor bias was potentially high (no information was given about the coding process). Also, no test for homogeneity was performed, even though the analysis used a fixed effects model.⁷⁶⁷ However, moderator analyses were performed by testing for the effect on the results of the included study had been conducted in a 'laboratory' or in the field.

In the meta-analysis of Colquitt *et al.*⁶⁷⁰ both selection and extractor bias were low. However, the study was open to greater publication bias because only one database of peer-reviewed articles and no grey literature sources were searched, and few additional information retrieval techniques were used. Although Colquitt *et al.*⁶⁷⁰ performed no test for homogeneity, the random effects model of Hunter and Schmidt⁷³⁶ was used. Moderator analyses were also performed.

Correlations with behaviours

Studies

The literature search identified 23 studies, five of which met the inclusion criteria:^{162,202,670,744,745}

- Dalal⁷⁴⁴ conducted a meta-analysis of 38 studies (49 samples) and LePine *et al.*⁷⁴⁵ a meta-analysis of 37 studies (37 samples). Both reported data on correlations between overall scores of organisational justice and an overall score for OCB.
- Cohen-Charash and Spector²⁰² conducted a meta-analysis of 190 studies (190 samples), reporting data on correlations between perceived distributive and procedural justice and work performance (field and laboratory studies) and OCB (including several of its dimensions). Work performance was measured by a variety of scales, but it is unclear whether this was always organisational performance or individual task performance (p. 290).
- The meta-analysis of Colquitt *et al.*⁶⁷⁰ again mentioned in the previous section in relation to correlations with intermediate outcomes, was performed on 183 studies (183 samples) and reported correlations between justice and performance, withdrawal (turnover) and OCB (organisational and individual). Again, the nature of performance being measured was not clear.
- Organ and Ryan¹⁶² conducted a meta-analysis of 55 studies (55 samples), reporting data on correlations between fairness and OCB (an overall score and the dimensions of altruism and generalised compliance).

Critical appraisal of meta-analyses

The meta-analyses of Dalal⁷⁴⁴ and Organ and Ryan¹⁶² were both good methodologically. Publication bias was moderate in both cases because only a small number of databases or grey literature sources were searched, but selection and extractor bias were low. Both studies also performed moderator analyses. The methodological quality of the meta-analysis by LePine *et al.*⁷⁴⁵ was also good. There was only moderate potential publication bias because a search for grey literature was conducted and relevant authors were contacted. Selection bias was low because inclusion criteria were clear. LePine *et al.*⁷⁴⁵ also performed a test for homogeneity, used a random effects model for the analysis, and performed moderator analyses by testing for the effect on the results of using different measures of OCB and measuring different dimensions of this concept. Only extractor bias was high.

The meta-analyses of Cohen-Charash and Spector²⁰² and Colquitt *et al.*⁶⁷⁰ were of slightly lower quality (see previous section for details).

Results

The two meta-analyses concerning relationships between organisational justice and intermediate outcomes^{202,670} reported large positive correlations between justice and organisational commitment (affective and overall), job satisfaction and trust. Cohen-Charash and Spector²⁰² also found a strong negative association with turnover intentions (−0.40). However, neither study was of high quality.

With regards organisational behaviours, all five studies reported positive correlations between organisational justice and OCB, ranging in strength from weak to moderate. Cohen-Charash and Spector²⁰² and Colquitt *et al.*⁶⁷⁰ found small associations between distributive justice and performance and medium to large associations between procedural justice and performance. The meta-analysis of Colquitt *et al.*⁶⁷⁰ also reported large negative relationships with turnover (−0.50 and −0.46 for distributive and procedural justice, respectively).

Organisational support

Correlations with other intermediate outcomes

Studies

The literature search identified one study that met the inclusion criteria.²⁰⁸ They conducted a meta-analysis of 73 studies, reporting correlations between perceived organisational support (as measured by the Survey of Perceived Organisational Support, SPOS; Eisenberger *et al.*²⁰⁶) and the following intermediate outcomes of interest: procedural justice, organisational commitment, job satisfaction, job involvement and turnover intentions.

Critical appraisal of meta-analyses

This meta-analysis was of high quality. There was only a low degree of potential publication, selection and extractor bias because a full range of sources were searched for published and unpublished studies using various methods, specific inclusion criteria were applied, and coding was monitored. A random effects model was used, after testing for homogeneity of effect sizes. No moderator analysis was performed (based on organisation type).

Correlations with behaviours

Studies

The literature search identified one study that met the inclusion criteria:²⁰⁸

- As reported in the previous section, Rhoades and Eisenberger²⁰⁸ conducted a meta-analysis of 73 studies, reporting correlations between perceived organisational support (as measured by the SPOS; Eisenberger *et al.*²⁰⁶) and the behaviours of performance, OCB and turnover, in addition to the correlations previously mentioned.

Critical appraisal of meta-analyses

This meta-analysis was of high quality (see previous critical appraisal section for details).

Results

Rhoades and Eisenberger²⁰⁸ reported strong, positive correlations between organisational support and procedural justice (0.59), organisational commitment (0.67) and job satisfaction (0.62). The relationship with job involvement was positive and of moderate strength (0.32), whilst the association with turnover intentions was strong and negative (−0.51). Weak positive correlations were found between organisational support and job performance (0.18), and OCB (0.22), and a weak negative correlation with turnover (−0.11).

Although it is not possible to infer causality from the correlations, Rhoades and Eisenberger²⁰⁸ classify procedural justice as an antecedent of organisational support, and organisational commitment, job satisfaction, job involvement and turnover as consequences of organisational support.

Organisational climate

Correlations with other intermediate outcomes and behaviours

Studies

The literature search identified two studies that met the inclusion criteria for the intermediate outcomes of interest:^{673,674}

- Carr *et al.*⁶⁷³ conducted a meta-analysis of 51 studies (70 samples), and reported correlations between the three facets of climate proposed by Ostroff⁶⁷⁵ – affective, cognitive and instrumental climate perceptions – and

between each facet and job satisfaction organisational commitment and psychological well-being. The primary studies used many different measures to determine these correlates.

- Parker *et al.*⁶⁷⁴ conducted a meta-analysis of 94 studies (121 samples), reporting correlations between the five facets of psychological climate perceptions proposed by James *et al.* (e.g. Jones and James⁶⁷⁶) – job, role, leadership, work group and organisation – and between the five facets and job satisfaction, job involvement, commitment, psychological well-being and motivation.

Critical appraisal of meta-analyses

This meta-analysis of Carr *et al.*⁶⁷³ was of moderate quality. Potential selection and extractor bias were both low. The potential degree of publication bias was moderate because although hand-searching of specific journals and reference-tracking was performed, only one electronic database and no grey literature were searched, and no information was provided on the search strategy used. A fixed effects model was used, after testing for homogeneity of effect sizes. Only path analysis, and not moderator analysis, was performed.

This meta-analysis of Parker *et al.*⁶⁷⁴ was also of moderate quality. Potential selection and extractor bias were both low, as specific inclusion criteria and a high consistency score between five raters were reported. Potential publication bias was moderate because although clear search terms were included and reference-tracking was performed, only one electronic database, and no grey literature, was searched. The random effects model of Hunter and Schmidt⁷³⁶ was used, but no test for homogeneity was conducted and only path analyses, and not moderator analyses, were performed.

Correlations with behaviours

The literature search identified two studies that met the inclusion criteria:^{673,674}

- As previously described, Carr *et al.*⁶⁷³ meta-analysis of 51 studies (70 samples) reported correlations between affective, cognitive and instrumental climate perceptions and between each of these climate dimensions and job performance and withdrawal (turnover).
- Parker *et al.*⁶⁷⁴ conducted a meta-analysis of 94 studies (121 samples), reporting correlations between the climate dimensions of job, role,

leadership, work group and organisation and, in addition to the correlations mentioned above, between these dimensions and performance.

Critical appraisal of meta-analyses

Both meta-analyses were of moderate quality (see previous critical appraisal section for details).

Results

The meta-analysis by Carr *et al.*⁶⁷³ found large positive relationships between affective climate and job satisfaction (0.46) and instrumental climate and job satisfaction (0.44), and a medium positive correlation between cognitive climate perceptions and job satisfaction (0.33). Medium positive correlations were reported between the three climate facets and organisational commitment (affective, 0.34; cognitive, 0.28; instrumental, 0.26). A very weak relationship was reported between cognitive climate perceptions and well-being (0.07), while weak relationships were reported between affective and instrumental climate and well-being (0.17 and 0.11, respectively). Job performance was found to have very weak positive associations with climate (affective, 0.9; cognitive, 0.5; instrumental, 0.5), while turnover had a very weak negative association with cognitive climate (–0.07) and moderate negative associations with affective (–0.28) and instrumental (–0.33) climate perceptions. For further analysis and interpretation of the findings, see Chapter 9 (Correlations between climate, other intermediate outcomes and employee behaviours).

The meta-analysis by Parker *et al.*⁶⁷⁴ reported large, positive correlations between the climate facets of leader, work group and organisation and job satisfaction (0.41, 0.48, 0.42, respectively), a medium, positive correlation between role characteristics and job satisfaction (0.28), and a small, positive correlation between job characteristics and satisfaction (0.21). Job involvement and commitment were grouped together to form the dimension of ‘job attitudes’. Job attitudes was found to have a small, positive relationship with role characteristics (0.22), and medium, positive relationships with job (0.26), leader (0.32), work group (0.27) and organisation (0.36) characteristics. A strong, positive association was reported between leader characteristics and well-being (0.44), while moderate, positive associations were reported between role, job, work group and organisation characteristics and

well-being (0.26, 0.35, 0.35, 0.29, respectively). The relationship between role characteristics and performance was found to be very weak (0.06), while the relationships between job, leader, work group and organisation characteristics with performance were all reported to be small (0.10, 0.16, 0.12, 0.13, respectively). Motivation was found to have a very weak correlation with role

characteristics (0.09), and small correlations with job (0.20), leader (0.21), work group (0.20), and organisation (0.22) dimensions. See *Table 59* for a summary of these correlations. For further analysis and interpretation of the findings, see Chapter 9 (Correlations between climate, other intermediate outcomes and employee behaviours).

Health Technology Assessment reports published to date

Volume 1, 1997

No. 1

Home parenteral nutrition: a systematic review.

By Richards DM, Deeks JJ, Sheldon TA, Shaffer JL.

No. 2

Diagnosis, management and screening of early localised prostate cancer.

A review by Selley S, Donovan J, Faulkner A, Coast J, Gillatt D.

No. 3

The diagnosis, management, treatment and costs of prostate cancer in England and Wales.

A review by Chamberlain J, Melia J, Moss S, Brown J.

No. 4

Screening for fragile X syndrome.

A review by Murray J, Cuckle H, Taylor G, Hewison J.

No. 5

A review of near patient testing in primary care.

By Hobbs FDR, Delaney BC, Fitzmaurice DA, Wilson S, Hyde CJ, Thorpe GH, *et al.*

No. 6

Systematic review of outpatient services for chronic pain control.

By McQuay HJ, Moore RA, Eccleston C, Morley S, de C Williams AC.

No. 7

Neonatal screening for inborn errors of metabolism: cost, yield and outcome.

A review by Pollitt RJ, Green A, McCabe CJ, Booth A, Cooper NJ, Leonard JV, *et al.*

No. 8

Preschool vision screening.

A review by Snowdon SK, Stewart-Brown SL.

No. 9

Implications of socio-cultural contexts for the ethics of clinical trials.

A review by Ashcroft RE, Chadwick DW, Clark SRL, Edwards RHT, Frith L, Hutton JL.

No. 10

A critical review of the role of neonatal hearing screening in the detection of congenital hearing impairment.

By Davis A, Bamford J, Wilson I, Ramkalawan T, Forshaw M, Wright S.

No. 11

Newborn screening for inborn errors of metabolism: a systematic review.

By Seymour CA, Thomason MJ, Chalmers RA, Addison GM, Bain MD, Cockburn F, *et al.*

No. 12

Routine preoperative testing: a systematic review of the evidence.

By Munro J, Booth A, Nicholl J.

No. 13

Systematic review of the effectiveness of laxatives in the elderly.

By Petticrew M, Watt I, Sheldon T.

No. 14

When and how to assess fast-changing technologies: a comparative study of medical applications of four generic technologies.

A review by Mowatt G, Bower DJ, Brebner JA, Cairns JA, Grant AM, McKee L.

Volume 2, 1998

No. 1

Antenatal screening for Down's syndrome.

A review by Wald NJ, Kennard A, Hackshaw A, McGuire A.

No. 2

Screening for ovarian cancer: a systematic review.

By Bell R, Petticrew M, Luengo S, Sheldon TA.

No. 3

Consensus development methods, and their use in clinical guideline development.

A review by Murphy MK, Black NA, Lamping DL, McKee CM, Sanderson CFB, Askham J, *et al.*

No. 4

A cost-utility analysis of interferon beta for multiple sclerosis.

By Parkin D, McNamee P, Jacoby A, Miller P, Thomas S, Bates D.

No. 5

Effectiveness and efficiency of methods of dialysis therapy for end-stage renal disease: systematic reviews.

By MacLeod A, Grant A, Donaldson C, Khan I, Campbell M, Daly C, *et al.*

No. 6

Effectiveness of hip prostheses in primary total hip replacement: a critical review of evidence and an economic model.

By Faulkner A, Kennedy LG, Baxter K, Donovan J, Wilkinson M, Bevan G.

No. 7

Antimicrobial prophylaxis in colorectal surgery: a systematic review of randomised controlled trials.

By Song F, Glenny AM.

No. 8

Bone marrow and peripheral blood stem cell transplantation for malignancy.

A review by Johnson PWM, Simmet SJ, Sweetenham JW, Morgan GJ, Stewart LA.

No. 9

Screening for speech and language delay: a systematic review of the literature.

By Law J, Boyle J, Harris F, Harkness A, Nye C.

No. 10

Resource allocation for chronic stable angina: a systematic review of effectiveness, costs and cost-effectiveness of alternative interventions.

By Sculpher MJ, Petticrew M, Kelland JL, Elliott RA, Holdright DR, Buxton MJ.

No. 11

Detection, adherence and control of hypertension for the prevention of stroke: a systematic review.

By Ebrahim S.

No. 12

Postoperative analgesia and vomiting, with special reference to day-case surgery: a systematic review.

By McQuay HJ, Moore RA.

No. 13

Choosing between randomised and nonrandomised studies: a systematic review.

By Britton A, McKee M, Black N, McPherson K, Sanderson C, Bain C.

No. 14

Evaluating patient-based outcome measures for use in clinical trials.

A review by Fitzpatrick R, Davey C, Buxton MJ, Jones DR.

No. 15

Ethical issues in the design and conduct of randomised controlled trials.

A review by Edwards SJL, Lilford RJ, Braunholtz DA, Jackson JC, Hewison J, Thornton J.

No. 16

Qualitative research methods in health technology assessment: a review of the literature.

By Murphy E, Dingwall R, Greatbatch D, Parker S, Watson P.

No. 17

The costs and benefits of paramedic skills in pre-hospital trauma care.

By Nicholl J, Hughes S, Dixon S, Turner J, Yates D.

No. 18

Systematic review of endoscopic ultrasound in gastro-oesophageal cancer.

By Harris KM, Kelly S, Berry E, Hutton J, Roderick P, Cullingworth J, *et al.*

No. 19

Systematic reviews of trials and other studies.

By Sutton AJ, Abrams KR, Jones DR, Sheldon TA, Song F.

No. 20

Primary total hip replacement surgery: a systematic review of outcomes and modelling of cost-effectiveness associated with different prostheses.

A review by Fitzpatrick R, Shortall E, Sculpher M, Murray D, Morris R, Lodge M, *et al.*

Volume 3, 1999

No. 1

Informed decision making: an annotated bibliography and systematic review.

By Bekker H, Thornton JG, Airey CM, Connelly JB, Hewison J, Robinson MB, *et al.*

No. 2

Handling uncertainty when performing economic evaluation of healthcare interventions.

A review by Briggs AH, Gray AM.

No. 3

The role of expectancies in the placebo effect and their use in the delivery of health care: a systematic review.

By Crow R, Gage H, Hampson S, Hart J, Kimber A, Thomas H.

No. 4

A randomised controlled trial of different approaches to universal antenatal HIV testing: uptake and acceptability. Annex: Antenatal HIV testing – assessment of a routine voluntary approach.

By Simpson WM, Johnstone FD, Boyd FM, Goldberg DJ, Hart GJ, Gormley SM, *et al.*

No. 5

Methods for evaluating area-wide and organisation-based interventions in health and health care: a systematic review.

By Koukounne OC, Gulliford MC, Chinn S, Sterne JAC, Burney PGJ.

No. 6

Assessing the costs of healthcare technologies in clinical trials.

A review by Johnston K, Buxton MJ, Jones DR, Fitzpatrick R.

No. 7

Cooperatives and their primary care emergency centres: organisation and impact.

By Hallam L, Henthorne K.

No. 8

Screening for cystic fibrosis.

A review by Murray J, Cuckle H, Taylor G, Littlewood J, Hewison J.

No. 9

A review of the use of health status measures in economic evaluation.

By Brazier J, Deverill M, Green C, Harper R, Booth A.

No. 10

Methods for the analysis of quality-of-life and survival data in health technology assessment.

A review by Billingham LJ, Abrams KR, Jones DR.

No. 11

Antenatal and neonatal haemoglobinopathy screening in the UK: review and economic analysis.

By Zeuner D, Ades AE, Karnon J, Brown J, Dezateux C, Anionwu EN.

No. 12

Assessing the quality of reports of randomised trials: implications for the conduct of meta-analyses.

A review by Moher D, Cook DJ, Jadad AR, Tugwell P, Moher M, Jones A, *et al.*

No. 13

'Early warning systems' for identifying new healthcare technologies.

By Robert G, Stevens A, Gabbay J.

No. 14

A systematic review of the role of human papillomavirus testing within a cervical screening programme.

By Cuzick J, Sasieni P, Davies P, Adams J, Normand C, Frater A, *et al.*

No. 15

Near patient testing in diabetes clinics: appraising the costs and outcomes.

By Grieve R, Beech R, Vincent J, Mazurkiewicz J.

No. 16

Positron emission tomography: establishing priorities for health technology assessment.

A review by Robert G, Milne R.

No. 17 (Pt 1)

The debridement of chronic wounds: a systematic review.

By Bradley M, Cullum N, Sheldon T.

No. 17 (Pt 2)

Systematic reviews of wound care management: (2) Dressings and topical agents used in the healing of chronic wounds.

By Bradley M, Cullum N, Nelson EA, Petticrew M, Sheldon T, Torgerson D.

No. 18

A systematic literature review of spiral and electron beam computed tomography: with particular reference to clinical applications in hepatic lesions, pulmonary embolus and coronary artery disease.

By Berry E, Kelly S, Hutton J, Harris KM, Roderick P, Boyce JC, *et al.*

No. 19

What role for statins? A review and economic model.

By Ebrahim S, Davey Smith G, McCabe C, Payne N, Pickin M, Sheldon TA, *et al.*

No. 20

Factors that limit the quality, number and progress of randomised controlled trials.

A review by Prescott RJ, Counsell CE, Gillespie WJ, Grant AM, Russell IT, Kiauka S, *et al.*

No. 21

Antimicrobial prophylaxis in total hip replacement: a systematic review.

By Glennly AM, Song F.

No. 22

Health promoting schools and health promotion in schools: two systematic reviews.

By Lister-Sharp D, Chapman S, Stewart-Brown S, Sowden A.

No. 23

Economic evaluation of a primary care-based education programme for patients with osteoarthritis of the knee.

A review by Lord J, Victor C, Littlejohns P, Ross FM, Axford JS.

Volume 4, 2000**No. 1**

The estimation of marginal time preference in a UK-wide sample (TEMPUS) project.

A review by Cairns JA, van der Pol MM.

No. 2

Geriatric rehabilitation following fractures in older people: a systematic review.

By Cameron I, Crotty M, Currie C, Finnegan T, Gillespie L, Gillespie W, *et al.*

No. 3

Screening for sickle cell disease and thalassaemia: a systematic review with supplementary research.

By Davies SC, Cronin E, Gill M, Greengross P, Hickman M, Normand C.

No. 4

Community provision of hearing aids and related audiology services.

A review by Reeves DJ, Alborz A, Hickson FS, Bamford JM.

No. 5

False-negative results in screening programmes: systematic review of impact and implications.

By Peticrew MP, Sowden AJ, Lister-Sharp D, Wright K.

