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An evidence synthesis of qualitative and quantitative research on component intervention techniques, effectiveness, cost-effectiveness, equity and acceptability of different versions of health-related lifestyle advisor role in improving health

SM Carr, M Lhussier, N Forster, L Geddes, K Deane, M Pennington, S Visram, M White, S Michie, C Donaldson and A Hildreth

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Abstract

An evidence synthesis of qualitative and quantitative research on component intervention techniques, effectiveness, cost-effectiveness, equity and acceptability of different versions of health-related lifestyle advisor role in improving health

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Background: There is a need to identify and analyse the range of models developed to date for delivering health-related lifestyle advice (HRLA), or training, for effectiveness and cost-effectiveness in improving the health and well-being of individuals and communities in the UK, with particular reference to the reduction of inequalities.
Objectives: To identify the component intervention techniques of lifestyle advisors (LAs) in the UK and similar contexts, and the outcomes of HRLA interventions.
Data sources: Stakeholder views, secondary analysis of the National Survey of Health Trainer Activity, telephone survey of health trainer leads/coordinators. A search of a range of electronic databases was undertaken [including the Applied Social Sciences Index and Abstracts (ASSIA), EMBASE, NHS Economic Evaluation Database (NHS EED), MEDLINE, Psyc INFO, etc.], as well searching relevant journals and reference lists, conducted from inception to September 2008.
Review methods: Identified studies were scanned by two reviewers and those meeting the following criteria were included: studies carrying out an evaluation of HRLA; those taking place in developed countries similar to the UK context; those looking at adult groups; interventions with the explicit aim of health improvement; interventions that involved paid or voluntary work with an individual or group of peers acting in an advisory role; advice delivered by post, online or electronically; training, support or counselling delivered to patients, communities or members of the public. After quality assessment, studies were selected for inclusion in the review. Data were abstracted from each study according to an agreed procedure and narrative, and realist and economic approaches were used to synthesise the data. Cost-effectiveness analysis of interventions was undertaken.
Results: In total, 269 studies were identified but 243 were excluded. The 26 included studies addressing chronic care, mental health, breastfeeding, smoking, diet and physical activity, screening and human immunodeficiency virus (HIV) infection prevention. Overall, there was insufficient evidence to either support or refute the use of LAs to promote

health and improve quality of life (QoL), and thus uncertainty about the interventions' cost-effectiveness. However, the economic analysis showed that LA interventions were cost-effective in chronic care and smoking cessation, inconclusive for breastfeeding and mental health and not cost-effective for screening uptake and diet/physical activity. LA interventions for HIV prevention were cost-effective, but not in a UK context.

Limitations: The wide variety of LA models, delivery settings and target populations prevented the reviewers from establishing firm causal relationships between intervention mode and study outcomes.

Conclusions: Evidence was variable, giving only limited support to LAs having a positive impact on health knowledge, behaviours and outcomes. Levels of acceptability appeared to be high. LAs acted as translational agents, sometimes removing barriers to prescribed behaviour or helping to create facilitative social environments. Reporting of processes of accessing or capitalising on indigenous knowledge was limited. Ambiguity was apparent with respect to the role and impact of lay and peer characteristics of the interventions. A future programme of research on HRLA could benefit from further emphasis on identification of needs, the broadening of population focus and intervention aims, the measurement of outcomes and the reviewing of evidence.

Funding: This study was funded by the Health Technology Assessment programme of the National Institute for Health Research.

Contents

List of abbreviations

AIDS	acquired immunodeficiency syndrome
ANC	antenatal care
ART	antiretroviral treatment
ASSIA	Applied Social Sciences Index and Abstracts
BCCCP	Breast and Cervical Cancer Control Program
BMI	body mass index
BSTC	barrier-specific telephone counselling
CA	community activity
CASP	Critical Appraisal Skills Programme
CCTR	Cochrane Controlled Trials Reports
CDC	Centres for Disease Control and Prevention
CDSM	Chronic Disease Self-Management
CDSR	Cochrane Database of Systematic Reviews
CHD	coronary heart disease
CHW	community health worker
CI	confidence interval
CINAHL	Cumulative Index to Nursing and Allied Health Literature
CORE	Centre for Outcomes Research and Effectiveness
CRD	Centre for Reviews and Dissemination
CVD	cardiovascular disease
D	mean difference
DALY	disability-adjusted life-year
DARE	Database of Abstracts of Reviews of Effects
EQ-5D	European Quality of Life-5 Dimensions
ES	effects size
GP	general practitioner
HADS	Hospital Anxiety and Depression Scale
HbA1c	glycated haemoglobin
HCHS	hospital and community health services
HDL	high-density lipoprotein
HIV	human immunodeficiency virus
HRLA	health-related lifestyle advice
HRQoL	health-related quality of life
IBSS	International Bibliography of the Social Sciences
IC	individual counselling
ICER	incremental cost-effectiveness ratio
IK	indigenous knowledge
ISRCTN	International Standard Randomised Controlled Trial Number
LA	lifestyle advisor
LDL	low-density lipoprotein
LHA	lay health advisor
MRC	Medical Research Council
NHANES	National Health and Nutrition Examination Survey
NHS EED	NHS Economic Evaluation Database
NICE	National Institute for Health and Clinical Excellence
NRT	nicotine replacement therapy
OR	odds ratio
PAG	Project Advisory Group

PAIS	Public Affairs Information Services
PICOS	Population, Interventions, Comparators, Outcomes and Study Designs
PPVTR	Peabody Picture Vocabulary Test Revised
PSI	Psychiatric Symptom Index
QALY	quality-adjusted life-year
QoL	quality of life
RCT	randomised controlled trial
RR	relative risk
SCI	Science Citation Index
SD	standard deviation
SSCI	Social Sciences Citation Index
SHA	Strategic Health Authority
STD	sexually transmitted disease
UCL	University College London
UKPDS	United Kingdom Prospective Diabetes Study
WHO	World Health Organization

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

Review question and objectives

This research aims to identify, describe, classify and analyse the range of models developed to date for delivering health-related lifestyle advice (HRLA), or training, for effectiveness, mechanism of effect, cost-effectiveness, equity and acceptability in improving the health and well-being of individuals and communities, with particular reference to the reduction of inequalities in the UK.

Typical of the complexity of public health issues, the question addressed in this review is broad and multifaceted. The overall question was therefore broken down and grouped under two broad groupings:

1. What are the component intervention techniques of lifestyle advisors (LAs) in the UK and similar contexts?
2. What are the outcomes of HRLA interventions?

Methods

Data sources

In preparation to undertake the evidence synthesis, a process of problem definition and intervention modelling to facilitate development of classification of the various intervention dimensions was undertaken: eliciting stakeholder views, secondary analysis of the National Survey of Health Trainer Activity, telephone survey of health trainer leads/co-ordinators. An extensive search of electronic databases [including the Applied Social Sciences Index and Abstracts (ASSIA), EMBASE, NHS Economic Evaluation Database (NHS EED), MEDLINE, PsycINFO, etc.], relevant journals and reference lists was undertaken. Searches were conducted from inception to September 2008.

Study selection

Studies with the following criteria were included:

- those carrying out an evaluation (quantitative, qualitative or economic) of HRLA
- those taking place in developed countries similar to the UK context, i.e. Western Europe, North America, Australia and New Zealand
- those looking at adult groups
- interventions with the explicit aim of health improvement, including community-based secondary prevention for chronic disease
- interventions that involved paid or voluntary work with an individual or group of peers acting in an advisory role, offering support in person, over the telephone or online
- advice delivered by post, online or electronically (only if this involved an iterative process of interaction between individual and advisor)
- training, support or counselling delivered to patients, communities or members of the public.

After quality assessment, using standardised quality checklists, 26 studies were identified for inclusion in the review.

Data abstraction

Data were abstracted from each study according to an agreed procedure.

Data analysis and synthesis

Multiple approaches were required to synthesis the data in this review: narrative, realist and economic. The narrative synthesis provided a detailed description of the included studies (qualitative and quantitative) and treated them as exemplar cases of LA interventions. The realist synthesis builds on this emerging theory to refine and elaborate the knowledge of how, why, and in which circumstances, LA interventions are likely to produce successful outcomes. The analysis of cost-effectiveness provided as comprehensive an answer as possible to the second group of review questions.

Results

In total, 269 studies that evaluated HRLA were identified but 243 were excluded owing to a range of methodological factors that made them unsuitable for inclusion in a systematic review. The 26 included studies addressing chronic care, mental health, breastfeeding, smoking, diet and physical activity, screening and human immunodeficiency virus (HIV) infection prevention.

Overall, the evidence was not sufficient to support or refute the use of LAs to promote health and improve quality of life (QoL). Although there is likely to be considerable uncertainty about statements of interventions' cost-effectiveness because of the sparse evidence base for effectiveness, lessons can be drawn from the realist analysis of the included studies.