No. 6

Costs and benefits of community postnatal support workers: a randomised controlled trial.

By Morrell CJ, Spiby H, Stewart P, Walters S, Morgan A.

No. 7

Implantable contraceptives (subdermal implants and hormonally impregnated intrauterine systems) versus other forms of reversible contraceptives: two systematic reviews to assess relative effectiveness, acceptability, tolerability and cost-effectiveness.

By French RS, Cowan FM, Mansour DJA, Morris S, Procter T, Hughes D, *et al.*

No. 8

An introduction to statistical methods for health technology assessment.

A review by White SJ, Ashby D, Brown PJ.

No. 9

Disease-modifying drugs for multiple sclerosis: a rapid and systematic review.

By Clegg A, Bryant J, Milne R.

No. 10

Publication and related biases.

A review by Song F, Eastwood AJ, Gilbody S, Duley L, Sutton AJ.

No. 11

Cost and outcome implications of the organisation of vascular services.

By Michaels J, Brazier J, Palfreyman S, Shackley P, Slack R.

No. 12

Monitoring blood glucose control in diabetes mellitus: a systematic review.

By Coster S, Gulliford MC, Seed PT, Powrie JK, Swaminathan R.

No. 13

The effectiveness of domiciliary health visiting: a systematic review of international studies and a selective review of the British literature.

By Elkan R, Kendrick D, Hewitt M, Robinson JJA, Tolley K, Blair M, *et al.*

No. 14

The determinants of screening uptake and interventions for increasing uptake: a systematic review.

By Jepson R, Clegg A, Forbes C, Lewis R, Sowden A, Kleijnen J.

No. 15

The effectiveness and cost-effectiveness of prophylactic removal of wisdom teeth.

A rapid review by Song F, O'Meara S, Wilson P, Golder S, Kleijnen J.

No. 16

Ultrasound screening in pregnancy: a systematic review of the clinical effectiveness, cost-effectiveness and women's views.

By Bricker L, Garcia J, Henderson J, Mugford M, Neilson J, Roberts T, *et al.*

No. 17

A rapid and systematic review of the effectiveness and cost-effectiveness of the taxanes used in the treatment of advanced breast and ovarian cancer.

By Lister-Sharp D, McDonagh MS, Khan KS, Kleijnen J.

No. 18

Liquid-based cytology in cervical screening: a rapid and systematic review.

By Payne N, Chilcott J, McGoogan E.

No. 19

Randomised controlled trial of non-directive counselling, cognitive-behaviour therapy and usual general practitioner care in the management of depression as well as mixed anxiety and depression in primary care.

By King M, Sibbald B, Ward E, Bower P, Lloyd M, Gabbay M, *et al.*

No. 20

Routine referral for radiography of patients presenting with low back pain: is patients' outcome influenced by GPs' referral for plain radiography?

By Kerry S, Hilton S, Patel S, Dundas D, Rink E, Lord J.

No. 21

Systematic reviews of wound care management: (3) antimicrobial agents for chronic wounds; (4) diabetic foot ulceration.

By O'Meara S, Cullum N, Majid M, Sheldon T.

No. 22

Using routine data to complement and enhance the results of randomised controlled trials.

By Lewsey JD, Leyland AH, Murray GD, Boddy FA.

No. 23

Coronary artery stents in the treatment of ischaemic heart disease: a rapid and systematic review.

By Meads C, Cummins C, Jolly K, Stevens A, Burls A, Hyde C.

No. 24

Outcome measures for adult critical care: a systematic review.

By Hayes JA, Black NA, Jenkinson C, Young JD, Rowan KM, Daly K, *et al.*

No. 25

A systematic review to evaluate the effectiveness of interventions to promote the initiation of breastfeeding.

By Fairbank L, O'Meara S, Renfrew MJ, Woolridge M, Sowden AJ, Lister-Sharp D.

No. 26

Implantable cardioverter defibrillators: arrhythmias. A rapid and systematic review.

By Parkes J, Bryant J, Milne R.

No. 27

Treatments for fatigue in multiple sclerosis: a rapid and systematic review.

By Brañas P, Jordan R, Fry-Smith A, Burls A, Hyde C.

No. 28

Early asthma prophylaxis, natural history, skeletal development and economy (EASE): a pilot randomised controlled trial.

By Baxter-Jones ADG, Helms PJ, Russell G, Grant A, Ross S, Cairns JA, *et al.*

No. 29

Screening for hypercholesterolaemia versus case finding for familial hypercholesterolaemia: a systematic review and cost-effectiveness analysis.

By Marks D, Wonderling D, Thorogood M, Lambert H, Humphries SE, Neil HAW.

No. 30

A rapid and systematic review of the clinical effectiveness and cost-effectiveness of glycoprotein IIb/IIIa antagonists in the medical management of unstable angina.

By McDonagh MS, Bachmann LM, Golder S, Kleijnen J, ter Riet G.

No. 31

A randomised controlled trial of prehospital intravenous fluid replacement therapy in serious trauma.

By Turner J, Nicholl J, Webber L, Cox H, Dixon S, Yates D.

No. 32

Intrathecal pumps for giving opioids in chronic pain: a systematic review.

By Williams JE, Louw G, Towler G.

No. 33

Combination therapy (interferon alfa and ribavirin) in the treatment of chronic hepatitis C: a rapid and systematic review.

By Shepherd J, Waugh N, Hewitson P.

No. 34

A systematic review of comparisons of effect sizes derived from randomised and non-randomised studies.

By MacLehose RR, Reeves BC, Harvey IM, Sheldon TA, Russell IT, Black AMS.

No. 35

Intravascular ultrasound-guided interventions in coronary artery disease: a systematic literature review, with decision-analytic modelling, of outcomes and cost-effectiveness.

By Berry E, Kelly S, Hutton J, Lindsay HSJ, Blaxill JM, Evans JA, *et al.*

No. 36

A randomised controlled trial to evaluate the effectiveness and cost-effectiveness of counselling patients with chronic depression.

By Simpson S, Corney R, Fitzgerald P, Beecham J.

No. 37

Systematic review of treatments for atopic eczema.

By Hoare C, Li Wan Po A, Williams H.

No. 38

Bayesian methods in health technology assessment: a review.

By Spiegelhalter DJ, Myles JP, Jones DR, Abrams KR.

No. 39

The management of dyspepsia: a systematic review.

By Delaney B, Moayyedi P, Deeks J, Innes M, Soo S, Barton P, *et al.*

No. 40

A systematic review of treatments for severe psoriasis.

By Griffiths CEM, Clark CM, Chalmers RJG, Li Wan Po A, Williams HC.

Volume 5, 2001

No. 1

Clinical and cost-effectiveness of donepezil, rivastigmine and galantamine for Alzheimer's disease: a rapid and systematic review.

By Clegg A, Bryant J, Nicholson T, McIntyre L, De Broe S, Gerard K, *et al.*

No. 2

The clinical effectiveness and cost-effectiveness of riluzole for motor neurone disease: a rapid and systematic review.

By Stewart A, Sandercock J, Bryan S, Hyde C, Barton PM, Fry-Smith A, *et al.*

No. 3

Equity and the economic evaluation of healthcare.

By Sassi F, Archard L, Le Grand J.

No. 4

Quality-of-life measures in chronic diseases of childhood.

By Eiser C, Morse R.

No. 5

Eliciting public preferences for healthcare: a systematic review of techniques.

By Ryan M, Scott DA, Reeves C, Bate A, van Teijlingen ER, Russell EM, *et al.*

No. 6

General health status measures for people with cognitive impairment: learning disability and acquired brain injury.

By Riemsma RP, Forbes CA, Glanville JM, Eastwood AJ, Kleijnen J.

No. 7

An assessment of screening strategies for fragile X syndrome in the UK.

By Pembrey ME, Barnicoat AJ, Carmichael B, Bobrow M, Turner G.

No. 8

Issues in methodological research: perspectives from researchers and commissioners.

By Lilford RJ, Richardson A, Stevens A, Fitzpatrick R, Edwards S, Rock F, *et al.*

No. 9

Systematic reviews of wound care management: (5) beds; (6) compression; (7) laser therapy, therapeutic ultrasound, electrotherapy and electromagnetic therapy.

By Cullum N, Nelson EA, Flemming K, Sheldon T.

No. 10

Effects of educational and psychosocial interventions for adolescents with diabetes mellitus: a systematic review.

By Hampson SE, Skinner TC, Hart J, Storey L, Gage H, Foxcroft D, *et al.*

No. 11

Effectiveness of autologous chondrocyte transplantation for hyaline cartilage defects in knees: a rapid and systematic review.

By Jobanputra P, Parry D, Fry-Smith A, Burls A.

No. 12

Statistical assessment of the learning curves of health technologies.

By Ramsay CR, Grant AM, Wallace SA, Garthwaite PH, Monk AF, Russell IT.

No. 13

The effectiveness and cost-effectiveness of temozolomide for the treatment of recurrent malignant glioma: a rapid and systematic review.

By Dinnes J, Cave C, Huang S, Major K, Milne R.

No. 14

A rapid and systematic review of the clinical effectiveness and cost-effectiveness of debriding agents in treating surgical wounds healing by secondary intention.

By Lewis R, Whiting P, ter Riet G, O'Meara S, Glanville J.

No. 15

Home treatment for mental health problems: a systematic review.

By Burns T, Knapp M, Catty J, Healey A, Henderson J, Watt H, *et al.*

No. 16

How to develop cost-conscious guidelines.

By Eccles M, Mason J.

No. 17

The role of specialist nurses in multiple sclerosis: a rapid and systematic review.

By De Broe S, Christopher F, Waugh N.

No. 18

A rapid and systematic review of the clinical effectiveness and cost-effectiveness of orlistat in the management of obesity.

By O'Meara S, Riemsma R, Shirran L, Mather L, ter Riet G.

No. 19

The clinical effectiveness and cost-effectiveness of pioglitazone for type 2 diabetes mellitus: a rapid and systematic review.

By Chilcott J, Wight J, Lloyd Jones M, Tappenden P.

No. 20

Extended scope of nursing practice: a multicentre randomised controlled trial of appropriately trained nurses and preregistration house officers in preoperative assessment in elective general surgery.

By Kinley H, Czoski-Murray C, George S, McCabe C, Primrose J, Reilly C, *et al.*

No. 21

Systematic reviews of the effectiveness of day care for people with severe mental disorders: (1) Acute day hospital versus admission; (2) Vocational rehabilitation; (3) Day hospital versus outpatient care.

By Marshall M, Crowther R, Almaraz-Serrano A, Creed F, Sledge W, Kluiters H, *et al.*

No. 22

The measurement and monitoring of surgical adverse events.

By Bruce J, Russell EM, Mollison J, Krukowski ZH.

No. 23

Action research: a systematic review and guidance for assessment.

By Waterman H, Tillen D, Dickson R, de Koning K.

No. 24

A rapid and systematic review of the clinical effectiveness and cost-effectiveness of gemcitabine for the treatment of pancreatic cancer.

By Ward S, Morris E, Bansback N, Calvert N, Crellin A, Forman D, *et al.*

No. 25

A rapid and systematic review of the evidence for the clinical effectiveness and cost-effectiveness of irinotecan, oxaliplatin and raltitrexed for the treatment of advanced colorectal cancer.

By Lloyd Jones M, Hummel S, Bansback N, Orr B, Seymour M.

No. 26

Comparison of the effectiveness of inhaler devices in asthma and chronic obstructive airways disease: a systematic review of the literature.

By Brocklebank D, Ram F, Wright J, Barry P, Cates C, Davies L, *et al.*

No. 27

The cost-effectiveness of magnetic resonance imaging for investigation of the knee joint.

By Bryan S, Weatherburn G, Bungay H, Hatrick C, Salas C, Parry D, *et al.*

No. 28

A rapid and systematic review of the clinical effectiveness and cost-effectiveness of topotecan for ovarian cancer.

By Forbes C, Shirran L, Bagnall A-M, Duffy S, ter Riet G.

No. 29

Superseded by a report published in a later volume.

No. 30

The role of radiography in primary care patients with low back pain of at least 6 weeks duration: a randomised (unblinded) controlled trial.

By Kendrick D, Fielding K, Bentley E, Miller P, Kerslake R, Pringle M.

No. 31

Design and use of questionnaires: a review of best practice applicable to surveys of health service staff and patients.

By McColl E, Jacoby A, Thomas L, Soutter J, Bamford C, Steen N, *et al.*

No. 32

A rapid and systematic review of the clinical effectiveness and cost-effectiveness of paclitaxel, docetaxel, gemcitabine and vinorelbine in non-small-cell lung cancer.

By Clegg A, Scott DA, Sidhu M, Hewitson P, Waugh N.

No. 33

Subgroup analyses in randomised controlled trials: quantifying the risks of false-positives and false-negatives.

By Brookes ST, Whitley E, Peters TJ, Mulheran PA, Egger M, Davey Smith G.

No. 34

Depot antipsychotic medication in the treatment of patients with schizophrenia: (1) Meta-review; (2) Patient and nurse attitudes.

By David AS, Adams C.

No. 35

A systematic review of controlled trials of the effectiveness and cost-effectiveness of brief psychological treatments for depression.

By Churchill R, Hunot V, Corney R, Knapp M, McGuire H, Tylee A, *et al.*

No. 36

Cost analysis of child health surveillance.

By Sanderson D, Wright D, Acton C, Duree D.

Volume 6, 2002**No. 1**

A study of the methods used to select review criteria for clinical audit.

By Hearnshaw H, Harker R, Cheater F, Baker R, Grimshaw G.

No. 2

Fludarabine as second-line therapy for B cell chronic lymphocytic leukaemia: a technology assessment.

By Hyde C, Wake B, Bryan S, Barton P, Fry-Smith A, Davenport C, *et al.*

No. 3

Rituximab as third-line treatment for refractory or recurrent Stage III or IV follicular non-Hodgkin's lymphoma: a systematic review and economic evaluation.

By Wake B, Hyde C, Bryan S, Barton P, Song F, Fry-Smith A, *et al.*

No. 4

A systematic review of discharge arrangements for older people.

By Parker SG, Peet SM, McPherson A, Cannaby AM, Baker R, Wilson A, *et al.*

No. 5

The clinical effectiveness and cost-effectiveness of inhaler devices used in the routine management of chronic asthma in older children: a systematic review and economic evaluation.

By Peters J, Stevenson M, Beverley C, Lim J, Smith S.

No. 6

The clinical effectiveness and cost-effectiveness of sibutramine in the management of obesity: a technology assessment.

By O'Meara S, Riemsma R, Shirran L, Mather L, ter Riet G.

No. 7

The cost-effectiveness of magnetic resonance angiography for carotid artery stenosis and peripheral vascular disease: a systematic review.

By Berry E, Kelly S, Westwood ME, Davies LM, Gough MJ, Bamford JM, *et al.*

No. 8

Promoting physical activity in South Asian Muslim women through 'exercise on prescription'.

By Carroll B, Ali N, Azam N.

No. 9

Zanamivir for the treatment of influenza in adults: a systematic review and economic evaluation.

By Burls A, Clark W, Stewart T, Preston C, Bryan S, Jefferson T, *et al.*

No. 10

A review of the natural history and epidemiology of multiple sclerosis: implications for resource allocation and health economic models.

By Richards RG, Sampson FC, Beard SM, Tappenden P.

No. 11

Screening for gestational diabetes: a systematic review and economic evaluation.

By Scott DA, Loveman E, McIntyre L, Waugh N.

No. 12

The clinical effectiveness and cost-effectiveness of surgery for people with morbid obesity: a systematic review and economic evaluation.

By Clegg AJ, Colquitt J, Sidhu MK, Royle P, Loveman E, Walker A.

No. 13

The clinical effectiveness of trastuzumab for breast cancer: a systematic review.

By Lewis R, Bagnall A-M, Forbes C, Shirran E, Duffy S, Kleijnen J, *et al.*

No. 14

The clinical effectiveness and cost-effectiveness of vinorelbine for breast cancer: a systematic review and economic evaluation.

By Lewis R, Bagnall A-M, King S, Woolacott N, Forbes C, Shirran L, *et al.*

No. 15

A systematic review of the effectiveness and cost-effectiveness of metal-on-metal hip resurfacing arthroplasty for treatment of hip disease.

By Vale L, Wyness L, McCormack K, McKenzie L, Brazzelli M, Stearns SC.

No. 16

The clinical effectiveness and cost-effectiveness of bupropion and nicotine replacement therapy for smoking cessation: a systematic review and economic evaluation.

By Woolacott NF, Jones L, Forbes CA, Mather LC, Sowden AJ, Song FJ, *et al.*

No. 17

A systematic review of effectiveness and economic evaluation of new drug treatments for juvenile idiopathic arthritis: etanercept.

By Cummins C, Connock M, Fry-Smith A, Burls A.

No. 18

Clinical effectiveness and cost-effectiveness of growth hormone in children: a systematic review and economic evaluation.

By Bryant J, Cave C, Mihaylova B, Chase D, McIntyre L, Gerard K, *et al.*

No. 19

Clinical effectiveness and cost-effectiveness of growth hormone in adults in relation to impact on quality of life: a systematic review and economic evaluation.

By Bryant J, Loveman E, Chase D, Mihaylova B, Cave C, Gerard K, *et al.*

No. 20

Clinical medication review by a pharmacist of patients on repeat prescriptions in general practice: a randomised controlled trial.

By Zermansky AG, Petty DR, Raynor DK, Lowe CJ, Freemantle N, Vail A.

No. 21

The effectiveness of infliximab and etanercept for the treatment of rheumatoid arthritis: a systematic review and economic evaluation.

By Jobanputra P, Barton P, Bryan S, Burls A.

No. 22

A systematic review and economic evaluation of computerised cognitive behaviour therapy for depression and anxiety.

By Kaltenthaler E, Shackley P, Stevens K, Beverley C, Parry G, Chilcott J.

No. 23

A systematic review and economic evaluation of pegylated liposomal doxorubicin hydrochloride for ovarian cancer.

By Forbes C, Wilby J, Richardson G, Sculpher M, Mather L, Riemsma R.

No. 24

A systematic review of the effectiveness of interventions based on a stages-of-change approach to promote individual behaviour change.

By Riemsma RP, Pattenden J, Bridle C, Sowden AJ, Mather L, Watt IS, *et al.*

No. 25

A systematic review update of the clinical effectiveness and cost-effectiveness of glycoprotein IIb/IIIa antagonists.

By Robinson M, Ginnelly L, Sculpher M, Jones L, Riemsma R, Palmer S, *et al.*

No. 26

A systematic review of the effectiveness, cost-effectiveness and barriers to implementation of thrombolytic and neuroprotective therapy for acute ischaemic stroke in the NHS.

By Sandercock P, Berge E, Dennis M, Forbes J, Hand P, Kwan J, *et al.*

No. 27

A randomised controlled crossover trial of nurse practitioner versus doctor-led outpatient care in a bronchiectasis clinic.

By Caine N, Sharples LD, Hollingworth W, French J, Keogan M, Exley A, *et al.*

No. 28

Clinical effectiveness and cost – consequences of selective serotonin reuptake inhibitors in the treatment of sex offenders.

By Adi Y, Ashcroft D, Browne K, Beech A, Fry-Smith A, Hyde C.

No. 29

Treatment of established osteoporosis: a systematic review and cost-utility analysis.

By Kanis JA, Brazier JE, Stevenson M, Calvert NW, Lloyd Jones M.

No. 30

Which anaesthetic agents are cost-effective in day surgery? Literature review, national survey of practice and randomised controlled trial.

By Elliott RA, Payne K, Moore JK, Davies LM, Harper NJN, St Leger AS, *et al.*

No. 31

Screening for hepatitis C among injecting drug users and in genitourinary medicine clinics: systematic reviews of effectiveness, modelling study and national survey of current practice.

By Stein K, Dalziel K, Walker A, McIntyre L, Jenkins B, Horne J, *et al.*

No. 32

The measurement of satisfaction with healthcare: implications for practice from a systematic review of the literature.

By Crow R, Gage H, Hampson S, Hart J, Kimber A, Storey L, *et al.*

No. 33

The effectiveness and cost-effectiveness of imatinib in chronic myeloid leukaemia: a systematic review.

By Garside R, Round A, Dalziel K, Stein K, Royle R.

No. 34

A comparative study of hypertonic saline, daily and alternate-day rhDNase in children with cystic fibrosis.

By Suri R, Wallis C, Bush A, Thompson S, Normand C, Flather M, *et al.*

No. 35

A systematic review of the costs and effectiveness of different models of paediatric home care.

By Parker G, Bhakta P, Lovett CA, Paisley S, Olsen R, Turner D, *et al.*

Volume 7, 2003

No. 1

How important are comprehensive literature searches and the assessment of trial quality in systematic reviews? Empirical study.

By Egger M, Jüni P, Bartlett C, Hohenstein F, Sterne J.

No. 2

Systematic review of the effectiveness and cost-effectiveness, and economic evaluation, of home versus hospital or satellite unit haemodialysis for people with end-stage renal failure.

By Mowatt G, Vale L, Perez J, Wyness L, Fraser C, MacLeod A, *et al.*

No. 3

Systematic review and economic evaluation of the effectiveness of infliximab for the treatment of Crohn's disease.

By Clark W, Raftery J, Barton P, Song F, Fry-Smith A, Burls A.

No. 4

A review of the clinical effectiveness and cost-effectiveness of routine anti-D prophylaxis for pregnant women who are rhesus negative.

By Chilcott J, Lloyd Jones M, Wight J, Forman K, Wray J, Beverley C, *et al.*

No. 5

Systematic review and evaluation of the use of tumour markers in paediatric oncology: Ewing's sarcoma and neuroblastoma.

By Riley RD, Burchill SA, Abrams KR, Heney D, Lambert PC, Jones DR, *et al.*

No. 6

The cost-effectiveness of screening for *Helicobacter pylori* to reduce mortality and morbidity from gastric cancer and peptic ulcer disease: a discrete-event simulation model.

By Roderick P, Davies R, Raftery J, Crabbe D, Pearce R, Bhandari P, *et al.*

No. 7

The clinical effectiveness and cost-effectiveness of routine dental checks: a systematic review and economic evaluation.

By Davenport C, Elley K, Salas C, Taylor-Weetman CL, Fry-Smith A, Bryan S, *et al.*

No. 8

A multicentre randomised controlled trial assessing the costs and benefits of using structured information and analysis of women's preferences in the management of menorrhagia.

By Kennedy ADM, Sculpher MJ, Coulter A, Dwyer N, Rees M, Horsley S, *et al.*

No. 9

Clinical effectiveness and cost-utility of photodynamic therapy for wet age-related macular degeneration: a systematic review and economic evaluation.

By Meads C, Salas C, Roberts T, Moore D, Fry-Smith A, Hyde C.

No. 10

Evaluation of molecular tests for prenatal diagnosis of chromosome abnormalities.

By Grimshaw GM, Szczepura A, Hultén M, MacDonald F, Nevin NC, Sutton F, *et al.*

No. 11

First and second trimester antenatal screening for Down's syndrome: the results of the Serum, Urine and Ultrasound Screening Study (SURUSS).

By Wald NJ, Rodeck C, Hackshaw AK, Walters J, Chitty L, Mackinson AM.

No. 12

The effectiveness and cost-effectiveness of ultrasound locating devices for central venous access: a systematic review and economic evaluation.

By Calvert N, Hind D, McWilliams RG, Thomas SM, Beverley C, Davidson A.

No. 13

A systematic review of atypical antipsychotics in schizophrenia.

By Bagnall A-M, Jones L, Lewis R, Ginnelly L, Glanville J, Torgerson D, *et al.*

No. 14

Prostate Testing for Cancer and Treatment (ProtecT) feasibility study.

By Donovan J, Hamdy F, Neal D, Peters T, Oliver S, Brindle L, *et al.*

No. 15

Early thrombolysis for the treatment of acute myocardial infarction: a systematic review and economic evaluation.

By Boland A, Dundar Y, Bagust A, Haycox A, Hill R, Mujica Mota R, *et al.*

No. 16

Screening for fragile X syndrome: a literature review and modelling.

By Song FJ, Barton P, Sleightholme V, Yao GL, Fry-Smith A.

No. 17

Systematic review of endoscopic sinus surgery for nasal polyps.

By Dalziel K, Stein K, Round A, Garside R, Royle P.

No. 18

Towards efficient guidelines: how to monitor guideline use in primary care.

By Hutchinson A, McIntosh A, Cox S, Gilbert C.

No. 19

Effectiveness and cost-effectiveness of acute hospital-based spinal cord injuries services: systematic review.

By Bagnall A-M, Jones L, Richardson G, Duffy S, Riemsma R.

No. 20

Prioritisation of health technology assessment. The PATHS model: methods and case studies.

By Townsend J, Buxton M, Harper G.

No. 21

Systematic review of the clinical effectiveness and cost-effectiveness of tension-free vaginal tape for treatment of urinary stress incontinence.

By Cody J, Wyness L, Wallace S, Glazener C, Kilonzo M, Stearns S, *et al.*

No. 22

The clinical and cost-effectiveness of patient education models for diabetes: a systematic review and economic evaluation.

By Loveman E, Cave C, Green C, Royle P, Dunn N, Waugh N.

No. 23

The role of modelling in prioritising and planning clinical trials.

By Chilcott J, Brennan A, Booth A, Karnon J, Tappenden P.

No. 24

Cost-benefit evaluation of routine influenza immunisation in people 65-74 years of age.

By Allsup S, Gosney M, Haycox A, Regan M.

No. 25

The clinical and cost-effectiveness of pulsatile machine perfusion versus cold storage of kidneys for transplantation retrieved from heart-beating and non-heart-beating donors.

By Wight J, Chilcott J, Holmes M, Brewer N.

No. 26

Can randomised trials rely on existing electronic data? A feasibility study to explore the value of routine data in health technology assessment.

By Williams JG, Cheung WY, Cohen DR, Hutchings HA, Longo MF, Russell IT.

No. 27

Evaluating non-randomised intervention studies.

By Deeks JJ, Dinnes J, D'Amico R, Sowden AJ, Sakaravitch C, Song F, *et al.*

No. 28

A randomised controlled trial to assess the impact of a package comprising a patient-orientated, evidence-based self-help guidebook and patient-centred consultations on disease management and satisfaction in inflammatory bowel disease.

By Kennedy A, Nelson E, Reeves D, Richardson G, Roberts C, Robinson A, *et al.*

No. 29

The effectiveness of diagnostic tests for the assessment of shoulder pain due to soft tissue disorders: a systematic review.

By Dinnes J, Loveman E, McIntyre L, Waugh N.

No. 30

The value of digital imaging in diabetic retinopathy.

By Sharp PF, Olson J, Strachan F, Hipwell J, Ludbrook A, O'Donnell M, *et al.*

No. 31

Lowering blood pressure to prevent myocardial infarction and stroke: a new preventive strategy.

By Law M, Wald N, Morris J.

No. 32

Clinical and cost-effectiveness of capecitabine and tegafur with uracil for the treatment of metastatic colorectal cancer: systematic review and economic evaluation.

By Ward S, Kaltenthaler E, Cowan J, Brewer N.

No. 33

Clinical and cost-effectiveness of new and emerging technologies for early localised prostate cancer: a systematic review.

By Hummel S, Paisley S, Morgan A, Currie E, Brewer N.

No. 34

Literature searching for clinical and cost-effectiveness studies used in health technology assessment reports carried out for the National Institute for Clinical Excellence appraisal system.

By Royle P, Waugh N.

No. 35

Systematic review and economic decision modelling for the prevention and treatment of influenza A and B.

By Turner D, Wailoo A, Nicholson K, Cooper N, Sutton A, Abrams K.

No. 36

A randomised controlled trial to evaluate the clinical and cost-effectiveness of Hickman line insertions in adult cancer patients by nurses.

By Boland A, Haycox A, Bagust A, Fitzsimmons L.

No. 37

Redesigning postnatal care: a randomised controlled trial of protocol-based midwifery-led care focused on individual women's physical and psychological health needs.

By MacArthur C, Winter HR, Bick DE, Lilford RJ, Lancashire RJ, Knowles H, *et al.*

No. 38

Estimating implied rates of discount in healthcare decision-making.

By West RR, McNabb R, Thompson AGH, Sheldon TA, Grimley Evans J.

No. 39

Systematic review of isolation policies in the hospital management of methicillin-resistant *Staphylococcus aureus*: a review of the literature with epidemiological and economic modelling.

By Cooper BS, Stone SP, Kibbler CC, Cookson BD, Roberts JA, Medley GF, *et al.*

No. 40

Treatments for spasticity and pain in multiple sclerosis: a systematic review.

By Beard S, Hunn A, Wight J.

No. 41

The inclusion of reports of randomised trials published in languages other than English in systematic reviews.

By Moher D, Pham B, Lawson ML, Klassen TP.

No. 42

The impact of screening on future health-promoting behaviours and health beliefs: a systematic review.

By Bankhead CR, Brett J, Bukach C, Webster P, Stewart-Brown S, Munafo M, *et al.*

Volume 8, 2004

No. 1

What is the best imaging strategy for acute stroke?

By Wardlaw JM, Keir SL, Seymour J, Lewis S, Sandercock PAG, Dennis MS, *et al.*

No. 2

Systematic review and modelling of the investigation of acute and chronic chest pain presenting in primary care.

By Mant J, McManus RJ, Oakes RAL, Delaney BC, Barton PM, Deeks JJ, *et al.*

No. 3

The effectiveness and cost-effectiveness of microwave and thermal balloon endometrial ablation for heavy menstrual bleeding: a systematic review and economic modelling.

By Garside R, Stein K, Wyatt K, Round A, Price A.

No. 4

A systematic review of the role of bisphosphonates in metastatic disease.

By Ross JR, Saunders Y, Edmonds PM, Patel S, Wonderling D, Normand C, *et al.*

No. 5

Systematic review of the clinical effectiveness and cost-effectiveness of capecitabine (Xeloda®) for locally advanced and/or metastatic breast cancer.

By Jones L, Hawkins N, Westwood M, Wright K, Richardson G, Riemsma R.

No. 6

Effectiveness and efficiency of guideline dissemination and implementation strategies.

By Grimshaw JM, Thomas RE, MacLennan G, Fraser C, Ramsay CR, Vale L, *et al.*

No. 7

Clinical effectiveness and costs of the Sugarbaker procedure for the treatment of pseudomyxoma peritonei.

By Bryant J, Clegg AJ, Sidhu MK, Brodin H, Royle P, Davidson P.

No. 8

Psychological treatment for insomnia in the regulation of long-term hypnotic drug use.

By Morgan K, Dixon S, Mathers N, Thompson J, Tomeny M.

No. 9

Improving the evaluation of therapeutic interventions in multiple sclerosis: development of a patient-based measure of outcome.

By Hobart JC, Riazi A, Lamping DL, Fitzpatrick R, Thompson AJ.

No. 10

A systematic review and economic evaluation of magnetic resonance cholangiopancreatography compared with diagnostic endoscopic retrograde cholangiopancreatography.

By Kaltenthaler E, Bravo Vergel Y, Chilcott J, Thomas S, Blakeborough T, Walters SJ, *et al.*

No. 11

The use of modelling to evaluate new drugs for patients with a chronic condition: the case of antibodies against tumour necrosis factor in rheumatoid arthritis.

By Barton P, Jobanputra P, Wilson J, Bryan S, Burls A.

No. 12

Clinical effectiveness and cost-effectiveness of neonatal screening for inborn errors of metabolism using tandem mass spectrometry: a systematic review.

By Pandor A, Eastham J, Beverley C, Chilcott J, Paisley S.

No. 13

Clinical effectiveness and cost-effectiveness of pioglitazone and rosiglitazone in the treatment of type 2 diabetes: a systematic review and economic evaluation.

By Czoski-Murray C, Warren E, Chilcott J, Beverley C, Psyllaki MA, Cowan J.

No. 14

Routine examination of the newborn: the EMREN study. Evaluation of an extension of the midwife role including a randomised controlled trial of appropriately trained midwives and paediatric senior house officers.

By Townsend J, Wolke D, Hayes J, Davé S, Rogers C, Bloomfield L, *et al.*

No. 15

Involving consumers in research and development agenda setting for the NHS: developing an evidence-based approach.

By Oliver S, Clarke-Jones L, Rees R, Milne R, Buchanan P, Gabbay J, *et al.*

No. 16

A multi-centre randomised controlled trial of minimally invasive direct coronary bypass grafting versus percutaneous transluminal coronary angioplasty with stenting for proximal stenosis of the left anterior descending coronary artery.

By Reeves BC, Angelini GD, Bryan AJ, Taylor FC, Cripps T, Spyt TJ, *et al.*

No. 17

Does early magnetic resonance imaging influence management or improve outcome in patients referred to secondary care with low back pain? A pragmatic randomised controlled trial.

By Gilbert FJ, Grant AM, Gillan MGC, Vale L, Scott NW, Campbell MK, *et al.*

No. 18

The clinical and cost-effectiveness of anakinra for the treatment of rheumatoid arthritis in adults: a systematic review and economic analysis.

By Clark W, Jobanputra P, Barton P, Burls A.

No. 19

A rapid and systematic review and economic evaluation of the clinical and cost-effectiveness of newer drugs for treatment of mania associated with bipolar affective disorder.

By Bridle C, Palmer S, Bagnall A-M, Darba J, Duffy S, Sculpher M, *et al.*

No. 20

Liquid-based cytology in cervical screening: an updated rapid and systematic review and economic analysis.

By Karnon J, Peters J, Platt J, Chilcott J, McGoogan E, Brewer N.

No. 21

Systematic review of the long-term effects and economic consequences of treatments for obesity and implications for health improvement.

By Avenell A, Broom J, Brown TJ, Poobalan A, Aucott L, Stearns SC, *et al.*

No. 22

Autoantibody testing in children with newly diagnosed type 1 diabetes mellitus.

By Dretzke J, Cummins C, Sandercock J, Fry-Smith A, Barrett T, Burls A.

No. 23

Clinical effectiveness and cost-effectiveness of prehospital intravenous fluids in trauma patients.

By Dretzke J, Sandercock J, Bayliss S, Burls A.

No. 24

Newer hypnotic drugs for the short-term management of insomnia: a systematic review and economic evaluation.

By Dündar Y, Boland A, Strobl J, Dodd S, Haycox A, Bagust A, *et al.*

No. 25

Development and validation of methods for assessing the quality of diagnostic accuracy studies.

By Whiting P, Rutjes AWS, Dinnes J, Reitsma JB, Bossuyt PMM, Kleijnen J.

No. 26

EVALUATE hysterectomy trial: a multicentre randomised trial comparing abdominal, vaginal and laparoscopic methods of hysterectomy.

By Garry R, Fountain J, Brown J, Manca A, Mason S, Sculpher M, *et al.*

No. 27

Methods for expected value of information analysis in complex health economic models: developments on the health economics of interferon- β and glatiramer acetate for multiple sclerosis.

By Tappenden P, Chilcott JB, Eggington S, Oakley J, McCabe C.

No. 28

Effectiveness and cost-effectiveness of imatinib for first-line treatment of chronic myeloid leukaemia in chronic phase: a systematic review and economic analysis.

By Dalziel K, Round A, Stein K, Garside R, Price A.

No. 29

VenUS I: a randomised controlled trial of two types of bandage for treating venous leg ulcers.

By Iglesias C, Nelson EA, Cullum NA, Torgerson DJ, on behalf of the VenUS Team.

No. 30

Systematic review of the effectiveness and cost-effectiveness, and economic evaluation, of myocardial perfusion scintigraphy for the diagnosis and management of angina and myocardial infarction.

By Mowatt G, Vale L, Brazzelli M, Hernandez R, Murray A, Scott N, *et al.*

No. 31

A pilot study on the use of decision theory and value of information analysis as part of the NHS Health Technology Assessment programme.

By Claxton K, Ginnelly L, Sculpher M, Philips Z, Palmer S.

No. 32

The Social Support and Family Health Study: a randomised controlled trial and economic evaluation of two alternative forms of postnatal support for mothers living in disadvantaged inner-city areas.

By Wiggins M, Oakley A, Roberts I, Turner H, Rajan L, Austerberry H, *et al.*

No. 33

Psychosocial aspects of genetic screening of pregnant women and newborns: a systematic review.

By Green JM, Hewison J, Bekker HL, Bryant LD, Cuckle HS.

No. 34

Evaluation of abnormal uterine bleeding: comparison of three outpatient procedures within cohorts defined by age and menopausal status.

By Critchley HOD, Warner P, Lee AJ, Brechin S, Guise J, Graham B.

No. 35

Coronary artery stents: a rapid systematic review and economic evaluation.

By Hill R, Bagust A, Bakhai A, Dickson R, Dündar Y, Haycox A, *et al.*

No. 36

Review of guidelines for good practice in decision-analytic modelling in health technology assessment.

By Philips Z, Ginnelly L, Sculpher M, Claxton K, Golder S, Riemsma R, *et al.*

No. 37

Rituximab (MabThera®) for aggressive non-Hodgkin's lymphoma: systematic review and economic evaluation.

By Knight C, Hind D, Brewer N, Abbott V.

No. 38

Clinical effectiveness and cost-effectiveness of clopidogrel and modified-release dipyridamole in the secondary prevention of occlusive vascular events: a systematic review and economic evaluation.

By Jones L, Griffin S, Palmer S, Main C, Orton V, Sculpher M, *et al.*

No. 39

Pegylated interferon α -2a and -2b in combination with ribavirin in the treatment of chronic hepatitis C: a systematic review and economic evaluation.

By Shepherd J, Brodin H, Cave C, Waugh N, Price A, Gabbay J.

No. 40

Clopidogrel used in combination with aspirin compared with aspirin alone in the treatment of non-ST-segment-elevation acute coronary syndromes: a systematic review and economic evaluation.

By Main C, Palmer S, Griffin S, Jones L, Orton V, Sculpher M, *et al.*

No. 41

Provision, uptake and cost of cardiac rehabilitation programmes: improving services to under-represented groups.

By Beswick AD, Rees K, Griebisch I, Taylor FC, Burke M, West RR, *et al.*

No. 42

Involving South Asian patients in clinical trials.

By Hussain-Gambles M, Leese B, Atkin K, Brown J, Mason S, Tovey P.

No. 43

Clinical and cost-effectiveness of continuous subcutaneous insulin infusion for diabetes.

By Colquitt JL, Green C, Sidhu MK, Hartwell D, Waugh N.

No. 44

Identification and assessment of ongoing trials in health technology assessment reviews.

By Song FJ, Fry-Smith A, Davenport C, Bayliss S, Adi Y, Wilson JS, *et al.*

No. 45

Systematic review and economic evaluation of a long-acting insulin analogue, insulin glargine

By Warren E, Weatherley-Jones E, Chilcott J, Beverley C.

No. 46

Supplementation of a home-based exercise programme with a class-based programme for people with osteoarthritis of the knees: a randomised controlled trial and health economic analysis.

By McCarthy CJ, Mills PM, Pullen R, Richardson G, Hawkins N, Roberts CR, *et al.*

No. 47

Clinical and cost-effectiveness of once-daily versus more frequent use of same potency topical corticosteroids for atopic eczema: a systematic review and economic evaluation.

By Green C, Colquitt JL, Kirby J, Davidson P, Payne E.

No. 48

Acupuncture of chronic headache disorders in primary care: randomised controlled trial and economic analysis.

By Vickers AJ, Rees RW, Zollman CE, McCarney R, Smith CM, Ellis N, *et al.*

No. 49

Generalisability in economic evaluation studies in healthcare: a review and case studies.

By Sculpher MJ, Pang FS, Manca A, Drummond MF, Golder S, Urdahl H, *et al.*

No. 50

Virtual outreach: a randomised controlled trial and economic evaluation of joint teleconferenced medical consultations.

By Wallace P, Barber J, Clayton W, Currell R, Fleming K, Garner P, *et al.*

Volume 9, 2005

No. 1

Randomised controlled multiple treatment comparison to provide a cost-effectiveness rationale for the selection of antimicrobial therapy in acne.

By Ozolins M, Eady EA, Avery A, Cunliffe WJ, O'Neill C, Simpson NB, *et al.*

No. 2

Do the findings of case series studies vary significantly according to methodological characteristics?

By Dalziel K, Round A, Stein K, Garside R, Castelnovo E, Payne L.

No. 3

Improving the referral process for familial breast cancer genetic counselling: findings of three randomised controlled trials of two interventions.

By Wilson BJ, Torrance N, Mollison J, Wordsworth S, Gray JR, Haites NE, *et al.*

No. 4

Randomised evaluation of alternative electrosurgical modalities to treat bladder outflow obstruction in men with benign prostatic hyperplasia.

By Fowler C, McAllister W, Plail R, Karim O, Yang Q.