- LA interventions in chronic care are cost-effective. The success of interventions to improve the management of chronic conditions is linked to their largely already engaged target group and to their aim, which differs from that of some of the other HRLA, in that they help people live with a condition rather than necessarily aiming at behaviour change.
- LA interventions for smoking cessation are cost-effective because of the important health gains that derive from cessation. The economic analysis excluded studies when effectiveness did not reach statistical significance. However, the buddy schemes explored in these studies have much to offer to an analysis of intervention components and may still offer potential as a practice model.
- From the evidence that could be accessed, the cost-effectiveness of LA interventions for breastfeeding is inconclusive. Intervention mechanisms details suggest that these interventions tended to use peers with common experience, and aimed at enhancing, rather than changing, behaviour.
- Included studies did not allow the production of a conclusive cost-effectiveness estimate for LA interventions for mental health. This intervention presented a mechanism in common with the smoking cessation 'buddy' system, in that it paired people with a similar experience (that of being the parent of a child with a chronic condition). LA interventions for screening uptake are not cost-effective. These interventions did reach, however, a large number of people, they presented, on the whole, high degrees of acceptability, and targeted population groups, which tended to be disengaged from mainstream service provision.
- LA interventions for diet and physical activity are not cost-effective. Highlighted by the realist analysis was an alternative intervention mechanism, in that one study targeted whole family groupings rather than individuals. This was a unique intervention characteristic within this review.
- LA interventions for HIV infection prevention were cost-effective, but not in a UK context. Realist analysis highlights that they did succeed, however, in reaching hard-to-reach communities and build on social capital – two aims of the health trainer scheme in the UK.

Conclusions

The wide variety of LA models, delivery settings and target populations prevented the reviewers from establishing firm causal relationships between intervention mode and study outcomes. Evidence is variable and can only give limited support to LAs having a positive impact on health knowledge, behaviours and outcomes. Levels of acceptability appear to be high. LAs acted as translational agents, sometimes removing barriers to prescribed behaviour or helping to create facilitative social environments. Reporting of processes of accessing or capitalising on indigenous knowledge (IK) is limited. Ambiguity continues with respect to the role and impact of lay and peer characteristics of the interventions.

Recommendations for practice

- Interventions that are low cost and have some effect are recommended.
- Further recognition of the IK base of the LA may be required.
- Training of LAs may be worthy of particular attention, as a balance needs to be reached between provider and LA-identified learning needs.
- The process of message tailoring and the effectiveness of inclusion of different aspects of community allegiance and IK require further exploration.
- There is a need for clearer definitions of target groups, their characteristics and particular needs.
- Intervention approaches need to be made more explicit.
- Peership and layness need to be considered and defined for particular settings.
- Short-, medium- and long-term intervention outcomes need to be clearly identified and measured.

Recommendations for a future programme of research

The following recommendations carry particular relevance to the UK context, but may also be of international relevance. They are designed to form a programme of research on HRLA, around the identification of needs, the broadening of population focus and intervention aims, the measurement of outcomes and the reviewing of evidence.

- Identifying need:
  - A concept mapping approach may be an appropriate strategy to use in order to identify what people believe helps them adhere to healthy lifestyle advice, and to triangulate this to views of public health professionals and community leaders.
- Target groups:
  - Interventions in groups not addressed in the review (men, transient populations, homeless people, etc.), broader interventions in groups with specific issues (e.g. physical health in mental health population groups), and prevention in general health promotion (such as stop smoking plus diet, exercise and screening) need further development.
  - Research on alternative target groups that may be of broader focus than health related, such as, for example, faith groups, youth groups, community centres, gangs, playschemes, etc.; within each group, existing leaders could be identified and collaborative relationships nurtured to identify, assess and address local needs. Such schemes are likely to lead to community development activities but would require longitudinal funding schemes.

- Intervention aim:
  - Research is needed on the building of social capital or community development through LA schemes. This would entail a focus on social and structural, rather than individual, determinants of health inequalities.
  - A development of research led by, or conducted in collaboration with, community guides would help to develop ways for health-care providers to maximise the potential of pre-existing 'unofficial' health improvement activities.
- Outcome identification and measurement:
  - This review endorses the need for a strategic movement along the Medical Research Council continuum of evidence so that research evolves from scoping practice to evaluating outcomes.
  - HRLA schemes would benefit from a development of current methodological advancements to help identify and assess short-, medium- and long-term intervention outcomes. In the long term, this would encourage the publication of promising outcomes and thus strengthen the HRLA evidence base.
  - There is a need to establish equity of outcomes between groups of different socioeconomic profiles.
  - There is a need to identify what enables long-term effects, i.e. regular low-cost 'top-up' interventions or multidimensional interventions with changes in approach over time.
- Systematic reviewing in public health:
  - A greater engagement with realistic review or synthesis principles would allow exposure of contexts and mechanism components that influence a range of outcomes in HRLA interventions.
  - This review supports previously published commentaries on the necessity for the development of quality assessment tools that could allow increased methodological flexibility.

Funding

This study was funded by the Health Technology Assessment programme of the National Institute for Health Research.

Chapter 1

Introduction

This chapter discusses the background to the review and presents a brief history and scoping of the lay health advisor (LHA) role. It is complemented by a review of existing reviews in the field of health-related lifestyle advice (HRLA), presented in *Appendix 1*.

Background

Behaviour is recognised as a key determinant of health, with modifiable lifestyle behaviours, such as smoking, physical activity, unhealthy eating and excessive alcohol use, resulting in significant morbidity and mortality.[1] There is a substantial knowledge base with respect to effective lifestyle intervention approaches. However, the successful translation of this into practice is a continuing challenge.[2] The consequent individual and societal costs are considerable. These major health risks tend to be more prevalent among lower socioeconomic groups and, consequently, large sociodemographic differences exist in both experiences and expectations of health.[3–6] With respect to the UK context, the *Public Health White Paper Choosing health: making healthy choices easier* sought to address this issue by taking action to encourage and enable individuals to make healthier choices, with a particular focus on those living in disadvantaged communities.[7] It recognises the central importance of changing behaviour to improve population health and also builds on the vision of a 'fully engaged scenario', in which people take control of their own health and the wider determinants of ill health are addressed.[8]

Approaches to health-care provision are therefore changing in recognition that clinical and curative foci are unsustainable, inappropriate or insufficiently effective.[9,10] Many Western health-care systems are currently undergoing a shift from paternalistic to partnership models of care, with policy-makers, clinicians and consumers all seeking ways to promote increased involvement of patients and the wider public.[11] There is therefore a movement in public health approaches 'from advice from on high to support from next door' (p. 13).[7] These shifts in policy require an expanded portfolio of public health interventions, including an expanded workforce continuum, in order to effectively address the health needs of both the general population and the most vulnerable groups in society.

The introduction of new roles or the expansion of existing roles to deliver HRLA or training represents one response to these developments. In the UK, NHS health trainers were introduced in the *Public Health White Paper Choosing health*,[7] as one element of a wider workforce, offering a range of approaches to helping people change their behaviour in relation to their health. They are described as 'people who are in touch with the realities of the lives of the people with whom they work and connected through a shared stake in improving the health of the communities that they live in'(p. 106)[7] and 'Offering practical support instead of preaching, and good connections into the advice and support available locally' (p. 106).[7] It is also recognised that a one-size-fits-all approach will not be appropriate, noting that 'different neighbourhoods will need different types of health trainers' (p. 106) and that different models of provision will be required to achieve best outcomes for different individuals and communities.

Versions of the health-related lifestyle advisor (LA) role represent a strategy that has been widely used to promote behaviour change and self-care across diverse conditions and

population groups.[12,13] It is becoming increasingly important in health-care environments that are challenged by limited financial and human resources, enduring inequalities issues and expanding populations with chronic diseases.[8,14,15] Much of the formal literature describing peer-based models comes from North America, where health promotion and disease prevention programmes that rely on LHAs have proliferated since the 1970s.[16] Research has shown that people are more likely to hear and personalise messages, and thus to change their attitudes and behaviours, if they believe the messenger is similar to them.[17] In addition, peer-based interventions can often be implemented economically, allow for direct involvement of clients and can result in long-term benefits for the peer educators themselves.[18] Preliminary work conducted in relation to the implementation of health trainers in the NHS identified a range of models varying by degree of targeting and mode of delivery.[19,20] However, it is not currently known what the effects of these various models are on health outcomes. It is therefore timely to bring together the available data on the impacts of HRLA or training to determine how effective the various approaches are. Drawing on both qualitative and quantitative research, this report synthesises the evidence on the component intervention techniques, effectiveness, cost-effectiveness, equity and acceptability of different versions of the health-related LA role in improving health and well-being in the UK.

Terminology

The term 'LHA' belongs to a group of roles that have been given, over time, a range of titles, but which have some common principle of recruitment, purpose or operation. These include 'natural helpers',[21] 'peer educators',[22,23] 'lay health advisors',[16] 'lay volunteers',[24] 'community health advisor',[2] 'community health aides',[25] 'peer counsellors',[26] 'lay health volunteers',[27] 'navigators',[24] 'community health workers',[12] 'health trainers',[7] 'community guides',[28] 'indigenous encouragers',[29] 'buddy'[30] and 'telecarer'.[9] There does appear to be a consistent term '*promotora*', used in Spanish-speaking communities. Summarising this diversity, Devilly *et al.*[23] suggest that peer education constitutes an umbrella term covering a 'range of different approaches including peer training, peer facilitation, peer counselling, peer modelling or peer helping' (p. 221).[23]

The variety of language has been highlighted as an issue of note.[12] There are, for example, consequences for clarity of role and expectations of impact. Opportunities for comparability of impact and effectiveness are also inhibited. With respect to this review the search strategy had to be particularly broad, utilising complex search strings. For clarity in this report, the intervention will be referred to as HRLA and the person delivering it as an LA.

History of the LA role

Accepting the LHA as an umbrella term, the role has a considerable history, more so in other parts of the world than in the UK, and with particular focus on certain health needs. For example, Earp and Flax[16] report a 30-year history of the development and increased utilisation of the role in the USA with respect to health promotion and disease prevention programmes. Similarly, Bishop *et al.*[21] report an increase during the 1990s in the development of links between communities and service providers through the training of indigenous community members.