No. 5

A pragmatic randomised controlled trial of the cost-effectiveness of palliative therapies for patients with inoperable oesophageal cancer.

By Shenfine J, McNamee P, Steen N, Bond J, Griffin SM.

No. 6

Impact of computer-aided detection prompts on the sensitivity and specificity of screening mammography.

By Taylor P, Champness J, Given-Wilson R, Johnston K, Potts H.

No. 7

Issues in data monitoring and interim analysis of trials.

By Grant AM, Altman DG, Babiker AB, Campbell MK, Clemens FJ, Darbyshire JH, *et al.*

No. 8

Lay public's understanding of equipoise and randomisation in randomised controlled trials.

By Robinson EJ, Kerr CEP, Stevens AJ, Lilford RJ, Brauholtz DA, Edwards SJ, *et al.*

No. 9

Clinical and cost-effectiveness of electroconvulsive therapy for depressive illness, schizophrenia, catatonia and mania: systematic reviews and economic modelling studies.

By Greenhalgh J, Knight C, Hind D, Beverley C, Walters S.

No. 10

Measurement of health-related quality of life for people with dementia: development of a new instrument (DEMQOL) and an evaluation of current methodology.

By Smith SC, Lamping DL, Banerjee S, Harwood R, Foley B, Smith P, *et al.*

No. 11

Clinical effectiveness and cost-effectiveness of drotrecogin alfa (activated) (Xigris®) for the treatment of severe sepsis in adults: a systematic review and economic evaluation.

By Green C, Dinnes J, Takeda A, Shepherd J, Hartwell D, Cave C, *et al.*

No. 12

A methodological review of how heterogeneity has been examined in systematic reviews of diagnostic test accuracy.

By Dinnes J, Deeks J, Kirby J, Roderick P.

No. 13

Cervical screening programmes: can automation help? Evidence from systematic reviews, an economic analysis and a simulation modelling exercise applied to the UK.

By Willis BH, Barton P, Pearmain P, Bryan S, Hyde C.

No. 14

Laparoscopic surgery for inguinal hernia repair: systematic review of effectiveness and economic evaluation.

By McCormack K, Wake B, Perez J, Fraser C, Cook J, McIntosh E, *et al.*

No. 15

Clinical effectiveness, tolerability and cost-effectiveness of newer drugs for epilepsy in adults: a systematic review and economic evaluation.

By Wilby J, Kainth A, Hawkins N, Epstein D, McIntosh H, McDaid C, *et al.*

No. 16

A randomised controlled trial to compare the cost-effectiveness of tricyclic antidepressants, selective serotonin reuptake inhibitors and lofepramine.

By Peveler R, Kendrick T, Buxton M, Longworth L, Baldwin D, Moore M, *et al.*

No. 17

Clinical effectiveness and cost-effectiveness of immediate angioplasty for acute myocardial infarction: systematic review and economic evaluation.

By Hartwell D, Colquitt J, Loveman E, Clegg AJ, Brodin H, Waugh N, *et al.*

No. 18

A randomised controlled comparison of alternative strategies in stroke care.

By Kalra L, Evans A, Perez I, Knapp M, Swift C, Donaldson N.

No. 19

The investigation and analysis of critical incidents and adverse events in healthcare.

By Woloshynowych M, Rogers S, Taylor-Adams S, Vincent C.

No. 20

Potential use of routine databases in health technology assessment.

By Raftery J, Roderick P, Stevens A.

No. 21

Clinical and cost-effectiveness of newer immunosuppressive regimens in renal transplantation: a systematic review and modelling study.

By Woodroffe R, Yao GL, Meads C, Bayliss S, Ready A, Raftery J, *et al.*

No. 22

A systematic review and economic evaluation of alendronate, etidronate, risedronate, raloxifene and teriparatide for the prevention and treatment of postmenopausal osteoporosis.

By Stevenson M, Lloyd Jones M, De Nigris E, Brewer N, Davis S, Oakley J.

No. 23

A systematic review to examine the impact of psycho-educational interventions on health outcomes and costs in adults and children with difficult asthma.

By Smith JR, Mugford M, Holland R, Candy B, Noble MJ, Harrison BDW, *et al.*

No. 24

An evaluation of the costs, effectiveness and quality of renal replacement therapy provision in renal satellite units in England and Wales.

By Roderick P, Nicholson T, Armitage A, Mehta R, Mullee M, Gerard K, *et al.*

No. 25

Imatinib for the treatment of patients with unresectable and/or metastatic gastrointestinal stromal tumours: systematic review and economic evaluation.

By Wilson J, Connock M, Song F, Yao G, Fry-Smith A, Raftery J, *et al.*

No. 26

Indirect comparisons of competing interventions.

By Glenny AM, Altman DG, Song F, Sakarovich C, Deeks JJ, D'Amico R, *et al.*

No. 27

Cost-effectiveness of alternative strategies for the initial medical management of non-ST elevation acute coronary syndrome: systematic review and decision-analytical modelling.

By Robinson M, Palmer S, Sculpher M, Philips Z, Ginnelly L, Bowens A, *et al.*

No. 28

Outcomes of electrically stimulated gracilis neosphincter surgery.

By Tillin T, Chambers M, Feldman R.

No. 29

The effectiveness and cost-effectiveness of pimecrolimus and tacrolimus for atopic eczema: a systematic review and economic evaluation.

By Garside R, Stein K, Castelnuovo E, Pitt M, Ashcroft D, Dimmock P, *et al.*

No. 30

Systematic review on urine albumin testing for early detection of diabetic complications.

By Newman DJ, Mattock MB, Dawnay ABS, Kerry S, McGuire A, Yaqoob M, *et al.*

No. 31

Randomised controlled trial of the cost-effectiveness of water-based therapy for lower limb osteoarthritis.

By Cochrane T, Davey RC, Matthes Edwards SM.

No. 32

Longer term clinical and economic benefits of offering acupuncture care to patients with chronic low back pain.

By Thomas KJ, MacPherson H, Ratcliffe J, Thorpe L, Brazier J, Campbell M, *et al.*

No. 33

Cost-effectiveness and safety of epidural steroids in the management of sciatica.

By Price C, Arden N, Coggan L, Rogers P.

No. 34

The British Rheumatoid Outcome Study Group (BROSG) randomised controlled trial to compare the effectiveness and cost-effectiveness of aggressive versus symptomatic therapy in established rheumatoid arthritis.

By Symmons D, Tricker K, Roberts C, Davies L, Dawes P, Scott DL.

No. 35

Conceptual framework and systematic review of the effects of participants' and professionals' preferences in randomised controlled trials.

By King M, Nazareth I, Lampe F, Bower P, Chandler M, Morou M, *et al.*

No. 36

The clinical and cost-effectiveness of implantable cardioverter defibrillators: a systematic review.

By Bryant J, Brodin H, Loveman E, Payne E, Clegg A.

No. 37

A trial of problem-solving by community mental health nurses for anxiety, depression and life difficulties among general practice patients. The CPN-GP study.

By Kendrick T, Simons L, Mynors-Wallis L, Gray A, Lathlean J, Pickering R, *et al.*

No. 38

The causes and effects of socio-demographic exclusions from clinical trials.

By Bartlett C, Doyal L, Ebrahim S, Davey P, Bachmann M, Egger M, *et al.*

No. 39

Is hydrotherapy cost-effective? A randomised controlled trial of combined hydrotherapy programmes compared with physiotherapy land techniques in children with juvenile idiopathic arthritis.

By Epps H, Ginnelly L, Utley M, Southwood T, Gallivan S, Sculpher M, *et al.*

No. 40

A randomised controlled trial and cost-effectiveness study of systematic screening (targeted and total population screening) versus routine practice for the detection of atrial fibrillation in people aged 65 and over. The SAFE study.

By Hobbs FDR, Fitzmaurice DA, Mant J, Murray E, Jowett S, Bryan S, *et al.*

No. 41

Displaced intracapsular hip fractures in fit, older people: a randomised comparison of reduction and fixation, bipolar hemiarthroplasty and total hip arthroplasty.

By Keating JF, Grant A, Masson M, Scott NW, Forbes JF.

No. 42

Long-term outcome of cognitive behaviour therapy clinical trials in central Scotland.

By Durham RC, Chambers JA, Power KG, Sharp DM, Macdonald RR, Major KA, *et al.*

No. 43

The effectiveness and cost-effectiveness of dual-chamber pacemakers compared with single-chamber pacemakers for bradycardia due to atrioventricular block or sick sinus syndrome: systematic review and economic evaluation.

By Castelnuovo E, Stein K, Pitt M, Garside R, Payne E.

No. 44

Newborn screening for congenital heart defects: a systematic review and cost-effectiveness analysis.

By Knowles R, Griebisch I, Dezateux C, Brown J, Bull C, Wren C.

No. 45

The clinical and cost-effectiveness of left ventricular assist devices for end-stage heart failure: a systematic review and economic evaluation.

By Clegg AJ, Scott DA, Loveman E, Colquitt J, Hutchinson J, Royle P, *et al.*

No. 46

The effectiveness of the Heidelberg Retina Tomograph and laser diagnostic glaucoma scanning system (GDx) in detecting and monitoring glaucoma.

By Kwartz AJ, Henson DB, Harper RA, Spencer AF, McLeod D.

No. 47

Clinical and cost-effectiveness of autologous chondrocyte implantation for cartilage defects in knee joints: systematic review and economic evaluation.

By Clar C, Cummins E, McIntyre L, Thomas S, Lamb J, Bain L, *et al.*

No. 48

Systematic review of effectiveness of different treatments for childhood retinoblastoma.

By McDaid C, Hartley S, Bagnall A-M, Ritchie G, Light K, Riemsma R.

No. 49

Towards evidence-based guidelines for the prevention of venous thromboembolism: systematic reviews of mechanical methods, oral anticoagulation, dextran and regional anaesthesia as thromboprophylaxis.

By Roderick P, Ferris G, Wilson K, Halls H, Jackson D, Collins R, *et al.*

No. 50

The effectiveness and cost-effectiveness of parent training/education programmes for the treatment of conduct disorder, including oppositional defiant disorder, in children.

By Dretzke J, Frew E, Davenport C, Barlow J, Stewart-Brown S, Sandercock J, *et al.*

Volume 10, 2006

No. 1

The clinical and cost-effectiveness of donepezil, rivastigmine, galantamine and memantine for Alzheimer's disease.

By Loveman E, Green C, Kirby J, Takeda A, Picot J, Payne E, *et al.*

No. 2

FOOD: a multicentre randomised trial evaluating feeding policies in patients admitted to hospital with a recent stroke.

By Dennis M, Lewis S, Cranswick G, Forbes J.

No. 3

The clinical effectiveness and cost-effectiveness of computed tomography screening for lung cancer: systematic reviews.

By Black C, Bagust A, Boland A, Walker S, McLeod C, De Verteuil R, *et al.*

No. 4

A systematic review of the effectiveness and cost-effectiveness of neuroimaging assessments used to visualise the seizure focus in people with refractory epilepsy being considered for surgery.

By Whiting P, Gupta R, Burch J, Mujica Mota RE, Wright K, Marson A, *et al.*

No. 5

Comparison of conference abstracts and presentations with full-text articles in the health technology assessments of rapidly evolving technologies.

By Dundar Y, Dodd S, Dickson R, Walley T, Haycox A, Williamson PR.

No. 6

Systematic review and evaluation of methods of assessing urinary incontinence.

By Martin JL, Williams KS, Abrams KR, Turner DA, Sutton AJ, Chapple C, *et al.*

No. 7

The clinical effectiveness and cost-effectiveness of newer drugs for children with epilepsy. A systematic review.

By Connock M, Frew E, Evans B-W, Bryan S, Cummins C, Fry-Smith A, *et al.*

No. 8

Surveillance of Barrett's oesophagus: exploring the uncertainty through systematic review, expert workshop and economic modelling.

By Garside R, Pitt M, Somerville M, Stein K, Price A, Gilbert N.

No. 9

Topotecan, pegylated liposomal doxorubicin hydrochloride and paclitaxel for second-line or subsequent treatment of advanced ovarian cancer: a systematic review and economic evaluation.

By Main C, Bojke L, Griffin S, Norman G, Barbieri M, Mather L, *et al.*

No. 10

Evaluation of molecular techniques in prediction and diagnosis of cytomegalovirus disease in immunocompromised patients.

By Szczepura A, Westmoreland D, Vinogradova Y, Fox J, Clark M.

No. 11

Screening for thrombophilia in high-risk situations: systematic review and cost-effectiveness analysis. The Thrombosis: Risk and Economic Assessment of Thrombophilia Screening (TREATS) study.

By Wu O, Robertson L, Twaddle S, Lowe GDO, Clark P, Greaves M, *et al.*

No. 12

A series of systematic reviews to inform a decision analysis for sampling and treating infected diabetic foot ulcers.

By Nelson EA, O'Meara S, Craig D, Iglesias C, Golder S, Dalton J, *et al.*

No. 13

Randomised clinical trial, observational study and assessment of cost-effectiveness of the treatment of varicose veins (REACTIV trial).

By Michaels JA, Campbell WB, Brazier JE, MacIntyre JB, Palfreyman SJ, Ratcliffe J, *et al.*

No. 14

The cost-effectiveness of screening for oral cancer in primary care.

By Speight PM, Palmer S, Moles DR, Downer MC, Smith DH, Henriksson M, *et al.*

No. 15

Measurement of the clinical and cost-effectiveness of non-invasive diagnostic testing strategies for deep vein thrombosis.

By Goodacre S, Sampson F, Stevenson M, Wailoo A, Sutton A, Thomas S, *et al.*

No. 16

Systematic review of the effectiveness and cost-effectiveness of HealOzone® for the treatment of occlusal pit/fissure caries and root caries.

By Brazzelli M, McKenzie L, Fielding S, Fraser C, Clarkson J, Kilonzo M, *et al.*

No. 17

Randomised controlled trials of conventional antipsychotic versus new atypical drugs, and new atypical drugs versus clozapine, in people with schizophrenia responding poorly to, or intolerant of, current drug treatment.

By Lewis SW, Davies L, Jones PB, Barnes TRE, Murray RM, Kerwin R, *et al.*

No. 18

Diagnostic tests and algorithms used in the investigation of haematuria: systematic reviews and economic evaluation.

By Rodgers M, Nixon J, Hempel S, Aho T, Kelly J, Neal D, *et al.*

No. 19

Cognitive behavioural therapy in addition to antispasmodic therapy for irritable bowel syndrome in primary care: randomised controlled trial.

By Kennedy TM, Chalder T, McCrone P, Darnley S, Knapp M, Jones RH, *et al.*

No. 20

A systematic review of the clinical effectiveness and cost-effectiveness of enzyme replacement therapies for Fabry's disease and mucopolysaccharidosis type 1.

By Connock M, Juarez-Garcia A, Frew E, Mans A, Dretzke J, Fry-Smith A, *et al.*

No. 21

Health benefits of antiviral therapy for mild chronic hepatitis C: randomised controlled trial and economic evaluation.

By Wright M, Grieve R, Roberts J, Main J, Thomas HC, on behalf of the UK Mild Hepatitis C Trial Investigators.

No. 22

Pressure relieving support surfaces: a randomised evaluation.

By Nixon J, Nelson EA, Cranny G, Iglesias CP, Hawkins K, Cullum NA, *et al.*

No. 23

A systematic review and economic model of the effectiveness and cost-effectiveness of methylphenidate, dexamfetamine and atomoxetine for the treatment of attention deficit hyperactivity disorder in children and adolescents.

By King S, Griffin S, Hodges Z, Weatherly H, Asseburg C, Richardson G, *et al.*

No. 24

The clinical effectiveness and cost-effectiveness of enzyme replacement therapy for Gaucher's disease: a systematic review.

By Connock M, Burls A, Frew E, Fry-Smith A, Juarez-Garcia A, McCabe C, *et al.*

No. 25

Effectiveness and cost-effectiveness of salicylic acid and cryotherapy for cutaneous warts. An economic decision model.

By Thomas KS, Keogh-Brown MR, Chalmers JR, Fordham RJ, Holland RC, Armstrong SJ, *et al.*

No. 26

A systematic literature review of the effectiveness of non-pharmacological interventions to prevent wandering in dementia and evaluation of the ethical implications and acceptability of their use.

By Robinson L, Hutchings D, Corner L, Beyer F, Dickinson H, Vanoli A, *et al.*

No. 27

A review of the evidence on the effects and costs of implantable cardioverter defibrillator therapy in different patient groups, and modelling of cost-effectiveness and cost-utility for these groups in a UK context.

By Buxton M, Caine N, Chase D, Connelly D, Grace A, Jackson C, *et al.*

No. 28

Adefovir dipivoxil and pegylated interferon alfa-2a for the treatment of chronic hepatitis B: a systematic review and economic evaluation.

By Shepherd J, Jones J, Takeda A, Davidson P, Price A.

No. 29

An evaluation of the clinical and cost-effectiveness of pulmonary artery catheters in patient management in intensive care: a systematic review and a randomised controlled trial.

By Harvey S, Stevens K, Harrison D, Young D, Brampton W, McCabe C, *et al.*

No. 30

Accurate, practical and cost-effective assessment of carotid stenosis in the UK.

By Wardlaw JM, Chappell FM, Stevenson M, De Nigris E, Thomas S, Gillard J, *et al.*

No. 31

Etanercept and infliximab for the treatment of psoriatic arthritis: a systematic review and economic evaluation.

By Woolacott N, Bravo Vergel Y, Hawkins N, Kainth A, Khadjesari Z, Misso K, *et al.*

No. 32

The cost-effectiveness of testing for hepatitis C in former injecting drug users.

By Castelnovo E, Thompson-Coon J, Pitt M, Cramp M, Siebert U, Price A, *et al.*

No. 33

Computerised cognitive behaviour therapy for depression and anxiety update: a systematic review and economic evaluation.

By Kaltenthaler E, Brazier J, De Nigris E, Tumor I, Ferriter M, Beverley C, *et al.*

No. 34

Cost-effectiveness of using prognostic information to select women with breast cancer for adjuvant systemic therapy.

By Williams C, Brunskill S, Altman D, Briggs A, Campbell H, Clarke M, *et al.*

No. 35

Psychological therapies including dialectical behaviour therapy for borderline personality disorder: a systematic review and preliminary economic evaluation.

By Brazier J, Tumor I, Holmes M, Ferriter M, Parry G, Dent-Brown K, *et al.*

No. 36

Clinical effectiveness and cost-effectiveness of tests for the diagnosis and investigation of urinary tract infection in children: a systematic review and economic model.

By Whiting P, Westwood M, Bojke L, Palmer S, Richardson G, Cooper J, *et al.*

No. 37

Cognitive behavioural therapy in chronic fatigue syndrome: a randomised controlled trial of an outpatient group programme.

By O'Dowd H, Gladwell P, Rogers CA, Hollinghurst S, Gregory A.

No. 38

A comparison of the cost-effectiveness of five strategies for the prevention of nonsteroidal anti-inflammatory drug-induced gastrointestinal toxicity: a systematic review with economic modelling.

By Brown TJ, Hooper L, Elliott RA, Payne K, Webb R, Roberts C, *et al.*

No. 39

The effectiveness and cost-effectiveness of computed tomography screening for coronary artery disease: systematic review.

By Waugh N, Black C, Walker S, McIntyre L, Cummins E, Hillis G.

No. 40

What are the clinical outcome and cost-effectiveness of endoscopy undertaken by nurses when compared with doctors? A Multi-Institution Nurse Endoscopy Trial (MINuET).

By Williams J, Russell I, Durai D, Cheung W-Y, Farrin A, Bloor K, *et al.*

No. 41

The clinical and cost-effectiveness of oxaliplatin and capecitabine for the adjuvant treatment of colon cancer: systematic review and economic evaluation.

By Pandor A, Eggington S, Paisley S, Tappenden P, Sutcliffe P.

No. 42

A systematic review of the effectiveness of adalimumab, etanercept and infliximab for the treatment of rheumatoid arthritis in adults and an economic evaluation of their cost-effectiveness.

By Chen Y-F, Jobanputra P, Barton P, Jowett S, Bryan S, Clark W, *et al.*

No. 43

Telemedicine in dermatology: a randomised controlled trial.

By Bowns IR, Collins K, Walters SJ, McDonagh AJG.

No. 44

Cost-effectiveness of cell salvage and alternative methods of minimising perioperative allogeneic blood transfusion: a systematic review and economic model.

By Davies L, Brown TJ, Haynes S, Payne K, Elliott RA, McCollum C.