The role of LA is more established in some fields, for example breastfeeding, sexual health, screening, chronic conditions/Expert Patients Programmes. Emerging roles are appearing, for example as exemplified in the development of the role for health improvement activities with offenders.[23]

The development of the role has not been unproblematic and reference to the World Health Organization (WHO) report on community health workers (CHWs)[12] provides an eight-item list of areas of potential weakness:

1. minimal policy and organisational commitment – vertical programmes, implemented with little professional interest, structural, political and economic factors neglected, lessons not learned from other sectors
2. poorly defined functions
3. poor selection
4. deficiencies in training and continuing education
5. lack of support and supervision
6. uncertain working conditions
7. undetermined cost and sources of finance
8. lack of monitoring and evaluation.

It seems reasonable to assume these issues may potentially apply to the LA role.

This brief review highlights that the LA role has had a precarious history and diversity of development that has not always benefited from rigorous evaluation.

Definitions and distinguishing features

As with role titles, there is also ambiguity with respect to role definitions. Significant debate has been devoted to attempting to clarify the role and what distinguishes it from other intervention approaches. Some definitions are offered here to both assist the process of distinguishing the role boundaries and characteristics and highlight the inherent challenges: 'community members who work almost exclusively in community settings and who serve as connectors between health care consumers and providers to promote health among groups that have traditionally lacked access to adequate care' (p. 1055);[31] 'members of the communities where they work, should be selected by the communities, should be answerable to the communities for their activities, should be supported by the health system but not necessarily a part of its organisation, and have a shorter training than professionals' (p. 6);[32] 'CHW must be of the people they serve. They must live with them, work with them, rejoice with them, suffer with them, grieve with them and decide with them' (p. 6).[32]

Being 'of the community' is recognised, however, as a complex issue. The WHO Study Group on strengthening CHW performance recognises that:[12] 'Community is not a homogeneous group – its members can have strong conflicts of interest. In this report, the word community is therefore used in the geographical sense of the population potentially served by a CHW; there is no assumption that such social groupings cooperate harmoniously in everyday affairs' (p. 16).

Walt[33] identifies that traditional definitions of the role are being challenged as new derivations emerge. She reports that until the 1980s CHWs were 'people who were *selected by* the community, *resident in* the community and *from* the community' (p. 3). These foundations are seen to be challenged, for example, when the degree of the relationship and the affiliations of the worker with the health-care system are strengthened or formalised, by issues of volunteer or financially remunerated worker, selection by the service provider rather than the service recipients. Transition from 'community' member to paid employee, as is the case for some LHAs, is an issue worthy of scrutiny. If, and how, this changes the individual's and /or the communities' perception of and relationship with the individual is open to debate.[34] Braithwaite *et al.*,[35] when exploring the experiences of community members who were involved in action research, found the transition

from community member or voluntary worker to a paid researcher to change the way that LHAs were perceived by community members.

In summary, the distinguishing features of belonging to a community are highly complex.[36] At any one point in time, one LA individual may belong to several 'communities', such as gender, age, geography, religion and occupation, and the challenge arises with respect to which affiliation to prioritise, or which results in the most effective health improvement intervention.

As an alternative to a community affiliation as a distinguisher, it may helpful to refer to Ungar *et al.*'s[37] discussion on the drivers for such role development in social care, which they identify as increased recognition of the value of indigenous knowledge (IK).

Indigenous knowledge can be broadly defined as the knowledge that an indigenous (local) community accumulates over generations of living in a particular environment.[38] This definition encompasses all forms of knowledge – technologies, know-how skills, practices and beliefs – that enable the community to achieve stable livelihoods in their environment.[38] A number of terms are used interchangeably to refer to the concept of IK, including 'traditional knowledge', 'indigenous technical knowledge', 'local knowledge' and 'indigenous knowledge system'.[38]

Indigenous knowledge is unique to every culture and society, and it is embedded in community practices, institutions, relationships and rituals.[38]

Indigenous knowledge is based on, and is deeply embedded in, local experience and historic reality, and is therefore unique to that specific culture; it also plays an important role in defining the identity of the community.[38]

Rationale for role/intervention

The LA role is generally used to achieve three broad aims: (1) access to communities or individuals who are in some way marginalised from the mainstream; (2) access from marginalised communities into the health and social care systems; and (3) alternative delivery mechanisms to professional provider. Varying degrees of detail and distinction on each of these aims have been reported, with the level of sophistication developing over time and role history.

Referring to the role of 'indigenous helpers', Reiff and Reissman[39] identify two distinct role intentions: one they describe as 'expediters or service agents' and the other as 'care aides or therapeutic agents'. Witmer *et al.*[31] differentiate role rationale under four headings: increasing access to health care; improving quality of care; reducing costs of care; and broader social contributions.

With respect to the use of peer education as a health promotion intervention, Turner and Shepherd[40] provide a list of 10 rationales:

1. More cost-effective.
2. Peers are credible.
3. Peer education is empowering.
4. Uses already established means of communication/information transfer.
5. People identify with peers and so peers are more successful than professionals.
6. Can act as positive role model.
7. Beneficial to those involved in providing it.
8. May be more acceptable than other education provider.

9. Reaches those hard to reach through conventional methods.
10. Reinforcement of learning through ongoing contact.

In summary, the purpose and aims of the LA role are broad and varied.

Theoretical basis of health-related lifestyle advisor

The theoretical basis of LA interventions is another debated issue, and one for which there is inconsistent reference in the literature on the topic. Although potentially only a dimension of HRLA, Turner and Shepherd[40] describe peer education as 'a method in search of a theory rather than the application of theory to practice … Although located broadly within the field of social psychology, peer education does not appear to have its roots within a particular school of thought' (p. 235).

Drawing on Turner and Shepherd's[40] work and a general review of the LA-type role, this report highlights a range of possible theoretical underpinnings: social network theory, social learning theory, self-efficacy theory, social inoculation theory, role theory, differential association theory, subcultures theories and communication of innovations theory.

Mechanism and models of intervention

As distinct from a theoretical basis, most reports of LA activity do make reference, even minimally, to mechanisms of intervention.

With respect to the lay health worker as a distinct intervention provider, the mechanisms may be grouped into three broad categories. One category is mechanisms that address embellishment of standard care, such as the provision of a 'bridge' between communities and service providers,[33] a 'complement' to formal systems,[16] a 'link' between communities and organisations.[41] Another is the provision of social network support for behaviour change messages and activity.[42] Schulz *et al.*[40] further differentiate support into affective support (caring, trust, love), informational support (advice, suggestions, information) and instrumental support (tangible aid and services). The third mechanism is style of information transmission, which can range from repeated message provision in several social contexts to individual one-to-one tailored message giving.[42]

With respect to models of provision, working alone or in partnership with another provider are two clear distinctions. For example, Nunez *et al.*[43] report an approach that combines the knowledge of a nurse with an advocate's understanding of the social reality of the community as a 'package' of provision.

Challenges of evaluating public health interventions

The WHO[12] endorses the effectiveness of CHWs by reporting: 'They have achieved much in many countries at different times, but shortcomings of CHW programmes are often imputed to the CHWs themselves. However, this debate is a sterile one: there is no longer any question of whether CHWs can be key agents in improving health; the question is how their potential can be realized' (p. 9).

These comments can potentially be applied to the more generic LA role. Evidence of effectiveness is not readily available and is hindered by acknowledged evaluation challenges for this type

of service provision. Twenty years ago, Walt[33] described the methodological difficulties as 'enormous, further hindered by the financial resources required to conduct rigour evaluation designs and a limited service provision history'. This comment still applies, as the practical difficulties in measuring the impact of public health interventions remain unchanged. Indeed, public health interventions may need to adapt to local circumstances and needs, preventing tight control of the intervention:[44] randomisation of community-based trials can be difficult[45] – possible contamination may preclude individual randomisation, and randomisation at community level may be beyond the resources of the trial[46] – and measurement of lifestyle changes inevitably relies on self-reported data, as observation of health improvements at community level is rarely feasible given the size and duration of a typical study.[47]

The impact of lifestyle and behaviour changes in terms of health gains is often not manifest until old age.[48] A measure of effectiveness almost inevitably necessitates extrapolation of health benefits from surrogate markers and measures of lifestyle changes. These benefits are dependent on the maintenance of lifestyle changes.[49] Considerable literature is available in certain disease areas allowing estimates of the health gains from changes in behaviour. However, little evidence is available on the long-term maintenance of lifestyle/behaviour changes.[50] Most of the available evidence comes from the smoking cessation literature, which suggests that 65%–75% of quitters at 1 month will relapse at 12 months.[51,52] A further 35%–54% of those abstaining at 12 months will subsequently relapse.[53,54]

Further challenges in evaluating public health interventions arise from the complex nature of these interventions. Interventions aimed at changing lifestyles inevitably interact with the social environment in which they are delivered.[55] The environment shapes and modifies the effect of the intervention.[56] Subtle differences in social environment may have a significant modifying effect on the impact of the intervention.[57] The intervention may also modify the social environment in terms of attitude towards health improvement and empowerment to make changes. While the impact of the intervention can be captured within the social environment studied, generalising the effects of the interventions to other contexts may not be possible. A thorough understanding of how the intervention *works* might be necessary before a judgement can be made on whether that intervention can be transferred to another context.[58]

The impact of the intervention on the social environment brings additional and unique challenges to public health evaluations. It requires consideration of the possibility of benefits (or harms) that extend well beyond the recipients. The impact of any particular intervention on the social values may be too small to detect.[59] Nevertheless, it is clear that social norms and lifestyles can and do change. The decline in cardiovascular disease (CVD) across the Western world over the last 30–40 years[60] is only partly a product of medical intervention – significant changes in diet have taken place.[61,62] However, the impacts of health-promotion programmes on changes in attitudes to diet are difficult to quantify.

Unsurprisingly, then, 'many LHA programmes are only minimally evaluated, if at all, and little published information is available about LHA evaluation strategies' (p. 443).[63] This situation is a consequence of the need for evaluation activities to not disturb the spontaneous and informal processes of natural helping, the difficulty in intermediate outcome measurement of unstructured roles and the generally modest evaluation budgets available to such interventions. Despite recent methodological developments in the public health and health improvement fields, these comments remain highly pertinent.

Chapter 2

Methods

Research question

This research aims to identify, describe, classify and analyse the range of models developed to date for delivering HRLA or training for effectiveness, mechanism of effect, cost-effectiveness, equity and acceptability in improving the health and well-being of individuals and communities, with particular reference to the reduction of inequalities in the UK. The proposed protocol is presented in *Appendix 2*.

Review question(s)

Typical of the complexity of public health issues, the question addressed in this systematic review is broad and multifaceted.[64,65] The overall question was therefore broken down and grouped under two broad groupings:

1. *What are the component intervention techniques of health-related LAs in the UK or similar contexts*?

This includes content and mediation aspects, and reference to Davidson *et al.*[66] provides detail of useful minimal intervention description.

- *Content* What is the content of the intervention and how was it delivered? (e.g. oral communication, written material, etc.)
- *Provider* The detailed role of the intervention deliverer.
- *Format* What were the methods of intervention administration (e.g. self-help, telephone, individual, group, etc.)
- *Setting* Where and when was the intervention delivered.
- *Intensity* How many different patient contacts and how much oral contact time was involved?
- *Duration* Over what time period were the intervention contacts conducted and how were they spaced?
- *Fidelity* Was the intervention delivered as intended?

2. *What are the outcomes of LA interventions? This includes moderation issues of for whom, and in what setting, effectiveness was achieved.*

- Are health-related LAs *effective* in improving health and well-being in the UK?
- Are health-related LAs *cost-effective* in improving health and well-being in the UK?
- Are health-related LAs *equitable* in improving health and well-being in the UK?
- Are health-related LAs *acceptable* in improving health and well-being in the UK?

The concept of health-related LAs is multifaceted and, as such, represents a complex public health intervention. Hence, any assessment of the effectiveness and cost-effectiveness of the models identified needs to take into consideration the nature of this type of intervention and

requires multiple methods of enquiry. The review was therefore framed by a staged approach to intervention development, evaluation and implementation, as exemplified by the Medical Research Council (MRC) framework for the evaluation of complex interventions[67] (*Figure 1*). The first phase of this review was therefore focused on problem definition and intervention modelling to facilitate development of classification of the various intervention dimensions developed by the research team (*Appendix 3*). There were three aspects to this phase: eliciting stakeholder views; secondary analysis of the National Survey of Health Trainer Activity;[68] and a telephone survey of health trainer leads/coordinators.

1. *Eliciting stakeholder views* The Project Advisory Group (PAG) (*Appendix 4*), recruited from different geographical locations, service, user and academic backgrounds and disciplines, was consulted on the key issues surrounding the role of health-related LAs to be taken into account when shaping, planning and executing the systematic review. The PAG membership was influenced by the Centre for Reviews and Dissemination (CRD)[69] guidance to ensure breadth of representation to attempt to make certain that 'the questions addressed are those of importance to decision makers' (p. 159). Considerable debate was generated with respect to inclusion of health trainers as members of the PAG. The desirability was not in question, but rather the appropriateness of the request at such an early point in the establishment of the services. Advice was sought from local health trainer leads and co-ordinators, who consulted with health trainers. The consensus was that the relevant PAG members would liaise with the health trainers in their areas regarding project issues and be the conduit for bringing that information to the PAG meetings. This also allowed a wider representation of health trainer views than inviting a small number to join the PAG. As a result of the consultation with PAG members, the researchers were able to elicit perceptions of key issues relating to the LA role to help set the parameters for the systematic review phase of the study. This added depth of detail to the knowledge already held by the reviewers.

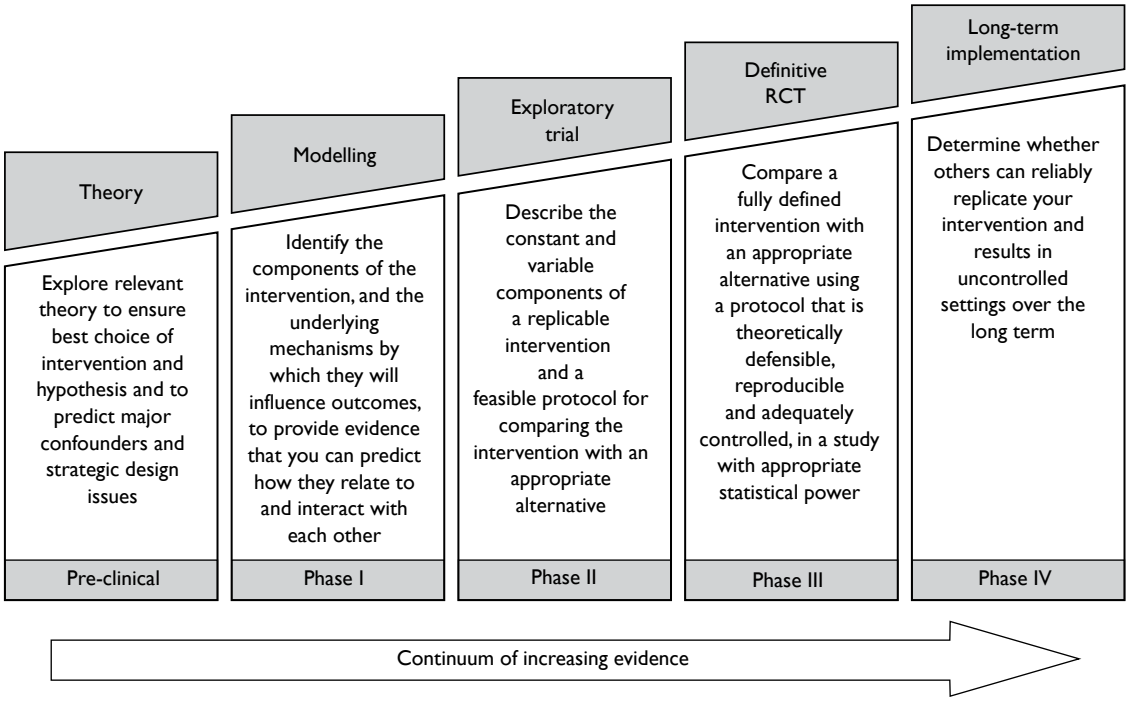

FIGURE 1 Medical Research Council framework for the evaluation of complex interventions. RCT, randomised controlled trial.

2. *A secondary analysis of the National Audit of Health Trainer Activity* Undertaken by Professor Susan Michie and colleagues at the Centre for Outcomes Research and Effectiveness (CORE), University College London (UCL). Data from the UCL audit were recoded, and questions were mapped against the primary classification sampling frame developed by the research team. These data were then analysed to identify key areas of importance for future discussion and sampling. However, owing to the limited number of data (many respondents to the original audit did not provide answers to each question – it was unclear in which instances missing data suggested the question was unanswered or the response was zero or not applicable) and the differences between the original audit data and the project's sampling frame, there were too many missing data to progress with this approach. Accordingly, services were mapped on to the sampling frame in the three key areas in which the audit data were the strongest. These were:

   i. *theoretical basis* (how does the intervention work?) 48%–66% response rates
   ii. *level of delivery* (population, group/individual intervention) 65%–69% response rates
   iii. *setting delivery* (where the intervention takes place) 62% response rates.

   These issues were agreed to be capable of providing an accurate sample of services through the country. Although data levels were not high enough to be mapped against each other to provide a complete picture of delivery, they were able to provide enough depth to select services reflecting a range of models for interview. These results, along with the PAG consultation, helped to shape the development of the analytical framework (found in *Appendix 3*) to be used in the evidence synthesis.
3. *Semi-structured telephone interviews with local health trainer leads/co-ordinators in England* Conducted in order to refine the classification of intervention dimensions as identified in the analytical framework. Review of the literature, consultation with the PAG and reference to the national audit identified three key dimensions for mapping diversity of models of provision:

   i. *setting of delivery* community/health-care setting/client's home
   ii. *level of delivery* formal to individual/closed group/general advice/support to members of the local community
   iii. *techniques used* use of formal behaviour change techniques.

   Using a purposive sampling approach, the 113 respondents to the national health trainer audit[67] were plotted against these dimensions and by region to enhance sample geographical diversity. Interviews ($n = 18$) were conducted with local project leads/co-ordinators (largely those with some involvement in local health trainer projects), until information saturation point was reached (an interview schedule is presented in *Appendix 5*). Although invitations to participate were positively received, recruitment was significantly hindered by multiple changes: in personnel change, organisation mergers and restructuring. Interviews were audio-recorded, with participants' consent, and later transcribed verbatim. Analysis of transcripts was undertaken using the framework analysis method to verify the classification and modify it according to the findings. No additional keywords were identified to refine the search strategy for Phase II.

Therefore, at the conclusion of Phase I, original search terms defined were confirmed and the series of continuums used within the analytical framework developed were refined for use in Phase II of the study.