No. 45

Clinical effectiveness and cost-effectiveness of laparoscopic surgery for colorectal cancer: systematic reviews and economic evaluation.

By Murray A, Lourenco T, de Verteuil R, Hernandez R, Fraser C, McKinley A, *et al.*

No. 46

Etanercept and efalizumab for the treatment of psoriasis: a systematic review.

By Woolacott N, Hawkins N, Mason A, Kainth A, Khadjesari Z, Bravo Vergel Y, *et al.*

No. 47

Systematic reviews of clinical decision tools for acute abdominal pain.

By Liu JLY, Wyatt JC, Deeks JJ, Clamp S, Keen J, Verde P, *et al.*

No. 48

Evaluation of the ventricular assist device programme in the UK.

By Sharples L, Buxton M, Caine N, Cafferty F, Demiris N, Dyer M, *et al.*

No. 49

A systematic review and economic model of the clinical and cost-effectiveness of immunosuppressive therapy for renal transplantation in children.

By Yao G, Albon E, Adi Y, Milford D, Bayliss S, Ready A, *et al.*

No. 50

Amniocentesis results: investigation of anxiety. The ARIA trial.

By Hewison J, Nixon J, Fountain J, Cocks K, Jones C, Mason G, *et al.*

Volume 11, 2007

No. 1

Pemetrexed disodium for the treatment of malignant pleural mesothelioma: a systematic review and economic evaluation.

By Dundar Y, Bagust A, Dickson R, Dodd S, Green J, Haycox A, *et al.*

No. 2

A systematic review and economic model of the clinical effectiveness and cost-effectiveness of docetaxel in combination with prednisone or prednisolone for the treatment of hormone-refractory metastatic prostate cancer.

By Collins R, Fenwick E, Trowman R, Perard R, Norman G, Light K, *et al.*

No. 3

A systematic review of rapid diagnostic tests for the detection of tuberculosis infection.

By Dinnes J, Deeks J, Kunst H, Gibson A, Cummins E, Waugh N, *et al.*

No. 4

The clinical effectiveness and cost-effectiveness of strontium ranelate for the prevention of osteoporotic fragility fractures in postmenopausal women.

By Stevenson M, Davis S, Lloyd-Jones M, Beverley C.

No. 5

A systematic review of quantitative and qualitative research on the role and effectiveness of written information available to patients about individual medicines.

By Raynor DK, Blenkinsopp A, Knapp P, Grime J, Nicolson DJ, Pollock K, *et al.*

No. 6

Oral naltrexone as a treatment for relapse prevention in formerly opioid-dependent drug users: a systematic review and economic evaluation.

By Adi Y, Juarez-Garcia A, Wang D, Jowett S, Frew E, Day E, *et al.*

No. 7

Glucocorticoid-induced osteoporosis: a systematic review and cost-utility analysis.

By Kanis JA, Stevenson M, McCloskey EV, Davis S, Lloyd-Jones M.

No. 8

Epidemiological, social, diagnostic and economic evaluation of population screening for genital chlamydial infection.

By Low N, McCarthy A, Macleod J, Salisbury C, Campbell R, Roberts TE, *et al.*

No. 9

Methadone and buprenorphine for the management of opioid dependence: a systematic review and economic evaluation.

By Connock M, Juarez-Garcia A, Jowett S, Frew E, Liu Z, Taylor RJ, *et al.*

No. 10

Exercise Evaluation Randomised Trial (EXERT): a randomised trial comparing GP referral for leisure centre-based exercise, community-based walking and advice only.

By Isaacs AJ, Critchley JA, See Tai S, Buckingham K, Westley D, Harridge SDR, *et al.*

No. 11

Interferon alfa (pegylated and non-pegylated) and ribavirin for the treatment of mild chronic hepatitis C: a systematic review and economic evaluation.

By Shepherd J, Jones J, Hartwell D, Davidson P, Price A, Waugh N.

No. 12

Systematic review and economic evaluation of bevacizumab and cetuximab for the treatment of metastatic colorectal cancer.

By Tappenden P, Jones R, Paisley S, Carroll C.

No. 13

A systematic review and economic evaluation of epoetin alfa, epoetin beta and darbepoetin alfa in anaemia associated with cancer, especially that attributable to cancer treatment.

By Wilson J, Yao GL, Raftery J, Bohlius J, Brunskill S, Sandercock J, *et al.*

No. 14

A systematic review and economic evaluation of statins for the prevention of coronary events.

By Ward S, Lloyd Jones M, Pandor A, Holmes M, Ara R, Ryan A, *et al.*

No. 15

A systematic review of the effectiveness and cost-effectiveness of different models of community-based respite care for frail older people and their carers.

By Mason A, Weatherly H, Spilsbury K, Arksey H, Golder S, Adamson J, *et al.*

No. 16

Additional therapy for young children with spastic cerebral palsy: a randomised controlled trial.

By Weindling AM, Cunningham CC, Glenn SM, Edwards RT, Reeves DJ.

No. 17

Screening for type 2 diabetes: literature review and economic modelling.

By Waugh N, Scotland G, McNamee P, Gillett M, Brennan A, Goyder E, *et al.*

No. 18

The effectiveness and cost-effectiveness of cinacalcet for secondary hyperparathyroidism in end-stage renal disease patients on dialysis: a systematic review and economic evaluation.

By Garside R, Pitt M, Anderson R, Mealing S, Roome C, Snaith A, *et al.*

No. 19

The clinical effectiveness and cost-effectiveness of gemcitabine for metastatic breast cancer: a systematic review and economic evaluation.

By Takeda AL, Jones J, Loveman E, Tan SC, Clegg AJ.

No. 20

A systematic review of duplex ultrasound, magnetic resonance angiography and computed tomography angiography for the diagnosis and assessment of symptomatic, lower limb peripheral arterial disease.

By Collins R, Cranny G, Burch J, Aguiar-Ibáñez R, Craig D, Wright K, *et al.*

No. 21

The clinical effectiveness and cost-effectiveness of treatments for children with idiopathic steroid-resistant nephrotic syndrome: a systematic review.

By Colquitt JL, Kirby J, Green C, Cooper K, Trompeter RS.

No. 22

A systematic review of the routine monitoring of growth in children of primary school age to identify growth-related conditions.

By Fayer D, Nixon J, Hartley S, Rithalia A, Butler G, Rudolf M, *et al.*

No. 23

Systematic review of the effectiveness of preventing and treating *Staphylococcus aureus* carriage in reducing peritoneal catheter-related infections.

By McCormack K, Rabindranath K, Kilonzo M, Vale L, Fraser C, McIntyre L, *et al.*

No. 24

The clinical effectiveness and cost of repetitive transcranial magnetic stimulation versus electroconvulsive therapy in severe depression: a multicentre pragmatic randomised controlled trial and economic analysis.

By McLoughlin DM, Mogg A, Eranti S, Pluck G, Purvis R, Edwards D, *et al.*

No. 25

A randomised controlled trial and economic evaluation of direct versus indirect and individual versus group modes of speech and language therapy for children with primary language impairment.

By Boyle J, McCartney E, Forbes J, O'Hare A.

No. 26

Hormonal therapies for early breast cancer: systematic review and economic evaluation.

By Hind D, Ward S, De Nigris E, Simpson E, Carroll C, Wyld L.

No. 27

Cardioprotection against the toxic effects of anthracyclines given to children with cancer: a systematic review.

By Bryant J, Picot J, Levitt G, Sullivan I, Baxter L, Clegg A.

No. 28

Adalimumab, etanercept and infliximab for the treatment of ankylosing spondylitis: a systematic review and economic evaluation.

By McLeod C, Bagust A, Boland A, Dagenais P, Dickson R, Dundar Y, *et al.*

No. 29

Prenatal screening and treatment strategies to prevent group B streptococcal and other bacterial infections in early infancy: cost-effectiveness and expected value of information analyses.

By Colbourn T, Asseburg C, Bojke L, Philips Z, Claxton K, Ades AE, *et al.*

No. 30

Clinical effectiveness and cost-effectiveness of bone morphogenetic proteins in the non-healing of fractures and spinal fusion: a systematic review.

By Garrison KR, Donell S, Ryder J, Shemilt I, Mugford M, Harvey I, *et al.*

No. 31

A randomised controlled trial of postoperative radiotherapy following breast-conserving surgery in a minimum-risk older population. The PRIME trial.

By Prescott RJ, Kunkler IH, Williams LJ, King CC, Jack W, van der Pol M, *et al.*

No. 32

Current practice, accuracy, effectiveness and cost-effectiveness of the school entry hearing screen.

By Bamford J, Fortnum H, Bristow K, Smith J, Vamvakas G, Davies L, *et al.*

No. 33

The clinical effectiveness and cost-effectiveness of inhaled insulin in diabetes mellitus: a systematic review and economic evaluation.

By Black C, Cummins E, Royle P, Philip S, Waugh N.

No. 34

Surveillance of cirrhosis for hepatocellular carcinoma: systematic review and economic analysis.

By Thompson Coon J, Rogers G, Hewson P, Wright D, Anderson R, Cramp M, *et al.*

No. 35

The Birmingham Rehabilitation Uptake Maximisation Study (BRUM). Homebased compared with hospital-based cardiac rehabilitation in a multi-ethnic population: cost-effectiveness and patient adherence.

By Jolly K, Taylor R, Lip GYH, Greenfield S, Rafferty J, Mant J, *et al.*

No. 36

A systematic review of the clinical, public health and cost-effectiveness of rapid diagnostic tests for the detection and identification of bacterial intestinal pathogens in faeces and food.

By Abubakar I, Irvine L, Aldus CF, Wyatt GM, Fordham R, Schelenz S, *et al.*

No. 37

A randomised controlled trial examining the longer-term outcomes of standard versus new antiepileptic drugs. The SANAD trial.

By Marson AG, Appleton R, Baker GA, Chadwick DW, Doughty J, Eaton B, *et al.*

No. 38

Clinical effectiveness and cost-effectiveness of different models of managing long-term oral anti-coagulation therapy: a systematic review and economic modelling.

By Connock M, Stevens C, Fry-Smith A, Jowett S, Fitzmaurice D, Moore D, *et al.*

No. 39

A systematic review and economic model of the clinical effectiveness and cost-effectiveness of interventions for preventing relapse in people with bipolar disorder.

By Soares-Weiser K, Bravo Vergel Y, Beynon S, Dunn G, Barbieri M, Duffy S, *et al.*

No. 40

Taxanes for the adjuvant treatment of early breast cancer: systematic review and economic evaluation.

By Ward S, Simpson E, Davis S, Hind D, Rees A, Wilkinson A.

No. 41

The clinical effectiveness and cost-effectiveness of screening for open angle glaucoma: a systematic review and economic evaluation.

By Burr JM, Mowatt G, Hernández R, Siddiqui MAR, Cook J, Lourenco T, *et al.*

No. 42

Acceptability, benefit and costs of early screening for hearing disability: a study of potential screening tests and models.

By Davis A, Smith P, Ferguson M, Stephens D, Gianopoulos I.

No. 43

Contamination in trials of educational interventions.

By Keogh-Brown MR, Bachmann MO, Shepstone L, Hewitt C, Howe A, Ramsay CR, *et al.*

No. 44

Overview of the clinical effectiveness of positron emission tomography imaging in selected cancers.

By Facey K, Bradbury I, Laking G, Payne E.

No. 45

The effectiveness and cost-effectiveness of carmustine implants and temozolomide for the treatment of newly diagnosed high-grade glioma: a systematic review and economic evaluation.

By Garside R, Pitt M, Anderson R, Rogers G, Dyer M, Mealing S, *et al.*

No. 46

Drug-eluting stents: a systematic review and economic evaluation.

By Hill RA, Boland A, Dickson R, Dünder Y, Haycox A, McLeod C, *et al.*

No. 47

The clinical effectiveness and cost-effectiveness of cardiac resynchronisation (biventricular pacing) for heart failure: systematic review and economic model.

By Fox M, Mealing S, Anderson R, Dean J, Stein K, Price A, *et al.*

No. 48

Recruitment to randomised trials: strategies for trial enrolment and participation study. The STEPS study.

By Campbell MK, Snowden C, Francis D, Elbourne D, McDonald AM, Knight R, *et al.*

No. 49

Cost-effectiveness of functional cardiac testing in the diagnosis and management of coronary artery disease: a randomised controlled trial. The CECaT trial.

By Sharples L, Hughes V, Crean A, Dyer M, Buxton M, Goldsmith K, *et al.*

No. 50

Evaluation of diagnostic tests when there is no gold standard. A review of methods.

By Rutjes AWS, Reitsma JB, Coomarasamy A, Khan KS, Bossuyt PMM.

No. 51

Systematic reviews of the clinical effectiveness and cost-effectiveness of proton pump inhibitors in acute upper gastrointestinal bleeding.

By Leontiadis GI, Sreedharan A, Dorward S, Barton P, Delaney B, Howden CW, *et al.*

No. 52

A review and critique of modelling in prioritising and designing screening programmes.

By Karnon J, Goyder E, Tappenden P, McPhie S, Towers I, Brazier J, *et al.*

No. 53

An assessment of the impact of the NHS Health Technology Assessment Programme.

By Hanney S, Buxton M, Green C, Coulson D, Raftery J.

Volume 12, 2008

No. 1

A systematic review and economic model of switching from nonglycopeptide to glycopeptide antibiotic prophylaxis for surgery.

By Cranny G, Elliott R, Weatherly H, Chambers D, Hawkins N, Myers L, *et al.*

No. 2

'Cut down to quit' with nicotine replacement therapies in smoking cessation: a systematic review of effectiveness and economic analysis.

By Wang D, Connock M, Barton P, Fry-Smith A, Aveyard P, Moore D.

No. 3

A systematic review of the effectiveness of strategies for reducing fracture risk in children with juvenile idiopathic arthritis with additional data on long-term risk of fracture and cost of disease management.

By Thornton J, Ashcroft D, O'Neill T, Elliott R, Adams J, Roberts C, *et al.*

No. 4

Does befriending by trained lay workers improve psychological well-being and quality of life for carers of people with dementia, and at what cost? A randomised controlled trial.

By Charlesworth G, Shepstone L, Wilson E, Thalany M, Mugford M, Poland F.

No. 5

A multi-centre retrospective cohort study comparing the efficacy, safety and cost-effectiveness of hysterectomy and uterine artery embolisation for the treatment of symptomatic uterine fibroids. The HOPEFUL study.

By Hirst A, Dutton S, Wu O, Briggs A, Edwards C, Waldenmaier L, *et al.*

No. 6

Methods of prediction and prevention of pre-eclampsia: systematic reviews of accuracy and effectiveness literature with economic modelling.

By Meads CA, Cnossen JS, Meher S, Juarez-Garcia A, ter Riet G, Duley L, *et al.*

No. 7

The use of economic evaluations in NHS decision-making: a review and empirical investigation.

By Williams I, McIver S, Moore D, Bryan S.

No. 8

Stapled haemorrhoidectomy (haemorrhoidopexy) for the treatment of haemorrhoids: a systematic review and economic evaluation.

By Burch J, Epstein D, Baba-Akbari A, Weatherly H, Fox D, Golder S, *et al.*

No. 9

The clinical effectiveness of diabetes education models for Type 2 diabetes: a systematic review.

By Loveman E, Frampton GK, Clegg AJ.

No. 10

Payment to healthcare professionals for patient recruitment to trials: systematic review and qualitative study.

By Raftery J, Bryant J, Powell J, Kerr C, Hawker S.

No. 11

Cyclooxygenase-2 selective non-steroidal anti-inflammatory drugs (etodolac, meloxicam, celecoxib, rofecoxib, etoricoxib, valdecoxib and lumiracoxib) for osteoarthritis and rheumatoid arthritis: a systematic review and economic evaluation.

By Chen Y-F, Jobanputra P, Barton P, Bryan S, Fry-Smith A, Harris G, *et al.*

No. 12

The clinical effectiveness and cost-effectiveness of central venous catheters treated with anti-infective agents in preventing bloodstream infections: a systematic review and economic evaluation.

By Hockenhull JC, Dwan K, Boland A, Smith G, Bagust A, Dundar Y, *et al.*

No. 13

Stepped treatment of older adults on laxatives. The STOOL trial.

By Mihaylov S, Stark C, McColl E, Steen N, Vanoli A, Rubin G, *et al.*

No. 14

A randomised controlled trial of cognitive behaviour therapy in adolescents with major depression treated by selective serotonin reuptake inhibitors. The ADAPT trial.

By Goodyer IM, Dubicka B, Wilkinson P, Kelvin R, Roberts C, Byford S, *et al.*

No. 15

The use of irinotecan, oxaliplatin and raltitrexed for the treatment of advanced colorectal cancer: systematic review and economic evaluation.

By Hind D, Tappenden P, Tumor I, Eggington E, Sutcliffe P, Ryan A.

No. 16

Ranibizumab and pegaptanib for the treatment of age-related macular degeneration: a systematic review and economic evaluation.

By Colquitt JL, Jones J, Tan SC, Takeda A, Clegg AJ, Price A.

No. 17

Systematic review of the clinical effectiveness and cost-effectiveness of 64-slice or higher computed tomography angiography as an alternative to invasive coronary angiography in the investigation of coronary artery disease.

By Mowatt G, Cummins E, Waugh N, Walker S, Cook J, Jia X, *et al.*

No. 18

Structural neuroimaging in psychosis: a systematic review and economic evaluation.

By Albon E, Tsourapas A, Frew E, Davenport C, Oyebo F, Bayliss S, *et al.*

No. 19

Systematic review and economic analysis of the comparative effectiveness of different inhaled corticosteroids and their usage with long-acting beta₂ agonists for the treatment of chronic asthma in adults and children aged 12 years and over.

By Shepherd J, Rogers G, Anderson R, Main C, Thompson-Coon J, Hartwell D, *et al.*

No. 20

Systematic review and economic analysis of the comparative effectiveness of different inhaled corticosteroids and their usage with long-acting beta₂ agonists for the treatment of chronic asthma in children under the age of 12 years.

By Main C, Shepherd J, Anderson R, Rogers G, Thompson-Coon J, Liu Z, *et al.*

No. 21

Ezetimibe for the treatment of hypercholesterolaemia: a systematic review and economic evaluation.

By Ara R, Tumor I, Pandor A, Duenas A, Williams R, Wilkinson A, *et al.*

No. 22

Topical or oral ibuprofen for chronic knee pain in older people. The TOIB study.

By Underwood M, Ashby D, Carnes D, Castelnuovo E, Cross P, Harding G, *et al.*

No. 23

A prospective randomised comparison of minor surgery in primary and secondary care. The MiSTIC trial.

By George S, Pockney P, Primrose J, Smith H, Little P, Kinley H, *et al.*

No. 24

A review and critical appraisal of measures of therapist–patient interactions in mental health settings.

By Cahill J, Barkham M, Hardy G, Gilbody S, Richards D, Bower P, *et al.*

No. 25

The clinical effectiveness and cost-effectiveness of screening programmes for amblyopia and strabismus in children up to the age of 4–5 years: a systematic review and economic evaluation.

By Carlton J, Karnon J, Czoski-Murray C, Smith KJ, Marr J.

No. 26

A systematic review of the clinical effectiveness and cost-effectiveness and economic modelling of minimal incision total hip replacement approaches in the management of arthritic disease of the hip.

By de Verteuil R, Imamura M, Zhu S, Glazener C, Fraser C, Munro N, *et al.*

No. 27

A preliminary model-based assessment of the cost-utility of a screening programme for early age-related macular degeneration.

By Karnon J, Czoski-Murray C, Smith K, Brand C, Chakravarthy U, Davis S, *et al.*

No. 28

Intravenous magnesium sulphate and sotalol for prevention of atrial fibrillation after coronary artery bypass surgery: a systematic review and economic evaluation.

By Shepherd J, Jones J, Frampton GK, Tanajewski L, Turner D, Price A.

No. 29

Absorbent products for urinary/faecal incontinence: a comparative evaluation of key product categories.

By Fader M, Cottenden A, Getliffe K, Gage H, Clarke-O'Neill S, Jamieson K, *et al.*

No. 30

A systematic review of repetitive functional task practice with modelling of resource use, costs and effectiveness.

By French B, Leathley M, Sutton C, McAdam J, Thomas L, Forster A, *et al.*

No. 31

The effectiveness and cost-effectiveness of minimal access surgery amongst people with gastro-oesophageal reflux disease – a UK collaborative study. The REFLUX trial.

By Grant A, Wileman S, Ramsay C, Bojke L, Epstein D, Sculpher M, *et al.*

No. 32

Time to full publication of studies of anti-cancer medicines for breast cancer and the potential for publication bias: a short systematic review.

By Takeda A, Loveman E, Harris P, Hartwell D, Welch K.

No. 33

Performance of screening tests for child physical abuse in accident and emergency departments.

By Woodman J, Pitt M, Wentz R, Taylor B, Hodes D, Gilbert RE.

No. 34

Curative catheter ablation in atrial fibrillation and typical atrial flutter: systematic review and economic evaluation.

By Rodgers M, McKenna C, Palmer S, Chambers D, Van Hout S, Golder S, *et al.*

No. 35

Systematic review and economic modelling of effectiveness and cost utility of surgical treatments for men with benign prostatic enlargement.

By Lourenco T, Armstrong N, N'Dow J, Nabi G, Deverill M, Pickard R, *et al.*

No. 36

Immunoprophylaxis against respiratory syncytial virus (RSV) with palivizumab in children: a systematic review and economic evaluation.

By Wang D, Cummins C, Bayliss S, Sandercock J, Burls A.

Volume 13, 2009**No. 1**

Deferasirox for the treatment of iron overload associated with regular blood transfusions (transfusional haemosiderosis) in patients suffering with chronic anaemia: a systematic review and economic evaluation.

By McLeod C, Fleeman N, Kirkham J, Bagust A, Boland A, Chu P, *et al.*

No. 2

Thrombophilia testing in people with venous thromboembolism: systematic review and cost-effectiveness analysis.

By Simpson EL, Stevenson MD, Rawdin A, Papaioannou D.

No. 3

Surgical procedures and non-surgical devices for the management of non-apnoeic snoring: a systematic review of clinical effects and associated treatment costs.

By Main C, Liu Z, Welch K, Weiner G, Quentin Jones S, Stein K.

No. 4

Continuous positive airway pressure devices for the treatment of obstructive sleep apnoea-hypopnoea syndrome: a systematic review and economic analysis.

By McDaid C, Griffin S, Weatherly H, Durée K, van der Burgt M, van Hout S, Akers J, *et al.*

No. 5

Use of classical and novel biomarkers as prognostic risk factors for localised prostate cancer: a systematic review.

By Sutcliffe P, Hummel S, Simpson E, Young T, Rees A, Wilkinson A, *et al.*

No. 6

The harmful health effects of recreational ecstasy: a systematic review of observational evidence.

By Rogers G, Elston J, Garside R, Roome C, Taylor R, Younger P, *et al.*

No. 7

Systematic review of the clinical effectiveness and cost-effectiveness of oesophageal Doppler monitoring in critically ill and high-risk surgical patients.

By Mowatt G, Houston G, Hernández R, de Verteuil R, Fraser C, Cuthbertson B, *et al.*

No. 8

The use of surrogate outcomes in model-based cost-effectiveness analyses: a survey of UK Health Technology Assessment reports.

By Taylor RS, Elston J.

No. 9

Controlling Hypertension and Hypotension Immediately Post Stroke (CHHIPS) – a randomised controlled trial.

By Potter J, Mistri A, Brodie F, Chernova J, Wilson E, Jagger C, *et al.*

No. 10

Routine antenatal anti-D prophylaxis for RhD-negative women: a systematic review and economic evaluation.

By Pilgrim H, Lloyd-Jones M, Rees A.

No. 11

Amantadine, oseltamivir and zanamivir for the prophylaxis of influenza (including a review of existing guidance no. 67): a systematic review and economic evaluation.

By Tappenden P, Jackson R, Cooper K, Rees A, Simpson E, Read R, *et al.*

No. 12

Improving the evaluation of therapeutic interventions in multiple sclerosis: the role of new psychometric methods.

By Hobart J, Cano S.

No. 13

Treatment of severe ankle sprain: a pragmatic randomised controlled trial comparing the clinical effectiveness and cost-effectiveness of three types of mechanical ankle support with tubular bandage. The CAST trial.

By Cooke MW, Marsh JL, Clark M, Nakash R, Jarvis RM, Hutton JL, *et al.*, on behalf of the CAST trial group.

No. 14

Non-occupational postexposure prophylaxis for HIV: a systematic review.

By Bryant J, Baxter L, Hird S.

No. 15

Blood glucose self-monitoring in type 2 diabetes: a randomised controlled trial.

By Farmer AJ, Wade AN, French DP, Simon J, Yudkin P, Gray A, *et al.*

No. 16

How far does screening women for domestic (partner) violence in different health-care settings meet criteria for a screening programme? Systematic reviews of nine UK National Screening Committee criteria.

By Feder G, Ramsay J, Dunne D, Rose M, Arsene C, Norman R, *et al.*

No. 17

Spinal cord stimulation for chronic pain of neuropathic or ischaemic origin: systematic review and economic evaluation.

By Simpson EL, Duenas A, Holmes MW, Papaioannou D, Chilcott J.

No. 18

The role of magnetic resonance imaging in the identification of suspected acoustic neuroma: a systematic review of clinical and cost-effectiveness and natural history.

By Fortnum H, O'Neill C, Taylor R, Lenthall R, Nikolopoulos T, Lightfoot G, *et al.*

No. 19

Dipsticks and diagnostic algorithms in urinary tract infection: development and validation, randomised trial, economic analysis, observational cohort and qualitative study.

By Little P, Turner S, Rumsby K, Warner G, Moore M, Lowes JA, *et al.*

No. 20

Systematic review of respite care in the frail elderly.

By Shaw C, McNamara R, Abrams K, Cannings-John R, Hood K, Longo M, *et al.*

No. 21

Neuroleptics in the treatment of aggressive challenging behaviour for people with intellectual disabilities: a randomised controlled trial (NACHBID).

By Tyrer P, Oliver-Africano P, Romeo R, Knapp M, Dickens S, Bouras N, *et al.*

No. 22

Randomised controlled trial to determine the clinical effectiveness and cost-effectiveness of selective serotonin reuptake inhibitors plus supportive care, versus supportive care alone, for mild to moderate depression with somatic symptoms in primary care: the THREAD (THREShold for AntiDepressant response) study.

By Kendrick T, Chatwin J, Dowrick C, Tylee A, Morriss R, Peveler R, *et al.*

No. 23

Diagnostic strategies using DNA testing for hereditary haemochromatosis in at-risk populations: a systematic review and economic evaluation.

By Bryant J, Cooper K, Picot J, Clegg A, Roderick P, Rosenberg W, *et al.*

No. 24

Enhanced external counterpulsation for the treatment of stable angina and heart failure: a systematic review and economic analysis.

By McKenna C, McDaid C, Suekarran S, Hawkins N, Claxton K, Light K, *et al.*

No. 25

Development of a decision support tool for primary care management of patients with abnormal liver function tests without clinically apparent liver disease: a record-linkage population cohort study and decision analysis (ALFIE).

By Donnan PT, McLernon D, Dillon JF, Ryder S, Roderick P, Sullivan F, *et al.*

No. 26

A systematic review of presumed consent systems for deceased organ donation.

By Rithalia A, McDaid C, Suekarran S, Norman G, Myers L, Sowden A.

No. 27

Paracetamol and ibuprofen for the treatment of fever in children: the PITCH randomised controlled trial.

By Hay AD, Redmond NM, Costelloe C, Montgomery AA, Fletcher M, Hollinghurst S, *et al.*

No. 28

A randomised controlled trial to compare minimally invasive glucose monitoring devices with conventional monitoring in the management of insulin-treated diabetes mellitus (MITRE).

By Newman SP, Cooke D, Casbard A, Walker S, Meredith S, Nunn A, *et al.*

No. 29

Sensitivity analysis in economic evaluation: an audit of NICE current practice and a review of its use and value in decision-making.

By Andronis L, Barton P, Bryan S.

Suppl. 1

Trastuzumab for the treatment of primary breast cancer in HER2-positive women: a single technology appraisal.

By Ward S, Pilgrim H, Hind D.

Docetaxel for the adjuvant treatment of early node-positive breast cancer: a single technology appraisal.

By Chilcott J, Lloyd Jones M, Wilkinson A.

The use of paclitaxel in the management of early stage breast cancer.

By Griffin S, Dunn G, Palmer S, Macfarlane K, Brent S, Dyker A, *et al.*

Rituximab for the first-line treatment of stage III/IV follicular non-Hodgkin's lymphoma.

By Dundar Y, Bagust A, Hounsome J, McLeod C, Boland A, Davis H, *et al.*

Bortezomib for the treatment of multiple myeloma patients.

By Green C, Bryant J, Takeda A, Cooper K, Clegg A, Smith A, *et al.*

Fludarabine phosphate for the first-line treatment of chronic lymphocytic leukaemia.

By Walker S, Palmer S, Erhorn S, Brent S, Dyker A, Ferrie L, *et al.*

Erlotinib for the treatment of relapsed non-small cell lung cancer.

By McLeod C, Bagust A, Boland A, Hockenhull J, Dundar Y, Proudlove C, *et al.*

Cetuximab plus radiotherapy for the treatment of locally advanced squamous cell carcinoma of the head and neck.

By Griffin S, Walker S, Sculpher M, White S, Erhorn S, Brent S, *et al.*

Infliximab for the treatment of adults with psoriasis.

By Loveman E, Turner D, Hartwell D, Cooper K, Clegg A.

No. 30

Psychological interventions for postnatal depression: cluster randomised trial and economic evaluation. The PoNDER trial.

By Morrell CJ, Warner R, Slade P, Dixon S, Walters S, Paley G, *et al.*

No. 31

The effect of different treatment durations of clopidogrel in patients with non-ST-segment elevation acute coronary syndromes: a systematic review and value of information analysis.

By Rogowski R, Burch J, Palmer S, Craigs C, Golder S, Woolacott N.

No. 32

Systematic review and individual patient data meta-analysis of diagnosis of heart failure, with modelling of implications of different diagnostic strategies in primary care.

By Mant J, Doust J, Roalfe A, Barton P, Cowie MR, Glasziou P, *et al.*

No. 33

A multicentre randomised controlled trial of the use of continuous positive airway pressure and non-invasive positive pressure ventilation in the early treatment of patients presenting to the emergency department with severe acute cardiogenic pulmonary oedema: the 3CPO trial.

By Gray AJ, Goodacre S, Newby DE, Masson MA, Sampson F, Dixon S, *et al.*, on behalf of the 3CPO study investigators.

No. 34

Early high-dose lipid-lowering therapy to avoid cardiac events: a systematic review and economic evaluation.

By Ara R, Pandor A, Stevens J, Rees A, Rafia R.

No. 35

Adefovir dipivoxil and pegylated interferon alpha for the treatment of chronic hepatitis B: an updated systematic review and economic evaluation.

By Jones J, Shepherd J, Baxter L, Gospodarevskaya E, Hartwell D, Harris P, *et al.*

No. 36

Methods to identify postnatal depression in primary care: an integrated evidence synthesis and value of information analysis.

By Hewitt CE, Gilbody SM, Brealey S, Paulden M, Palmer S, Mann R, *et al.*

No. 37

A double-blind randomised placebo-controlled trial of topical intranasal corticosteroids in 4- to 11-year-old children with persistent bilateral otitis media with effusion in primary care.

By Williamson I, Bengt S, Barton S, Petrou S, Letley L, Fasey N, *et al.*

No. 38

The effectiveness and cost-effectiveness of methods of storing donated kidneys from deceased donors: a systematic review and economic model.

By Bond M, Pitt M, Akoh J, Moxham T, Hoyle M, Anderson R.

No. 39

Rehabilitation of older patients: day hospital compared with rehabilitation at home. A randomised controlled trial.

By Parker SG, Oliver P, Pennington M, Bond J, Jagger C, Enderby PM, *et al.*

No. 40

Breastfeeding promotion for infants in neonatal units: a systematic review and economic analysis.

By Renfrew MJ, Craig D, Dyson L, McCormick F, Rice S, King SE, *et al.*

No. 41

The clinical effectiveness and cost-effectiveness of bariatric (weight loss) surgery for obesity: a systematic review and economic evaluation.

By Picot J, Jones J, Colquitt JL, Gospodarevskaya E, Loveman E, Baxter L, *et al.*

No. 42

Rapid testing for group B streptococcus during labour: a test accuracy study with evaluation of acceptability and cost-effectiveness.

By Daniels J, Gray J, Pattison H, Roberts T, Edwards E, Milner P, *et al.*

No. 43

Screening to prevent spontaneous preterm birth: systematic reviews of accuracy and effectiveness literature with economic modelling.

By Honest H, Forbes CA, Durée KH, Norman G, Duffy SB, Tsourapas A, *et al.*

No. 44

The effectiveness and cost-effectiveness of cochlear implants for severe to profound deafness in children and adults: a systematic review and economic model.

By Bond M, Mealing S, Anderson R, Elston J, Weiner G, Taylor RS, *et al.*

Suppl. 2

Gemcitabine for the treatment of metastatic breast cancer.

By Jones J, Takeda A, Tan SC, Cooper K, Loveman E, Clegg A.

Varenicline in the management of smoking cessation: a single technology appraisal.

By Hind D, Tappenden P, Peters J, Kenjegalieva K.

Alteplase for the treatment of acute ischaemic stroke: a single technology appraisal.

By Lloyd Jones M, Holmes M.

Rituximab for the treatment of rheumatoid arthritis.

By Bagust A, Boland A, Hockenhull J, Fleeman N, Greenhalgh J, Dundar Y, *et al.*

Omalizumab for the treatment of severe persistent allergic asthma.

By Jones J, Shepherd J, Hartwell D, Harris P, Cooper K, Takeda A, *et al.*

Rituximab for the treatment of relapsed or refractory stage III or IV follicular non-Hodgkin's lymphoma.

By Boland A, Bagust A, Hockenhull J, Davis H, Chu P, Dickson R.

Adalimumab for the treatment of psoriasis.

By Turner D, Picot J, Cooper K, Loveman E.

Dabigatran etexilate for the prevention of venous thromboembolism in patients undergoing elective hip and knee surgery: a single technology appraisal.

By Holmes M, Carroll C, Papaioannou D.

Romiplostim for the treatment of chronic immune or idiopathic thrombocytopenic purpura: a single technology appraisal.

By Mowatt G, Boachie C, Crowther M, Fraser C, Hernández R, Jia X, *et al.*

Sunitinib for the treatment of gastrointestinal stromal tumours: a critique of the submission from Pfizer.

By Bond M, Hoyle M, Moxham T, Napier M, Anderson R.

No. 45

Vitamin K to prevent fractures in older women: systematic review and economic evaluation.

By Stevenson M, Lloyd-Jones M, Papaioannou D.

No. 46

The effects of biofeedback for the treatment of essential hypertension: a systematic review.

By Greenhalgh J, Dickson R, Dundar Y.

No. 47

A randomised controlled trial of the use of aciclovir and/or prednisolone for the early treatment of Bell's palsy: the BELLS study.

By Sullivan FM, Swan IRC, Donnan PT, Morrison JM, Smith BH, McKinstry B, *et al.*

Suppl. 3

Lapatinib for the treatment of HER2-overexpressing breast cancer.

By Jones J, Takeda A, Picot J, von Keyserlingk C, Clegg A.

Infliximab for the treatment of ulcerative colitis.

By Hyde C, Bryan S, Juarez-Garcia A, Andronis L, Fry-Smith A.

Rimonabant for the treatment of overweight and obese people.

By Burch J, McKenna C, Palmer S, Norman G, Glanville J, Sculpher M, *et al.*

Telbivudine for the treatment of chronic hepatitis B infection.

By Hartwell D, Jones J, Harris P, Cooper K.

Entecavir for the treatment of chronic hepatitis B infection.

By Shepherd J, Gospodarevskaya E, Frampton G, Cooper K.

Febuxostat for the treatment of hyperuricaemia in people with gout: a single technology appraisal.

By Stevenson M, Pandor A.

Rivaroxaban for the prevention of venous thromboembolism: a single technology appraisal.

By Stevenson M, Scope A, Holmes M, Rees A, Kaltenthaler E.

Cetuximab for the treatment of recurrent and/or metastatic squamous cell carcinoma of the head and neck.

By Greenhalgh J, Bagust A, Boland A, Fleeman N, McLeod C, Dundar Y, *et al.*

Mifamurtide for the treatment of osteosarcoma: a single technology appraisal.

By Pandor A, Fitzgerald P, Stevenson M, Papaioannou D.

Ustekinumab for the treatment of moderate to severe psoriasis.

By Gospodarevskaya E, Picot J, Cooper K, Loveman E, Takeda A.

No. 48

Endovascular stents for abdominal aortic aneurysms: a systematic review and economic model.

By Chambers D, Epstein D, Walker S, Fayter D, Paton F, Wright K, *et al.*

No. 49

Clinical and cost-effectiveness of epoprostenol, iloprost, bosentan, sitaxentan and sildenafil for pulmonary arterial hypertension within their licensed indications: a systematic review and economic evaluation.

By Chen Y-F, Jowett S, Barton P, Malottki K, Hyde C, Gibbs JSR, *et al.*

No. 50

Cessation of attention deficit hyperactivity disorder drugs in the young (CADDY) – a pharmacoepidemiological and qualitative study.

By Wong ICK, Asherson P, Bilbow A, Clifford S, Coghill D, DeSoysa R, *et al.*

No. 51

ARTISTIC: a randomised trial of human papillomavirus (HPV) testing in primary cervical screening.

By Kitchener HC, Almonte M, Gilham C, Dowie R, Stoykova B, Sargent A, *et al.*

No. 52

The clinical effectiveness of glucosamine and chondroitin supplements in slowing or arresting progression of osteoarthritis of the knee: a systematic review and economic evaluation.

By Black C, Clar C, Henderson R, MacEachern C, McNamee P, Quayyum Z, *et al.*

No. 53

Randomised preference trial of medical versus surgical termination of pregnancy less than 14 weeks' gestation (TOPS).

By Robson SC, Kelly T, Howel D, Deverill M, Hewison J, Lie MLS, *et al.*

No. 54

Randomised controlled trial of the use of three dressing preparations in the management of chronic ulceration of the foot in diabetes.

By Jeffcoate WJ, Price PE, Phillips CJ, Game FL, Mudge E, Davies S, *et al.*

No. 55

VenUS II: a randomised controlled trial of larval therapy in the management of leg ulcers.

By Dumville JC, Worthy G, Soares MO, Bland JM, Cullum N, Dowson C, *et al.*

No. 56

A prospective randomised controlled trial and economic modelling of antimicrobial silver dressings versus non-adherent control dressings for venous leg ulcers: the VULCAN trial.

By Michaels JA, Campbell WB, King BM, MacIntyre J, Palfreyman SJ, Shackley P, *et al.*

No. 57

Communication of carrier status information following universal newborn screening for sickle cell disorders and cystic fibrosis: qualitative study of experience and practice.

By Kai J, Ulph F, Cullinan T, Qureshi N.

No. 58

Antiviral drugs for the treatment of influenza: a systematic review and economic evaluation.

By Burch J, Paulden M, Conti S, Stock C, Corbett M, Welton NJ, *et al.*

No. 59

Development of a toolkit and glossary to aid in the adaptation of health technology assessment (HTA) reports for use in different contexts.

By Chase D, Rosten C, Turner S, Hicks N, Milne R.

No. 60

Colour vision testing for diabetic retinopathy: a systematic review of diagnostic accuracy and economic evaluation.

By Rodgers M, Hodges R, Hawkins J, Hollingworth W, Duffy S, McKibbin M, *et al.*

No. 61

Systematic review of the effectiveness and cost-effectiveness of weight management schemes for the under fives: a short report.

By Bond M, Wyatt K, Lloyd J, Welch K, Taylor R.

No. 62

Are adverse effects incorporated in economic models? An initial review of current practice.

By Craig D, McDaid C, Fonseca T, Stock C, Duffy S, Woolacott N.

Volume 14, 2010

No. 1

Multicentre randomised controlled trial examining the cost-effectiveness of contrast-enhanced high field magnetic resonance imaging in women with primary breast cancer scheduled for wide local excision (COMICE).

By Turnbull LW, Brown SR, Olivier C, Harvey I, Brown J, Drew P, *et al.*

No. 2

Bevacizumab, sorafenib tosylate, sunitinib and temsirolimus for renal cell carcinoma: a systematic review and economic evaluation.

By Thompson Coon J, Hoyle M, Green C, Liu Z, Welch K, Moxham T, *et al.*

No. 3

The clinical effectiveness and cost-effectiveness of testing for cytochrome P450 polymorphisms in patients with schizophrenia treated with antipsychotics: a systematic review and economic evaluation.