Review protocol

The PICOS (Population, Interventions, Comparators, Outcomes and Study Designs) framework was used to break down the research question into search terms. The CRD[69] identified a number of ways in which this framework may need to be adapted for use with public health interventions. A decision was made to focus the 'P' on the different versions of LA roles and the 'I' on their intervention modes. This was done to best answer the first group of the review questions, as detailed (p. 25). Petticrew and Roberts[70] suggest that inclusion of a sixth criterion of context may be appropriate. Consideration of context is important to better understand if context is a contributor to outcome. However, as there were no contexts that would be excluded, context was not included in the review protocol at this stage, although context of delivery was noted in the data abstraction processes.

Population

The population dimension is shown in *Table 1*.

Reference to the literature identifies a wide variety of terms and roles that could potentially be regarded as a LA. For example, Eng *et al.*[24] refer to 'a continuum from natural helping to paraprofessional helping'. This breadth of role created considerable debate for the review team in defining the boundaries of the roles to be accepted under the LA title. The outcome was to adopt a wide and inclusive approach.

The population mediators of socioeconomic position, ethnicity, age and gender were taken into consideration to allow monitoring of any size or direction of any effects.

Interventions

The interventions dimension is shown in *Table 2*.

Again, the breadth of intervention activity coming under the umbrella title of LHA was the source of considerable debate for the review team. They are distinguished from clinical interventions, which are intended to prevent or treat illness in individuals.

TABLE 1 Population dimension of the PICOS framework

Include	Exclude
Workplace advisors	
Health champions	
Health activists	
LAs	
Age Concern	
Lifestyle coaches	
Citizens Advice Bureau	
Badged/rebadged health trainers	
Expert patient trainers	
Healthlink workers	
Community parents	
Community health educators	
Countries: Western Europe, North America, Australia, New Zealand	

TABLE 2 Interventions dimension of the PICOS framework

Include	Exclude
HRLA or training delivered to patients or public in the UK or a sufficiently similar setting	Advice/training interventions without explicit aim of health improvement
Individual or groups of peers acting in advisory role, offering training, support or counselling (in person, telephone, online) focuses on delivering HRLA or training in terms of health improvement	Advice/training related to acute care only
Advice provided electronically or by mail, if iterative interaction	One-off advice-giving

There is a wide continuum from very specific disease-focused, protocol-guided instruction at one end, to social support being available for use as determined by individual users. Again, the decision was taken to adopt a wide and inclusive approach. This did generate some consequences that are detailed further in the results section of this report, which hinge on distinguishing disease management from health improvement interventions.

Comparators

The comparators dimension is shown in *Table 3*.

Comparator issues are complicated by the fact that public health interventions tend not to be single, isolated interventions, but rather multifaceted interventions. Another complication, especially when focusing on interventions that are attempting to address health inequalities, is that the populations may also be simultaneously exposed to a range of area-based initiatives and complex packages of interventions. Comparators were relevant only in the context of a controlled study design.

Outcomes

The outcomes dimension is shown in *Table 4*.

Study designs

The study designs dimension is shown in *Table 5*.

As highlighted by Rychetnik *et al.*[71] 'public health interventions tend to be complex, programmatic and context dependent'. It follows therefore that 'the evidence base for their effectiveness must be sufficiently comprehensive to encompass that complexity' (p. 119). Although the traditional hierarchy of evidence is applicable to public health reviews, the CRD guidance[69] recommends that a range of study designs may need to be included. Skewing of findings towards certain intervention types may result if only randomised controlled trials (RCTs) and controlled trials were included. A particularly pertinent issue in view of the limited number of RCT designs conducted in public health and, in particular, the field of the LA.

Review methods

A systematic review was carried out in accordance with the methods outlined in guidance issued by the CRD.[69] Searches were performed to identify a broad range of literature on the health-related LA roles in improving health. Citations were downloaded into an ENDNOTE (version X.0.2) library. Two reviewers independently screened all titles and abstracts. Full paper manuscripts of any titles/abstracts that were considered relevant were obtained where possible. The relevance of each paper was assessed independently by two reviewers according to the inclusion criteria below. Any discrepancies were resolved by consensus and if necessary a third reviewer was consulted. The quality assessors were not masked.

TABLE 3 Comparators dimension of the PICOS framework

Include	Exclude
Standard care	
Types of LA	

TABLE 4 Outcomes dimension of the PICOS framework

Include	Exclude
Physiological measures of general health:	
BP levels	
Cholesterol levels	
Other measures of general health	
Health behaviour:	
Smoking rates	
Breastfeeding rates	
Health-care beliefs and knowledge:	
Self-efficacy to improve health	
Knowledge acquisition	
Self-reported competence	
Communication with health-care professionals	
Health-care use:	
Uptake	
Rates of referral	
Participation:	
Social role/activities	
Cost-effectiveness	
Other outcomes:	
Effects on relatives /carers	
Adverse outcome (e.g. complaints)	

BP, blood pressure.

TABLE 5 Study design dimension of the PICOS framework

Include	Exclude
RCT	Descriptions
Non-RCTs	Reviews
Cohort studies	
Case–study control	
Interrupted time series	
Ethnographic	
Phenomenological	
In-depth qualitative evaluations	
Combined designs	

Seven search activities were undertaken:

1. searches of electronic databases
2. searches of the internet
3. suggestions from experts and those working in the field
4. searches of specific websites
5. reference lists of relevant studies
6. searches of the Science Citation Index (SCI) and Social Sciences Citation Index (SSCI)
7. hand searches of relevant journals.

Search strategy

Electronic databases

A range of electronic databases (*Box 1)* were searched for published and grey literature on the effectiveness and role of the health-related LA in improving health. These databases were chosen in order to reflect a broad social definition of health and the link to health inequalities. Obviously there is a wide range of other databases available to search that have not been included in this study due to the limitations of resources, which future similar studies may wish to consider. These include databases such as the Cochrane Database of Systematic Reviews (CDSR), The Campbell Library, Database of Promoting Health Effectiveness Reviews, Cochrane Controlled Trials Reports (CCTR) and Trials Register of Promoting Health Interventions.

BOX 1 Electronic databases searched

Applied Social Sciences Index and Abstracts (ASSIA)
Article 1st
British Humanities Index
Cumulative Index to Nursing and Allied Health Literature (CINAHL)
EMBASE
Database of Abstracts and Reviews of Effects (DARE)
FRANCIS
NHS Economic Evaluation Database (NHS EED)
International Bibliography of the Social Sciences (IBSS)
MEDLINE
Public Affairs Information Services (PAIS)
PsycINFO
Science Citation Index (SCI)
SIRS Researcher
Social Sciences Citation Index (SSCI)
Social Services Abstracts
Sociological Abstracts
Web of Knowledge
WorldCat
Zetoc

Preliminary search strategy

Potential search terms were circulated among the team and the advisory group to develop a potential search string. Initial terms were derived from preliminary searches of the literature and previous research carried out in this area by members of the review team. They were limited to the following:

- *list one* role label
- *list two* study method
- *list three* health improvement areas (based on the *Choosing health* priority areas[7]).

Following feedback, a string was confirmed and preliminary searches were carried out within the databases listed in *Box 1*:

(Health train$ OR lifestyle advi$ OR lifestyle train$ OR lay health worker OR lay health advis*r OR peer educ$ OR peer counsel$ OR peer support$ OR health activ$ OR health aide OR health advoc$ OR link worker OR community champion OR community health educ$ OR outreach worker)

and

(Evaluation OR effectiveness OR cost-effectiveness OR equity OR acceptability OR behaviour change OR health promotion OR health improvement OR disease prevention)

and

(Smoking OR physical activity OR diet OR overweight OR obesity OR alcohol OR breastfeeding OR sexual health)

Search strategy enhancement

Via access to the database host Ovid, the preliminary search strategy was used to identify a number of medical subject heading terms and Cumulative Index to Nursing and Allied Health Literature (CINAHL) headings that could develop the string further. These terms, along with others identified by the project team and advisory group (including those relating to health economics) and additional literature searches were then integrated into the preliminary search strategy when considered to be relevant. This created a more detailed search string that could be utilised more effectively on a variety of hosts. Also, to improve the accuracy of the results, an additional list of exclusions was added to the string as follows:

- *list one* role label
- *list two* health improvement areas/terms
- *list three* study method/health economics terms
- *list four* exclusions.

The string detailed in *Box 2* was utilised to undertake the search.

Where multiple options were available, hosts that supported advanced Boolean operators were selected, and in each case the string was modified to best suit the functions available on the hosts. Individual search strategies were developed, where applicable, for each electronic database. Detailed search logs were maintained throughout. Searches were conducted from inception to September 2008, and no language restrictions were applied. The full search strategies for each database searched are presented in *Appendix 6*.

BOX 2 Search string

(Health trainer OR lifestyle advi$/ train$ OR lay health worker/adviser OR peer educ$/counsel$/support$ OR health activator/activist OR health aide OR health advocate OR link worker OR community champion OR community health educator OR outreach worker) AND (evaluation OR effectiveness OR cost-effectiveness OR equity OR acceptability OR behaviour change OR health promotion/improvement OR disease prevention) OR searches for specific health-related behaviours: (smoking OR physical activity OR diet OR overweight/obesity OR alcohol OR breastfeeding OR sexual health)

Differences in terminology and definitions of terms made refinement of the strategy difficult. For example, lay health worker and CHW have similar meanings in different cultures. As discussed in the introduction, the term LHA belongs to a group of roles that, over time, have been given a range of titles, but which have some common principle of recruitment, purpose or operation. The problem of defining role and value, and translating these into a finite list of searchable keywords meant that a very broad strategy was required.