By Fleeman N, McLeod C, Bagust A, Beale S, Boland A, Dundar Y, *et al.*

No. 4

Systematic review of the clinical effectiveness and cost-effectiveness of photodynamic diagnosis and urine biomarkers (FISH, ImmunoCyt, NMP22) and cytology for the detection and follow-up of bladder cancer.

By Mowatt G, Zhu S, Kilonzo M, Boachie C, Fraser C, Griffiths TRL, *et al.*

No. 5

Effectiveness and cost-effectiveness of arthroscopic lavage in the treatment of osteoarthritis of the knee: a mixed methods study of the feasibility of conducting a surgical placebo-controlled trial (the KORAL study).

By Campbell MK, Skea ZC, Sutherland AG, Cuthbertson BH, Entwistle VA, McDonald AM, *et al.*

No. 6

A randomised 2 × 2 trial of community versus hospital pulmonary rehabilitation for chronic obstructive pulmonary disease followed by telephone or conventional follow-up.

By Waterhouse JC, Walters SJ, Oluboyede Y, Lawson RA.

No. 7

The effectiveness and cost-effectiveness of behavioural interventions for the prevention of sexually transmitted infections in young people aged 13–19: a systematic review and economic evaluation.

By Shepherd J, Kavanagh J, Picot J, Cooper K, Harden A, Barnett-Page E, *et al.*

No. 8

Dissemination and publication of research findings: an updated review of related biases.

By Song F, Parekh S, Hooper L, Loke YK, Ryder J, Sutton AJ, *et al.*

No. 9

The effectiveness and cost-effectiveness of biomarkers for the prioritisation of patients awaiting coronary revascularisation: a systematic review and decision model.

By Hemingway H, Henriksson M, Chen R, Damant J, Fitzpatrick N, Abrams K, *et al.*

No. 10

Comparison of case note review methods for evaluating quality and safety in health care.

By Hutchinson A, Coster JE, Cooper KL, McIntosh A, Walters SJ, Bath PA, *et al.*

No. 11

Clinical effectiveness and cost-effectiveness of continuous subcutaneous insulin infusion for diabetes: systematic review and economic evaluation.

By Cummins E, Royle P, Snaith A, Greene A, Robertson L, McIntyre L, *et al.*

No. 12

Self-monitoring of blood glucose in type 2 diabetes: systematic review.

By Clar C, Barnard K, Cummins E, Royle P, Waugh N.

No. 13

North of England and Scotland Study of Tonsillectomy and Adeno-tonsillectomy in Children (NESSTAC): a pragmatic randomised controlled trial with a parallel non-randomised preference study.

By Lock C, Wilson J, Steen N, Eccles M, Mason H, Carrie S, *et al.*

No. 14

Multicentre randomised controlled trial of the clinical and cost-effectiveness of a bypass-surgery-first versus a balloon-angioplasty-first revascularisation strategy for severe limb ischaemia due to infrainguinal disease. The Bypass versus Angioplasty in Severe Ischaemia of the Leg (BASIL) trial.

By Bradbury AW, Adam DJ, Bell J, Forbes JF, Fowkes FGR, Gillespie I, *et al.*

No. 15

A randomised controlled multicentre trial of treatments for adolescent anorexia nervosa including assessment of cost-effectiveness and patient acceptability – the TOuCAN trial.

By Gowers SG, Clark AF, Roberts C, Byford S, Barrett B, Griffiths A, *et al.*

No. 16

Randomised controlled trials for policy interventions: a review of reviews and meta-regression.

By Oliver S, Bagnall AM, Thomas J, Shepherd J, Sowden A, White I, *et al.*

No. 17

Paracetamol and selective and non-selective non-steroidal anti-inflammatory drugs (NSAIDs) for the reduction of morphine-related side effects after major surgery: a systematic review.

By McDaid C, Maund E, Rice S, Wright K, Jenkins B, Woolcott N.

No. 18

A systematic review of outcome measures used in forensic mental health research with consensus panel opinion.

By Fitzpatrick R, Chambers J, Burns T, Doll H, Fazel S, Jenkinson C, *et al.*

No. 19

The clinical effectiveness and cost-effectiveness of topotecan for small cell lung cancer: a systematic review and economic evaluation.

By Loveman E, Jones J, Hartwell D, Bird A, Harris P, Welch K, *et al.*

No. 20

Antenatal screening for haemoglobinopathies in primary care: a cohort study and cluster randomised trial to inform a simulation model. The Screening for Haemoglobinopathies in First Trimester (SHIFT) trial.

By Dormandy E, Bryan S, Gulliford MC, Roberts T, Ades T, Calnan M, *et al.*

No. 21

Early referral strategies for management of people with markers of renal disease: a systematic review of the evidence of clinical effectiveness, cost-effectiveness and economic analysis.

By Black C, Sharma P, Scotland G, McCullough K, McGurn D, Robertson L, *et al.*

No. 22

A randomised controlled trial of cognitive behaviour therapy and motivational interviewing for people with Type 1 diabetes mellitus with persistent sub-optimal glycaemic control: A Diabetes and Psychological Therapies (ADAPT) study.

By Ismail K, Maissi E, Thomas S, Chalder T, Schmidt U, Bartlett J, *et al.*

No. 23

A randomised controlled equivalence trial to determine the effectiveness and cost-utility of manual chest physiotherapy techniques in the management of exacerbations of chronic obstructive pulmonary disease (MATREX).

By Cross J, Elender F, Barton G, Clark A, Shephstone L, Blyth A, *et al.*

No. 24

A systematic review and economic evaluation of the clinical effectiveness and cost-effectiveness of aldosterone antagonists for postmyocardial infarction heart failure.

By McKenna C, Burch J, Suekarran S, Walker S, Bakhai A, Witte K, *et al.*

No. 25

Avoiding and identifying errors in health technology assessment models: qualitative study and methodological review.

By Chilcott JB, Tappenden P, Rawdin A, Johnson M, Kaltenthaler E, Paisley S, *et al.*

No. 26

BoTULS: a multicentre randomised controlled trial to evaluate the clinical effectiveness and cost-effectiveness of treating upper limb spasticity due to stroke with botulinum toxin type A.

By Shaw L, Rodgers H, Price C, van Wijck F, Shackley P, Steen N, *et al.*, on behalf of the BoTULS investigators.

No. 27

Weighting and valuing quality-adjusted life-years using stated preference methods: preliminary results from the Social Value of a QALY Project.

By Baker R, Bateman I, Donaldson C, Jones-Lee M, Lancsar E, Loomes G, *et al.*

Suppl. 1

Cetuximab for the first-line treatment of metastatic colorectal cancer.

By Meads C, Round J, Tubeuf S, Moore D, Pennant M, Bayliss S.

Infliximab for the treatment of acute exacerbations of ulcerative colitis.

By Bryan S, Andronis L, Hyde C, Connock M, Fry-Smith A, Wang D.

Sorafenib for the treatment of advanced hepatocellular carcinoma.

By Connock M, Round J, Bayliss S, Tubeuf S, Greenheld W, Moore D.

Tenofovir disoproxil fumarate for the treatment of chronic hepatitis B infection.

By Jones J, Colquitt J, Shepherd J, Harris P, Cooper K.

Prasugrel for the treatment of acute coronary artery syndromes with percutaneous coronary intervention.

By Greenhalgh J, Bagust A, Boland A, Saborido CM, Fleeman N, McLeod C, *et al.*

Alitretinoin for the treatment of severe chronic hand eczema.

By Paulden M, Rodgers M, Griffin S, Slack R, Duffy S, Ingram JR, *et al.*

Pemetrexed for the first-line treatment of locally advanced or metastatic non-small cell lung cancer.

By Fleeman N, Bagust A, McLeod C, Greenhalgh J, Boland A, Dundar Y, *et al.*

Topotecan for the treatment of recurrent and stage IVB carcinoma of the cervix.

By Paton F, Paulden M, Saramago P, Manca A, Misso K, Palmer S, *et al.*

Trabectedin for the treatment of advanced metastatic soft tissue sarcoma.

By Simpson EL, Rafia R, Stevenson MD, Papaioannou D.

Azacitidine for the treatment of myelodysplastic syndrome, chronic myelomonocytic leukaemia and acute myeloid leukaemia.

By Edlin R, Connock M, Tubeuf S, Round J, Fry-Smith A, Hyde C, *et al.*

No. 28

The safety and effectiveness of different methods of earwax removal: a systematic review and economic evaluation.

By Clegg AJ, Loveman E, Gospodarevskaya E, Harris P, Bird A, Bryant J, *et al.*

No. 29

Systematic review of the clinical effectiveness and cost-effectiveness of rapid point-of-care tests for the detection of genital chlamydia infection in women and men.

By Hislop J, Quayyum Z, Flett G, Boachie C, Fraser C, Mowatt G.

No. 30

School-linked sexual health services for young people (SSHYP): a survey and systematic review concerning current models, effectiveness, cost-effectiveness and research opportunities.

By Owen J, Carroll C, Cooke J, Formby E, Hayter M, Hirst J, *et al.*

No. 31

Systematic review and cost-effectiveness evaluation of 'pill-in-the-pocket' strategy for paroxysmal atrial fibrillation compared to episodic in-hospital treatment or continuous antiarrhythmic drug therapy.

By Martin Saborido C, Hockenhull J, Bagust A, Boland A, Dickson R, Todd D.

No. 32

Chemoprevention of colorectal cancer: systematic review and economic evaluation.

By Cooper K, Squires H, Carroll C, Papaioannou D, Booth A, Logan RF, *et al.*

No. 33

Cross-trimester repeated measures testing for Down's syndrome screening: an assessment.

By Wright D, Bradbury I, Malone F, D'Alton M, Summers A, Huang T, *et al.*

No. 34

Exploring the needs, concerns and behaviours of people with existing respiratory conditions in relation to the H1N1 'swine influenza' pandemic: a multicentre survey and qualitative study.

By Caress A-L, Duxbury P, Woodcock A, Luker KA, Ward D, Campbell M, *et al.*

Influenza A/H1N1v in pregnancy: an investigation of the characteristics and management of affected women and the relationship to pregnancy outcomes for mother and infant.

By Yates L, Pierce M, Stephens S, Mill AC, Spark P, Kurinczuk JJ, *et al.*

The impact of communications about swine flu (influenza A H1N1v) on public responses to the outbreak: results from 36 national telephone surveys in the UK.

By Rubin GJ, Potts HWW, Michie S.

The impact of illness and the impact of school closure on social contact patterns.

By Eames KTD, Tilston NL, White PJ, Adams E, Edmunds WJ.

Vaccine effectiveness in pandemic influenza – primary care reporting (VIPER): an observational study to assess the effectiveness of the pandemic influenza A (H1N1)v vaccine.

By Simpson CR, Ritchie LD, Robertson C, Sheikh A, McMenamin J.

Physical interventions to interrupt or reduce the spread of respiratory viruses: a Cochrane review.

By Jefferson T, Del Mar C, Dooley L, Ferroni E, Al-Ansary LA, Bawazeer GA, *et al.*

No. 35

Randomised controlled trial and parallel economic evaluation of conventional ventilatory support versus extracorporeal membrane oxygenation for severe adult respiratory failure (CESAR).

By Peek GJ, Elbourne D, Mugford M, Tiruvoipati R, Wilson A, Allen E, *et al.*

No. 36

Newer agents for blood glucose control in type 2 diabetes: systematic review and economic evaluation.

By Waugh N, Cummins E, Royle P, Clar C, Marien M, Richter B, *et al.*

No. 37

Barrett's oesophagus and cancers of the biliary tract, brain, head and neck, lung, oesophagus and skin.

By Fayer D, Corbett M, Heirs M, Fox D, Eastwood A.

No. 38

Towards single embryo transfer? Modelling clinical outcomes of potential treatment choices using multiple data sources: predictive models and patient perspectives.

By Roberts SA, McGowan L, Hirst WM, Brison DR, Vail A, Lieberman BA.

No. 39

Sugammadex for the reversal of muscle relaxation in general anaesthesia: a systematic review and economic assessment.

By Chambers D, Paulden M, Paton F, Heirs M, Duffy S, Craig D, *et al.*

No. 40

Systematic review and economic modelling of the effectiveness and cost-effectiveness of non-surgical treatments for women with stress urinary incontinence.

By Imamura M, Abrams P, Bain C, Buckley B, Cardozo L, Cody J, *et al.*

No. 41

A multicentred randomised controlled trial of a primary care-based cognitive behavioural programme for low back pain. The Back Skills Training (BeST) trial.

By Lamb SE, Lall R, Hansen Z, Castelnuovo E, Withers EJ, Nichols V, *et al.*

No. 42

Recombinant human growth hormone for the treatment of growth disorders in children: a systematic review and economic evaluation.

By Takeda A, Cooper K, Bird A, Baxter L, Frampton GK, Gospodarevskaya E, *et al.*

No. 43

A pragmatic randomised controlled trial to compare antidepressants with a community-based psychosocial intervention for the treatment of women with postnatal depression: the RESPOND trial.

By Sharp DJ, Chew-Graham C, Tylee A, Lewis G, Howard L, Anderson I, *et al.*

No. 44

Group cognitive behavioural therapy for postnatal depression: a systematic review of clinical effectiveness, cost-effectiveness and value of information analyses.

By Stevenson MD, Scope A, Sutcliffe PA, Booth A, Slade P, Parry G, *et al.*

No. 45

Screening for hyperglycaemia in pregnancy: a rapid update for the National Screening Committee.

By Waugh N, Royle P, Clar C, Henderson R, Cummins E, Hadden D, *et al.*

No. 46

Open-label, randomised, parallel-group, multicentre study to evaluate the safety, tolerability and immunogenicity of an AS03B/oil-in-water emulsion-adjuvanted (AS03B) split-virion versus non-adjuvanted whole-virion H1N1 influenza vaccine in UK children 6 months to 12 years of age.

By Waddington CS, Andrews N, Hoschler K, Walker WT, Oeser C, Reiner A, *et al.*

Evaluation of droplet dispersion during non-invasive ventilation, oxygen therapy, nebuliser treatment and chest physiotherapy in clinical practice: implications for management of pandemic influenza and other airborne infections.

By Simonds AK, Hanak A, Chatwin M, Morrell MJ, Hall A, Parker KH, *et al.*

Evaluation of triage methods used to select patients with suspected pandemic influenza for hospital admission: cohort study.

By Goodacre S, Challen, K, Wilson R, Campbell M.

Virus shedding and environmental deposition of novel A (H1N1) pandemic influenza virus: interim findings.

By Killingley B, Giatrores J, Cauchemez S, Enstone JE, Curran M, Read R, *et al.*

Neuraminidase inhibitors for preventing and treating influenza in healthy adults: a Cochrane review.

By Jefferson T, Jones M, Doshi P, Del Mar C, Dooley L, Foxlee R.

No. 47

Intensity-modulated radiotherapy for the treatment of prostate cancer: a systematic review and economic evaluation.

By Hummel S, Simpson EL, Hemingway P, Stevenson MD, Rees A.

No. 48

Computerised decision support systems in order communication for diagnostic, screening or monitoring test ordering: systematic reviews of the effects and cost-effectiveness of systems.

By Main C, Moxham T, Wyatt JC, Kay J, Anderson R, Stein K.

No. 49

Relapse prevention in UK Stop Smoking Services: current practice, systematic reviews of effectiveness and cost-effectiveness analysis.

By Coleman T, Agboola S, Leonardi-Bee J, Taylor M, McEwen A, McNeill A.

No. 50

A systematic review of positron emission tomography (PET) and positron emission tomography/computed tomography (PET/CT) for the diagnosis of breast cancer recurrence.

By Pennant M, Takwoingi Y, Pennant L, Davenport C, Fry-Smith A, Eisinga A, *et al.*

Suppl. 2

Certolizumab pegol (CIMZIA®) for the treatment of rheumatoid arthritis.

By Connock M, Tubeuf S, Malottki K, Uthman A, Round J, Bayliss S, *et al.*

Capecitabine for the treatment of advanced gastric cancer.

By Norman G, Soares M, Peura P, Rice S, Suh D, Wright K, *et al.*

Rituximab for the treatment of relapsed/refractory chronic lymphocytic leukaemia.

By Dretzke J, Barton P, Kaambwa B, Connock M, Uthman O, Bayliss S, *et al.*

The clinical effectiveness and cost-effectiveness of rituximab for the first-line treatment of chronic lymphocytic leukaemia: an evidence review of the submission from Roche.

By Main C, Pitt M, Moxham T, Stein K.

Pemetrexed for the maintenance treatment of locally advanced or metastatic non-small cell lung cancer.

By Greenhalgh J, McLeod C, Bagust A, Boland A, Fleeman N, Dundar Y, *et al.*

Everolimus for the second-line treatment of advanced and/or metastatic renal cell cancer: a critique of the submission from Novartis.

By Pitt M, Crathorne L, Moxham T, Bond M, Hyde C.

Bevacizumab in combination with fluoropyrimidine-based chemotherapy for the first-line treatment of metastatic colorectal cancer.

By Whyte S, Pandor A, Stevenson M, Rees A.

Dronedarone for the treatment of atrial fibrillation and atrial flutter.

By Maund E, McKenna C, Sarowar M, Fox D, Stevenson M, Pepper C, *et al.*

Imatinib as adjuvant treatment following resection of KIT-positive gastrointestinal stromal tumours.

By Dretzke J, Round J, Connock M, Tubeuf S, Pennant M, Fry-Smith A, *et al.*

Gefitinib for the first-line treatment of locally advanced or metastatic non-small cell lung cancer.

By Brown T, Boland A, Bagust A, Oyee J, Hockenhull J, Dundar Y, *et al.*



Health Technology Assessment programme

Director,
Professor Tom Walley,
Director, NIHR HTA
programme, Professor of
Clinical Pharmacology,
University of Liverpool

Deputy Director,
Professor Jon Nicholl,
Director, Medical Care Research
Unit, University of Sheffield

Prioritisation Strategy Group

Members

Chair,
Professor Tom Walley,
Director, NIHR HTA
programme, Professor of
Clinical Pharmacology,
University of Liverpool

Deputy Chair,
Professor Jon Nicholl,
Director, Medical Care Research
Unit, University of Sheffield

Dr Bob Coates,
Consultant Advisor, NETSCC,
HTA

Dr Andrew Cook,
Consultant Advisor, NETSCC,
HTA

Dr Peter Davidson,
Director of NETSCC, Health
Technology Assessment

Professor Robin E Ferner,
Consultant Physician and
Director, West Midlands Centre
for Adverse Drug Reactions,
City Hospital NHS Trust,
Birmingham

Professor Paul Glasziou,
Professor of Evidence-Based
Medicine, University of Oxford

Dr Nick Hicks,
Consultant Adviser, NETSCC,
HTA

Dr Edmund Jessop,
Medical Adviser, National
Specialist, National
Commissioning Group (NCG),
Department of Health, London

Ms Lynn Kerridge,
Chief Executive Officer,
NETSCC and NETSCC, HTA

Professor Ruairidh Milne,
Director of NETSCC External
Relations

Ms Kay Pattison,
Senior NIHR Programme
Manager, Department of
Health

Ms Pamela Young,
Specialist Programme Manager,
NETSCC, HTA

HTA Commissioning Board

Members

Programme Director,
Professor Tom Walley,
Director, NIHR HTA
programme, Professor of
Clinical Pharmacology,
University of Liverpool

Chairs,
Professor Sallie Lamb,
Director, Warwick Clinical Trials
Unit

Professor Hywel Williams,
Director, Nottingham Clinical
Trials Unit

Deputy Chair,
Dr Andrew Farmer,
Senior Lecturer in General
Practice, Department of
Primary Health Care,
University of Oxford

Professor Ann Ashburn,
Professor of Rehabilitation
and Head of Research,
Southampton General Hospital

Professor Deborah Ashby,
Professor of Medical Statistics,
Queen Mary, University of
London

Professor John Cairns,
Professor of Health Economics,
London School of Hygiene and
Tropical Medicine

Professor Peter Croft,
Director of Primary Care
Sciences Research Centre, Keele
University

Professor Nicky Cullum,
Director of Centre for Evidence-
Based Nursing, University of
York

Professor Jenny Donovan,
Professor of Social Medicine,
University of Bristol

Professor Steve Halligan,
Professor of Gastrointestinal
Radiology, University College
Hospital, London

Professor Freddie Hamdy,
Professor of Urology,
University of Sheffield

Professor Allan House,
Professor of Liaison Psychiatry,
University of Leeds

Dr Martin J Landray,
Reader in Epidemiology,
Honorary Consultant Physician,
Clinical Trial Service Unit,
University of Oxford

Professor Stuart Logan,
Director of Health & Social
Care Research, The Peninsula
Medical School, Universities of
Exeter and Plymouth

Dr Rafael Perera,
Lecturer in Medical Statistics,
Department of Primary Health
Care, University of Oxford

Professor Ian Roberts,
Professor of Epidemiology &
Public Health, London School
of Hygiene and Tropical
Medicine

Professor Mark Sculpher,
Professor of Health Economics,
University of York

Professor Helen Smith,
Professor of Primary Care,
University of Brighton

Professor Kate Thomas,
Professor of Complementary &
Alternative Medicine Research,
University of Leeds

Professor David John
Torgerson,
Director of York Trials Unit,
University of York

Observers

Ms Kay Pattison,
Section Head, NHS R&D
Programme, Department of
Health

Dr Morven Roberts,
Clinical Trials Manager,
Medical Research Council

Diagnostic Technologies and Screening Panel

Members

Chair,
Professor Paul Glasziou,
Professor of Evidence-Based
Medicine, University of Oxford

Deputy Chair,
Dr David Elliman,
Consultant Paediatrician and
Honorary Senior Lecturer,
Great Ormond Street Hospital,
London

Professor Judith E Adams,
Consultant Radiologist,
Manchester Royal Infirmary,
Central Manchester &
Manchester Children's
University Hospitals NHS
Trust, and Professor of
Diagnostic Radiology, Imaging
Science and Biomedical
Engineering, Cancer &
Imaging Sciences, University of
Manchester

Mr A S Arunkalaivanan,
Honorary Senior Lecturer,
University of Birmingham and
Consultant Urogynaecologist
and Obstetrician, City Hospital

Dr Dianne Baralle,
Consultant & Senior Lecturer
in Clinical Genetics, Human
Genetics Division & Wessex
Clinical Genetics Service,
Southampton, University of
Southampton

Dr Stephanie Dancer,
Consultant Microbiologist,
Hairmyres Hospital, East
Kilbride

Dr Ron Gray,
Consultant, National Perinatal
Epidemiology Unit, Institute of
Health Sciences, University of
Oxford

Professor Paul D Griffiths,
Professor of Radiology,
Academic Unit of Radiology,
University of Sheffield

Mr Martin Hooper,
Service User Representative

Professor Anthony Robert
Kendrick,
Professor of Primary
Medical Care, University of
Southampton

Dr Susanne M Ludgate,
Director, Medical Devices
Agency, London

Dr Anne Mackie,
Director of Programmes, UK
National Screening Committee

Dr David Mathew
Service User Representative

Dr Michael Millar, Lead
Consultant in Microbiology,
Department of Pathology &
Microbiology, Barts and The
London NHS Trust, Royal
London Hospital

Mr Stephen Pilling,
Director, Centre for Outcomes,
Research & Effectiveness,
University College London

Mrs Una Rennard,
Service User Representative

Ms Jane Smith,
Consultant Ultrasound
Practitioner, Ultrasound
Department, Leeds Teaching
Hospital NHS Trust, Leeds

Dr W Stuart A Smellie,
Consultant, Bishop Auckland
General Hospital

Professor Lindsay Wilson
Turnbull,
Scientific Director of the
Centre for Magnetic Resonance
Investigations and YCR
Professor of Radiology, Hull
Royal Infirmary

Dr Alan J Williams,
Consultant in General
Medicine, Department of
Thoracic Medicine, The Royal
Bournemouth Hospital

Observers

Dr Tim Elliott,
Team Leader, Cancer
Screening, Department of
Health

Dr Catherine Moody,
Programme Manager,
Neuroscience and Mental
Health Board

Dr Ursula Wells,
Principal Research Officer,
Department of Health

Disease Prevention Panel

Members

Chair,
Dr Edmund Jessop,
Medical Adviser, National
Specialist Commissioning
Advisory Group (NSCAG),
Department of Health

Deputy Chair,
**Professor Margaret
Thorogood,**
Professor of Epidemiology,
University of Warwick Medical
School, Coventry

Dr Robert Cook
Clinical Programmes Director,
Bazian Ltd, London

Dr Elizabeth Fellow-Smith,
Medical Director, West London
Mental Health Trust, Middlesex

Dr Colin Greaves
Senior Research Fellow,
Peninsular Medical School
(Primary Care)

Dr John Jackson,
General Practitioner, Parkway
Medical Centre, Newcastle
upon Tyne

Dr Russell Jago,
Senior Lecturer in Exercise,
Nutrition and Health, Centre
for Sport, Exercise and Health,
University of Bristol

Dr Chris McCall,
General Practitioner, The
Hadleigh Practice, Corfe
Mullen, Dorset

Miss Nicky Mullany,
Service User Representative

Dr Julie Mytton,
Locum Consultant in Public
Health Medicine, Bristol
Primary Care Trust

Professor Irwin Nazareth,
Professor of Primary Care
and Director, Department of
Primary Care and Population
Sciences, University College
London

Professor Ian Roberts,
Professor of Epidemiology and
Public Health, London School
of Hygiene & Tropical Medicine

Professor Carol Tannahill,
Glasgow Centre for Population
Health

Mrs Jean Thurston,
Service User Representative

Professor David Weller,
Head, School of Clinical
Science and Community
Health, University of
Edinburgh

Observers

Ms Christine McGuire,
Research & Development,
Department of Health

Ms Kay Pattison
Senior NIHR Programme
Manager, Department of
Health

Dr Caroline Stone,
Programme Manager, Medical
Research Council

External Devices and Physical Therapies Panel

Members

Chair, Dr John Pounsford, Consultant Physician North Bristol NHS Trust, Bristol	Dr Dawn Carnes, Senior Research Fellow, Barts and the London School of Medicine and Dentistry, London	Dr Peter Martin, Consultant Neurologist, Addenbrooke's Hospital, Cambridge	Dr Pippa Tyrrell, Stroke Medicine, Senior Lecturer/Consultant Stroke Physician, Salford Royal Foundation Hospitals' Trust, Salford
Deputy Chair, Professor E Andrea Nelson, Reader in Wound Healing and Director of Research, University of Leeds, Leeds	Dr Emma Clark, Clinician Scientist Fellow & Cons. Rheumatologist, University of Bristol, Bristol	Dr Lorraine Pinnigton, Associate Professor in Rehabilitation, University of Nottingham, Nottingham	Dr Sarah Tyson, Senior Research Fellow & Associate Head of School, University of Salford, Salford
Professor Bipin Bhakta Charterhouse Professor in Rehabilitation Medicine, University of Leeds, Leeds	Mrs Anthea De Barton-Watson, Service User Representative	Dr Kate Radford, Division of Rehabilitation and Ageing, School of Community Health Sciences, University of Nottingham, Nottingham	Dr Nefyn Williams, Clinical Senior Lecturer, Cardiff University, Cardiff
Mrs Penny Calder Service User Representative	Professor Christopher Griffiths, Professor of Primary Care, Barts and the London School of Medicine and Dentistry, London	Mr Jim Reece, Service User Representative	
Professor Paul Carding, Professor of Voice Pathology, Newcastle Hospital NHS Trust, Newcastle	Dr Shaheen Hamdy, Clinical Senior Lecturer and Consultant Physician, University of Manchester, Manchester	Professor Maria Stokes, Professor of Neuromusculoskeletal Rehabilitation, University of Southampton, Southampton	

Observers

Dr Phillip Leech, Principal Medical Officer for Primary Care, Department of Health, London	Ms Kay Pattison Senior NIHR Programme Manager, Department of Health	Dr Morven Roberts, Clinical Trials Manager, MRC, London	Dr Ursula Wells PRP, DH, London
---	--	---	------------------------------------

Interventional Procedures Panel

Members

Chair, Professor Jonathan Michaels, Consultant Surgeon & Honorary Clinical Lecturer, University of Sheffield	Mr Seamus Eckford, Consultant in Obstetrics & Gynaecology, North Devon District Hospital	Dr Nadim Malik, Consultant Cardiologist/ Honorary Lecturer, University of Manchester	Dr Ashish Paul, Medical Director, Bedfordshire PCT
Mr David P Britt, Service User Representative, Cheshire	Professor David Taggart, Consultant Cardiothoracic Surgeon, John Radcliffe Hospital	Mr Hisham Mehanna, Consultant & Honorary Associate Professor, University Hospitals Coventry & Warwickshire NHS Trust	Dr Sarah Purdy, Consultant Senior Lecturer, University of Bristol
Mr Sankaran ChandraSekharan, Consultant Surgeon, Colchester Hospital University NHS Foundation Trust	Dr Matthew Hatton, Consultant in Clinical Oncology, Sheffield Teaching Hospital Foundation Trust	Dr Jane Montgomery, Consultant in Anaesthetics and Critical Care, South Devon Healthcare NHS Foundation Trust	Mr Michael Thomas, Consultant Colorectal Surgeon, Bristol Royal Infirmary
Professor Nicholas Clarke, Consultant Orthopaedic Surgeon, Southampton University Hospitals NHS Trust	Dr John Holden, General Practitioner, Garswood Surgery, Wigan	Dr Simon Padley, Consultant Radiologist, Chelsea & Westminster Hospital	Professor Yit Chiun Yang, Consultant Ophthalmologist, Royal Wolverhampton Hospitals NHS Trust
			Mrs Isabel Boyer, Service User Representative, London

Pharmaceuticals Panel

Members

Chair,

Professor Imti Choonara,
Professor in Child Health,
University of Nottingham

Deputy Chair,

Dr Lesley Wise,
Unit Manager,
Pharmacoepidemiology
Research Unit, VRMM,
Medicines & Healthcare
Products Regulatory Agency

Mrs Nicola Carey,
Senior Research Fellow,
School of Health and Social
Care, The University of
Reading

Mr John Chapman,
Service User Representative

Dr Peter Elton,
Director of Public Health,
Bury Primary Care Trust

Professor Robin Ferner,
Consultant Physician and
Director, West Midlands Centre
for Adverse Drug Reactions,
City Hospital NHS Trust,
Birmingham

Dr Ben Goldacre,
Research Fellow, Division of
Psychological Medicine and
Psychiatry, King's College
London

Dr Bill Gutteridge,
Medical Adviser, London
Strategic Health Authority

Dr Dyfrig Hughes,
Reader in Pharmacoeconomics
and Deputy Director, Centre
for Economics and Policy in
Health, IMSCaR, Bangor
University

Dr Yoon K Loke,
Senior Lecturer in Clinical
Pharmacology, University of
East Anglia

Professor Femi Oyeboode,
Consultant Psychiatrist
and Head of Department,
University of Birmingham

Dr Andrew Prentice,
Senior Lecturer and Consultant
Obstetrician and Gynaecologist,
The Rosie Hospital, University
of Cambridge

Dr Martin Shelly,
General Practitioner, Leeds,
and Associate Director, NHS
Clinical Governance Support
Team, Leicester

Dr Gillian Shepherd,
Director, Health and Clinical
Excellence, Merck Serono Ltd

Mrs Katrina Simister,
Assistant Director New
Medicines, National Prescribing
Centre, Liverpool

Mr David Symes,
Service User Representative

Observers

Ms Kay Pattison
Senior NIHR Programme
Manager, Department of
Health

Mr Simon Reeve,
Head of Clinical and Cost-
Effectiveness, Medicines,
Pharmacy and Industry Group,
Department of Health

Dr Heike Weber,
Programme Manager,
Medical Research Council

Dr Ursula Wells,
Principal Research Officer,
Department of Health

Psychological and Community Therapies Panel

Members

Chair,

Professor Scott Weich,
Professor of Psychiatry,
University of Warwick

Professor Jane Barlow,
Professor of Public Health in
the Early Years, Health Sciences
Research Institute, Warwick
Medical School

Dr Sabyasachi Bhaumik,
Consultant Psychiatrist,
Leicestershire Partnership NHS
Trust

Mrs Val Carlill,
Service User Representative,
Gloucestershire

Dr Steve Cunningham,
Consultant Respiratory
Paediatrician, Lothian Health
Board

Dr Anne Hesketh,
Senior Clinical Lecturer in
Speech and Language Therapy,
University of Manchester

Dr Yann Lefevre,
GP Partner, Burrage Road
Surgery, London

Dr Jeremy J Murphy,
Consultant Physician &
Cardiologist, County Durham &
Darlington Foundation Trust

Mr John Needham,
Service User, Buckinghamshire

Ms Mary Nettle,
Mental Health User Consultant,
Gloucestershire

Professor John Potter,
Professor of Ageing and Stroke
Medicine, University of East
Anglia

Dr Greta Rait,
Senior Clinical Lecturer and
General Practitioner, University
College London

Dr Paul Ramchandani,
Senior Research Fellow/Cons.
Child Psychiatrist, University of
Oxford

Dr Howard Ring,
Consultant & University
Lecturer in Psychiatry,
University of Cambridge

Dr Karen Roberts,
Nurse/Consultant, Dunston Hill
Hospital, Tyne and Wear

Dr Karim Saad,
Consultant in Old Age
Psychiatry, Coventry &
Warwickshire Partnership Trust

Dr Alastair Sutcliffe,
Senior Lecturer, University
College London

Dr Simon Wright,
GP Partner, Walkden Medical
Centre, Manchester

Observers

Ms Kay Pattison
Senior NIHR Programme
Manager, Department of
Health

Dr Morven Roberts,
Clinical Trials Manager, MRC,
London

Professor Tom Walley,
HTA Programme Director,
Liverpool

Dr Ursula Wells,
Policy Research Programme,
DH, London

Expert Advisory Network

Members

Professor Douglas Altman,
Professor of Statistics in
Medicine, Centre for Statistics
in Medicine, University of
Oxford

Professor John Bond,
Professor of Social Gerontology
& Health Services Research,
University of Newcastle upon
Tyne

Professor Andrew Bradbury,
Professor of Vascular Surgery,
Solihull Hospital, Birmingham

Mr Shaun Brogan,
Chief Executive, Ridgeway
Primary Care Group, Aylesbury

Mrs Stella Burnside OBE,
Chief Executive, Regulation
and Improvement Authority,
Belfast

Ms Tracy Bury,
Project Manager, World
Confederation for Physical
Therapy, London

Professor Iain T Cameron,
Professor of Obstetrics and
Gynaecology and Head of the
School of Medicine, University
of Southampton

Dr Christine Clark,
Medical Writer and Consultant
Pharmacist, Rossendale

Professor Collette Clifford,
Professor of Nursing and
Head of Research, The
Medical School, University of
Birmingham

Professor Barry Cookson,
Director, Laboratory of Hospital
Infection, Public Health
Laboratory Service, London

Dr Carl Counsel, Clinical Senior Lecturer in
Neurology, University of
Aberdeen

Professor Howard Cuckle,
Professor of Reproductive
Epidemiology, Department
of Paediatrics, Obstetrics &
Gynaecology, University of
Leeds

Dr Katherine Darton,
Information Unit, MIND – The
Mental Health Charity, London

Professor Carol Dezateux,
Professor of Paediatric
Epidemiology, Institute of Child
Health, London

Mr John Dunning,
Consultant Cardiothoracic
Surgeon, Papworth Hospital
NHS Trust, Cambridge

Mr Jonothan Earnshaw,
Consultant Vascular Surgeon,
Gloucestershire Royal Hospital,
Gloucester

Professor Martin Eccles,
Professor of Clinical
Effectiveness, Centre for Health
Services Research, University of
Newcastle upon Tyne

Professor Pam Enderby,
Dean of Faculty of Medicine,
Institute of General Practice
and Primary Care, University of
Sheffield

Professor Gene Feder,
Professor of Primary Care
Research & Development,
Centre for Health Sciences,
Barts and The London School
of Medicine and Dentistry

Mr Leonard R Fenwick,
Chief Executive, Freeman
Hospital, Newcastle upon Tyne

Mrs Gillian Fletcher,
Antenatal Teacher and Tutor
and President, National
Childbirth Trust, Henfield

Professor Jayne Franklyn,
Professor of Medicine,
University of Birmingham

Mr Tam Fry,
Honorary Chairman, Child
Growth Foundation, London

Professor Fiona Gilbert,
Consultant Radiologist and
NCRN Member, University of
Aberdeen

Professor Paul Gregg,
Professor of Orthopaedic
Surgical Science, South Tees
Hospital NHS Trust

Bec Hanley,
Co-director, TwoCan Associates,
West Sussex

Dr Maryann L Hardy,
Senior Lecturer, University of
Bradford

Mrs Sharon Hart,
Healthcare Management
Consultant, Reading

Professor Robert E Hawkins,
CRC Professor and Director
of Medical Oncology, Christie
CRC Research Centre,
Christie Hospital NHS Trust,
Manchester

Professor Richard Hobbs,
Head of Department of Primary
Care & General Practice,
University of Birmingham

Professor Alan Horwich,
Dean and Section Chairman,
The Institute of Cancer
Research, London

Professor Allen Hutchinson,
Director of Public Health and
Deputy Dean of ScHARR,
University of Sheffield

Professor Peter Jones,
Professor of Psychiatry,
University of Cambridge,
Cambridge

Professor Stan Kaye,
Cancer Research UK Professor
of Medical Oncology, Royal
Marsden Hospital and Institute
of Cancer Research, Surrey

Dr Duncan Keeley,
General Practitioner (Dr Burch
& Ptms), The Health Centre,
Thame

Dr Donna Lamping,
Research Degrees Programme
Director and Reader in
Psychology, Health Services
Research Unit, London School
of Hygiene and Tropical
Medicine, London

Mr George Levy,
Chief Executive, Motor
Neurone Disease Association,
Northampton

Professor James Lindesay,
Professor of Psychiatry for the
Elderly, University of Leicester

Professor Julian Little,
Professor of Human Genome
Epidemiology, University of
Ottawa

Professor Alistaire McGuire,
Professor of Health Economics,
London School of Economics

Professor Rajan Madhok,
Medical Director and Director
of Public Health, Directorate
of Clinical Strategy & Public
Health, North & East Yorkshire
& Northern Lincolnshire
Health Authority, York

Professor Alexander Markham,
Director, Molecular Medicine
Unit, St James's University
Hospital, Leeds

Dr Peter Moore,
Freelance Science Writer,
Ashted

Dr Andrew Mortimore,
Public Health Director,
Southampton City Primary
Care Trust

Dr Sue Moss,
Associate Director, Cancer
Screening Evaluation Unit,
Institute of Cancer Research,
Sutton

Professor Miranda Mugford,
Professor of Health Economics
and Group Co-ordinator,
University of East Anglia

Professor Jim Neilson,
Head of School of Reproductive
& Developmental Medicine
and Professor of Obstetrics
and Gynaecology, University of
Liverpool

Mrs Julietta Patnick,
National Co-ordinator, NHS
Cancer Screening Programmes,
Sheffield

Professor Robert Peveler,
Professor of Liaison Psychiatry,
Royal South Hants Hospital,
Southampton

Professor Chris Price,
Director of Clinical Research,
Bayer Diagnostics Europe,
Stoke Poges

Professor William Rosenberg,
Professor of Hepatology
and Consultant Physician,
University of Southampton

Professor Peter Sandercock,
Professor of Medical Neurology,
Department of Clinical
Neurosciences, University of
Edinburgh

Dr Susan Schonfield,
Consultant in Public Health,
Hillingdon Primary Care Trust,
Middlesex

Dr Eamonn Sheridan,
Consultant in Clinical Genetics,
St James's University Hospital,
Leeds

Dr Margaret Somerville,
Director of Public Health
Learning, Peninsula Medical
School, University of Plymouth

Professor Sarah Stewart-Brown,
Professor of Public Health,
Division of Health in the
Community, University of
Warwick, Coventry

Professor Ala Szczepura,
Professor of Health Service
Research, Centre for Health
Services Studies, University of
Warwick, Coventry

Mrs Joan Webster,
Consumer Member, Southern
Derbyshire Community Health
Council

Professor Martin Whittle,
Clinical Co-director, National
Co-ordinating Centre for
Women's and Children's
Health, Lymington

Feedback

The HTA programme and the authors would like to know your views about this report.

The Correspondence Page on the HTA website (www.hta.ac.uk) is a convenient way to publish your comments. If you prefer, you can send your comments to the address below, telling us whether you would like us to transfer them to the website.

We look forward to hearing from you.