The following databases were searched for relevant studies: MEDLINE (via Ovid 1950 to week 4 May 2008, 9 September 2008); CINAHL (via Ovid 1982 to September week 1 2008, 9 September 2008); EMBASE (via Ovid 1980 to week 36 2008, 9 September 2008); ISI Web Of Knowledge [via Thomas Reuters (formerly ISI web of knowledge) no date restriction, 25 September 2008]; Applied Social Sciences Index and Abstracts (ASSIA) (via CSA Illumina no date restriction, 9 September 2008); Social Services Abstracts (via CSA Illumina no date restriction, 9 September 2008); Sociological Abstracts (via CSA Illumina no date restriction, 9 September 2008); British Humanities Index (via CSA Illumina no date restriction, 9 September 2008); PsycINFO [American Psychological Association (APA) PsychNet no date restriction, 12 September 2008]; FRANCIS (via OCLC FirstSearch no date restriction, 14 September 2008); SIRS Researcher (via OCLC FirstSearch no date restriction, 14 September 2008); WorldCat (via OCLC FirstSearch no date restriction, 14 September 2008); Article 1st (via OCLC FirstSearch no date restriction, 14 September 2008); International Bibliography of the Social Sciences (IBSS) (via EBSCO no date restriction, 16 September 2008); Zetoc (via Mimas no date restriction, 16 September 2008); Web of Knowledge (via ISI no date restriction, 25 September 2008); NHS Economic Evaluation Database (NHS EED) (12 October 2008).

The number of results obtained for the various databases searched can be found in *Table 6*. Please note that two databases [MDX Health Digest (MDXHD) and Public Affairs Information Services (PAIS)] were unavailable to both Northumbria and Newcastle Universities and, therefore, were omitted from the final strategy. On completion of the database searches there were 19,203 references, and the final total was 17,673 after duplicates were removed.

Searches of the internet

Searches were made by means of the Google search engine (www.google.com) using the search terms listed in *Appendix 7*. It is acknowledged that other Google search options, such as date, geographic location and file type, could have been used to narrow the results, but this was felt to be too exclusive, as it was important to capture as broad a range of results as possible.

The first 100 results returned by each search strategy were scanned for relevance and those judged to be potentially relevant were followed up. As only the first 100 results were to be examined, it was decided to break down the list of search terms into smaller search strings to avoid the danger that a long string would result in the first 100 results being relevant to only the first search term.

TABLE 6 Results obtained for the databases searched

Databases searched	Number of results
ASSIA	910
Article 1st	217
British Humanities Index	501
CINAHL	4823
EMBASE	4863
FRANCIS	101
NHS EED	181
IBSS	0
MDXHD	N/A
MEDLINE	10,222
PAIS	N/A
PsycINFO	617
SCI (part of Web of Science)	613
SIRS Researcher	2
SSCI (part of Web of Science)	See above
Social Services Abstracts	768
Sociological Abstracts	501
Web of Knowledge	1359
WorldCat	745
Zetoc	232
Total (with duplicates removed by ENDNOTE) = 17,673 results	

N/A, not available.

These were then combined with search terms on study methods or general outcome. The number of results returned for each search string can be found in *Appendix 8*.

Where health-related advice or training programmes were identified but no information on evaluation was available on the internet, attempts were made to contact programme organisers by e-mail in order to access any evaluation that has been performed. Where reference lists or bibliographies were identified through the searches, these were also examined for their relevance. A total of 15 documents/articles were identified through searches of the internet, included in the ENDNOTE database, and entered into the full text assessment stage

Suggestions from experts and those working in the field

Requests for assistance with accessing relevant literature were posted on the NHS Health Trainers' Network discussion forum (www.networks.nhs.uk/forums/showthread.php?*p*=11#post11) and sent to relevant mailbases detailed in *Box 3*.

'Experts' – identified as such either by responses to postings, frequent publication in the area, or through personal contacts of the research team – were also contacted directly and asked for help with identifying relevant literature or providing further contacts. A total of 12 studies/documents were identified in this way.

BOX 3 Relevant mailbases

HEALTH-EQUITY-NETWORK@JISCMAIL.AC.UK
COMMUNITY-HEALTH@JISCMAIL.AC.UK
GP-UK@JISCMAIL.AC.UK
GPRD-RESEARCH@JISCMAIL.AC.UK
HEALTH-FOR-ALL@JISCMAIL.AC.UK
HEALTH-PROMOTION@JISCMAIL.AC.UK
HEALTH-SERVICES-RESEARCH@JISCMAIL.AC.UK
PUBLIC-HEALTH@JISCMAIL.AC.UK
PUBLIC-HEALTH-IN-TRUSTS@JISCMAIL.AC.UK
SOCIALWORK-HEALTHINEQUALITIES@JISCMAIL.AC.UK
EVIDENCE-BASED-HEALTH@JISCMAIL.AC.UK
HEALTH-SECTOR-DEVELOPMENT@JISCMAIL.AC.UK
HEALTHFUTURESUK@JISCMAIL.AC.UK
APIG@JISCMAIL.AC.UK
LEEDSPEERSUPERVISION@JISCMAIL.AC.UK
primarycarenursingresearchnetwork@yahoogroups.com
evidencenetwork.com
click4HP@yorku.ca
address_healthcare_disparities@list.ahrq.gov
health-disparities@lis.ahrq.gov
public-health@latrobe.edu.au
SDOH@yorku.ca

Searches of specific websites

The websites below were searched on the dates shown, using the onsite search engines with single search terms: 'health trainer', 'lay health worker', 'health trainer evaluation', 'lay health worker evaluation', 'health trainer effectiveness', 'lay health worker effectiveness', 'health improvement', 'lay health worker health improvement' and 'health trainer health improvement':

- National Audit Office [www.nao.org.uk (accessed 16 October 2008)]
- Home Office [www.homeoffice.gov.uk (accessed 16 October 2008)]
- Office of the Deputy Prime Minister [www.odpm.gov.uk, now www.communities.gov.uk (accessed 16 October 2008)]
- International Standard Randomised Controlled Trial Number (ISRCTN) Register [www.controlled-trials.com/isrctn (accessed 16 October 2008)]
- Joseph Rowntree Foundation [www.jrf.org.uk (accessed 16 October 2008)]
- Department of Health [www.dh.gov.uk (accessed 16 October 2008)]
- American Institutes for Research [www.air.org (accessed 17 October 2008)]
- Office of Policy [www.ssa.gov/policy (accessed 17 October 2008)]
- MRC [www.mrc.ac.uk (accessed 17 October 2008)]
- Urban Institute [www.urban.org (accessed 17 October 2008)]
- Wellcome Trust [www.wellcome.ac.uk (accessed 17 October 2008)].

Results of these searches produced a total of 5225 references. A breakdown of the search results for each website can be found in *Appendix 9*.

Reference lists of relevant studies

The reference lists of all studies assessed to be relevant were hand searched to identify additional studies that may be of relevance. Reference lists of previous reviews were also searched to ensure thoroughness. In total, five articles were identified as relevant studies and were included in the ENDNOTE database.

Searches of the SCI and SSCI

Citation searches of the SCI and SSCI were made in order to identify all citations of studies identified as relevant, and therefore to identify any further possible relevant studies. This was carried out as part of the above electronic database searches.

Hand searches of relevant journals

The contents pages of journals considered to be highly relevant (i.e. found to contain a significant number of relevant articles using the above methods) were scanned to identify additional relevant publications by a member of the research team. Any relevant articles were checked against the ENDNOTE database, and if not a duplicate they were included.

Search outcome summary

A total of two databases (MDXHD and PAIS) were unavailable to both Northumbria and Newcastle University and were therefore omitted from the final strategy, as the existing searches were deemed to have met an appropriate saturation point (i.e. many resources are duplicated within multiple hosts). All search results were merged and de-duplicated via ENDNOTE. The remaining duplicates were then removed manually by members of the project team and administrative staff. At this stage, the final database contained 22,898 references.

Study selection criteria and procedures

At the initial screening stage, titles and abstracts (where available) of studies that were identified using the above search strategies were scanned by two reviewers to make an initial assessment of relevance. If doubt concerning relevance remained at this stage, or no abstract was available, full reports were retrieved for review.

Abstracts and relevant articles were reviewed independently by two reviewers, based on the inclusion criteria and the specified outcomes of interest detailed in *Box 4*.

After reviewing abstracts or full reports, studies were excluded, based on the following criteria:

- not based in Western Europe, North America, Australia and New Zealand
- not an evaluative design
- not solely health-related LAs
- not adult health focused
- poor methodological quality
- not translatable.

Full details of excluded studies can be found in *Appendix 10*.

In cases when both an internal report and peer-reviewed paper on the same study were retrieved then both documents were scrutinised. If there were any discrepancies in results then those reported in peer-reviewed journals were favoured.

BOX 4 Study selection criteria

Include

1. Those studies carrying out an evaluation of HRLA
2. Studies conducted in developed countries similar to the UK context, i.e. Western Europe, North America, Australia and New Zealand
3. Those looking at adult groups
4. Interventions with the explicit aim of health improvement, including community-based secondary prevention for chronic disease
5. Interventions that involve paid or voluntary work with an individual or group of peers acting in an advisory role, offering support in person, over the telephone or online
6. Advice delivered by post, online or electronically (only if this involves an iterative process of interaction between individual and advisor)
7. Training, support or counselling delivered to patients, communities or members of the public

Exclude

8. Purely descriptive material
9. Studies conducted outside of the specified areas
10. Those focusing solely on advice or training delivered to children or adolescents
11. Training, support or lifestyle advice that does not have health improvement as its primary aim
12. Services that do not involve some form of contact with a trained interventionist, e.g. self-care or the provision of information and advice via leaflets and audiovisual materials
13. Simple web-based information sources or online peer support groups
14. Training on HRLA delivered to professionals or service providers

Study quality assessment checklists and procedures

The quality of each paper was assessed independently by two reviewers, using the tools described below. Any discrepancies were resolved by consensus and, if necessary, a third reviewer was consulted.

With respect to quantitative studies, quality was assessed using the *Quality Assessment Tool for Quantitative Studies*, developed by the Effective Public Health Practice Project, ON, Canada[72]. The tool assesses the following quality criteria: selection bias, study design, confounders, blinding, data collection methods, withdrawals and dropouts, intervention integrity and statistical analyses. It is suitable to be used in systematic reviews of effectiveness, and can be used for RCTs, quasi-experimental studies and uncontrolled studies.[73]

Quality appraisal is a much discussed issue in relation to the role of qualitative research in systematic reviews.[74] With respect to qualitative studies, the Critical Appraisal Skills Programme (CASP)[75] checklist for qualitative research was used, a tool which is recommended for reviewers by the Cochrane Qualitative Research Methods Group.[76] The checklist comprises 10 questions that are designed to help the reviewer to appraise the report of qualitative research by thinking systematically about the key issues of rigour, credibility and relevance.

Data abstraction

A project-specific data abstraction tool modified from a tool developed by Adams *et al.*[77] was used. The following information was extracted from studies investigating the health-related LA roles in improving health: bibliographic details, study characteristics, participant characteristics, intervention and setting, outcome and data results, time period, study design, methods of analysis, factors considered in the analysis, other contextual factors, role, costs and any other outcomes of interest. Data abstraction forms were piloted using a sample of included studies to ensure that all of the relevant information was captured and that resources were not wasted on extracting data that were not required. The consistency of the data extracted was also assessed to make sure that those extracting the data were interpreting in the same way the forms, draft instructions and decision rules about coding data. Data were extracted by one reviewer into an access database and checked by a second reviewer. Any disagreements were resolved by consensus by the researchers or, if required, a third member of the team was consulted. A record of corrections or amendments to data extraction forms was kept for future reference.

Data synthesis

Synthesis involves the collation, combination and summary of the findings of individual studies included in the systematic review. The synthesis of qualitative findings in systematic reviews is still a new and developing discipline. The Cochrane Qualitative Research Methods Group[76] acknowledges a need for methodological work on combining studies using different qualitative methods and data types. These were anticipated challenges to this review.

Less anticipated was the wide variety of LA models delivered in a wide variety of settings, targeting a variety of population groups, and assessed through disparate outcomes. This prevented the reviewers from engaging in establishing firm causal relationships between intervention mode and study outcomes (as would have been allowed through a meta-analysis). The options thus available to the reviewers were to conduct a narrative synthesis only (providing a descriptive of the interventions), and be confronted with the inconclusiveness of the evidence, or use elements of a realist model to produce a new, and more informative, assemblage of evidence.

Pawson[78] makes the distinction between the causality models used in different synthesis approaches. Meta-analysis assumes a successionist causality, with comparison of net effects. Narrative reviews assume a configurational approach to causality, in which interventions components and strategies are aligned to produce the most favourable outcomes. Realist synthesis delves deeper into the intervention components and contexts, and assumes a generative approach to causation. This takes the stand that it is not interventions per se that bring about positive outcomes, but underlying mechanisms of action. Thus, while narrative synthesis identifies groups of programmes, realist synthesis examines groups of underlying mechanisms that might be common across a wide variety of interventions. In order to illustrate this, *Figure 2* represents an adaptation of the MRC framework for the evaluation of complex intervention to the synthesis of data for the same kind of interventions.

Pawson[78] exposes the relative approaches of meta-analysis, narrative review and realist synthesis, and makes a case for theoretical development through realist synthesis. The protocol originally developed for this systematic review assumed the existence of a strength of evidence that would allow for a meta-analysis, complemented by exemplar development of successful interventions, through narrative synthesis.

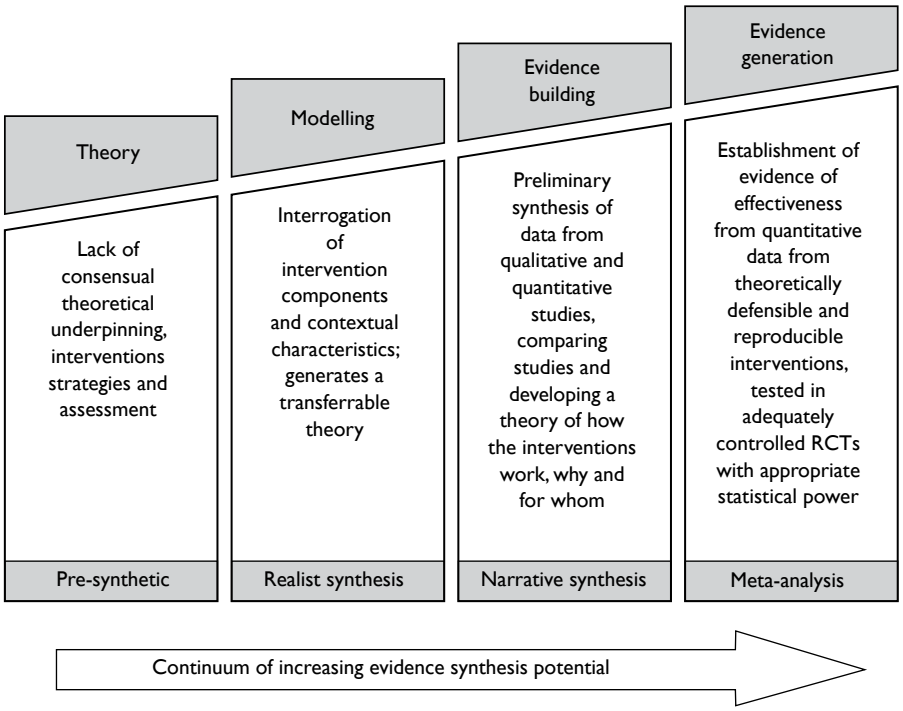

FIGURE 2 Adaptation of the MRC framework to systematic reviews.

By convention, meta-analysis is designed to utilise results from several related studies (in terms of research hypotheses) by identifying a common measure of effect size that is modelled via meta-regression. The resulting inferences are thus more credible than those obtained via individual studies. The only common factor of the studies included in this review, however, is the fact that they focus on interventions delivered by non-health professionals, and neither the outcomes under investigation nor the methods used are constant. While most of the studies reviewed adopted a quantitative methodology, primary outcome measures were of either the parametric or frequency variety, thereby rendering direct comparisons impossible. Thus it became apparent that the synthesis could not be fulfilled as originally proposed. The statistical treatment of the data available is explained below, before the final synthesis strategy is exposed.

Given the difficulties outlined above, the following strategies were undertaken when synthesising the data. Parametric data, for which effect sizes based on the means and standard deviations (SDs) have been supplied by the authors, are reproduced in the report. Where no effect sizes are given, and the authors have supplied baseline and follow-up mean scores for groups together with variances and sample sizes, approximate effect sizes have been calculated via differences in the means (baseline to follow-up), and by estimating the common SDs. Wherever possible, estimates for 95% confidence intervals (CIs) for effect size have also been calculated. Where variances are not provided by authors, effect sizes have not been calculated. In the case of frequency data, where odds ratios (ORs) [or relative risk (RR) estimates] are supplied then these are simply cited in the report, otherwise they are calculated (together with 95% CIs) from the stated proportions and sample sizes.

In some studies authors have applied multivariate methods to their data, usually resulting in ORs being supplied in terms of the relative effect on outcome of different covariates. Where this is the case, these are cited in the report together with 95% CIs (where provided).Where CIs based on multivariate models are not provided then these have not been estimated. In some cases authors have included baseline values in the model as covariates, either together with likely confounders

or individually. Unfortunately, resulting statistics are not always comprehensive, nor are effect sizes included.

Additional approaches drawing on the philosophical stance of realist synthesis[71,79] were used, with the emphasis thus shifted from focusing solely on effectiveness and cost-effectiveness to providing a rich description of intervention environments, mechanisms of interventions and outcomes measured. Realist synthesis acknowledges that outcomes are the consequence of 'individuals, interpersonal relationships, institutions and infrastructures through which and in which the intervention is delivered'[79] (p. 3). The relevance of this approach is supported with reference to Rychetnik *et al.*,[71] who highlight that 'public health interventions are rarely a standard package' and 'to assess transferability, information is needed on multiple components of an intervention' (p. 120). This was supported by economic analysis and modelling.

Pawson[78] makes the case for realist synthesis by exposing how it fills the gap between a firm establishment of causality generated by meta-analysis and the 'configurational' exploration of causality achieved by narrative synthesis. Using realist principles for the synthesis of studies selected through a stringent conventional process of quality assessment enables the surfacing of interventions contexts and mechanisms that would be likely to go unnoticed through other methods. Realist synthesis is much broader in its approach to selection of studies, and in that respect this synthesis falls short of adopting a 'true' realist approach. Realist synthesis indeed enables the identification of 'families of mechanisms',[78] rather than 'families of programmes'. This enables the present review to test out the LA idea in a variety of intervention formats (mechanisms) and settings (contexts) in order to build on existing theories of lay interventions developed in Phase I of this project. The integration of economic, narrative and realist approaches to synthesis, and how this strategy has been used to answer the review questions, is represented in *Figure 3*.

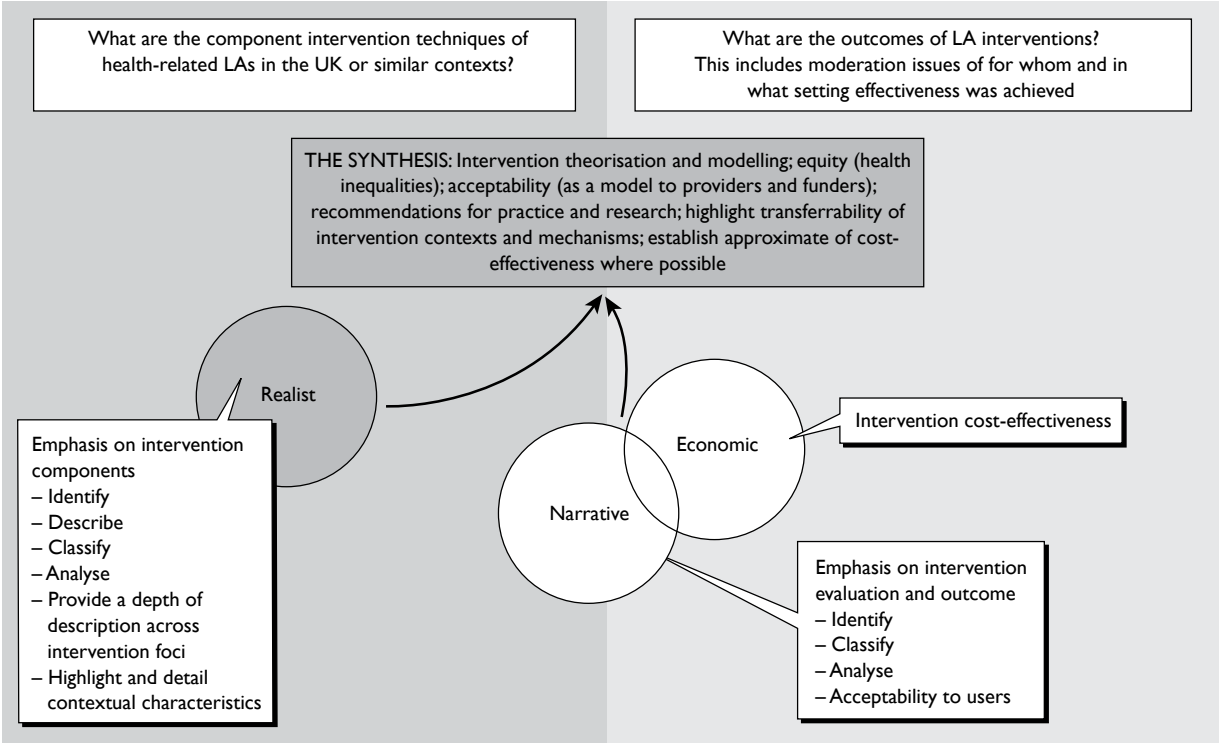

FIGURE 3 Integration of narrative, economic and realist synthesis strategies.

As exposed earlier, the review question has been subdivided into two distinct foci: intervention components on one side and on their outcomes on the other. While the combination of narrative synthesis and economic analysis does answer both strands of the review questions to an extent, many of the intervention details would remain unexplored without an additional approach. The concurrent use of the three review strategies enables the production of a review with a clear and explicit audit trail of the different steps included. The narrative synthesis provides a detailed description of the included studies (qualitative and quantitative), and treats them as exemplar cases of LA interventions, with their outcomes classified rather conventionally by intervention focus and following the series of continuums developed in Phase I and presented in *Appendix 3*. The realist synthesis builds on this emerging theory, by delving into the inconsistencies presented by the studies included to refine and elaborate the theory of how, why and in which circumstances LA interventions are likely to produce successful outcomes. The two qualitative studies included in this review provided a richness of detail that was crucial in theory development. Within the limits of available evidence and methodological constraints further elaborated on p. 109, the combination of the three synthetic approaches enables the most efficient and meaningful management of data, in a way that both answers the review question and maximises the potential of the studies included.

Chapter 3

Results of the review

The results of the review are provided in three sections:

- *Section 1* Studies described by intervention focus.
- *Section 2* Studies described by their intervention's context, mechanisms and measured outcomes.
- *Section 3* Cost-effectiveness analysis and modelling.

A flowchart showing the study selection process is shown in *Figure 4*.

Studies included in the review are listed in *Table 7*.

Each included study has been scanned for associated publications (i.e. same population, same intervention, different evaluation subset, for example). For ease of reading in the rest of the report, included studies are referred to by the study ID, as presented in the first column. Thus, for example, Andersen 2000 refers to the three studies referenced in the second column of *Table 7*.

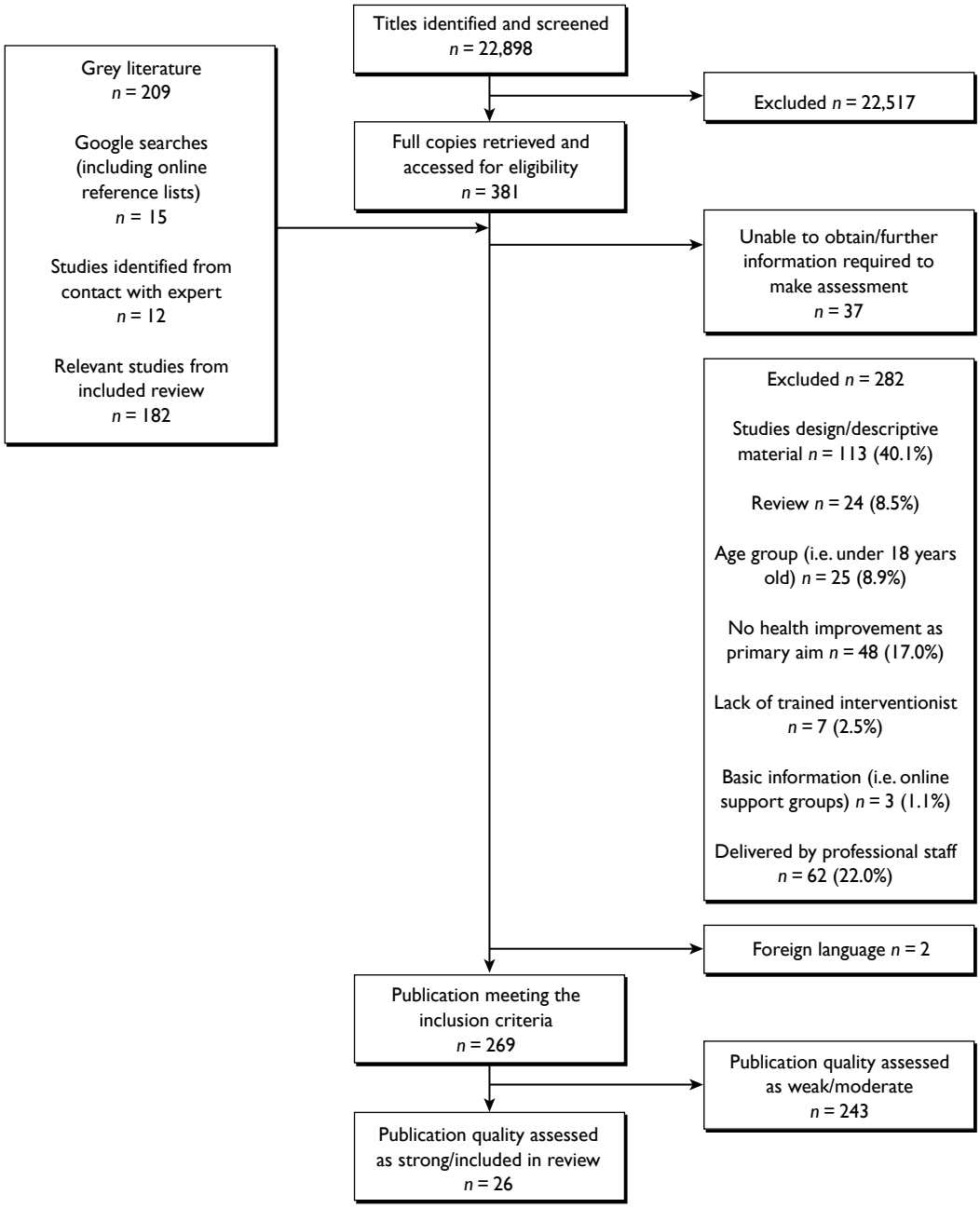

FIGURE 4 Study selection process.

TABLE 7 Included studies

Study ID and main publication reference	Full references[a]
Anand 2007[80]	**Anand SS, Davis DA, Rashid A, Jacobs R, Xie C, Hill A, *et al.* A family-based intervention to promote healthy lifestyles in an aboriginal community in Canada. *Can J Public Health* 2007;**98:447–52**[80]
Andersen 2000[42,81,82]	**Andersen MR, Yasui Y, Meischke H, Kuniyuki A, Etzioni R, Urban N. The effectiveness of mammography promotion by volunteers in rural communities. *Am J Prev Med* 2000;**18:199–207**[81]** Andersen MR, Hager M, Su M, Urban N Analysis of the cost-effectiveness of mammography promotion by volunteers in rural communities. *Health Educ Behav* 2002;**29**:755–70[82] Andersen MR, Hager M, Meischke H, Shaw C, Yasui Y, Urban N. Recruitment, retention, and activity of volunteers promoting mammography use in rural communities. *Health Promot Prac* 2000;**1**:341–50[42]
Barlow 2000[83]	**Barlow JH, Turner AP, Wright CC. A randomized controlled study of the Arthritis Management Programme in the UK *Health Educ Res* 2000;**15:665–80**[83]**
Bird 1998[84–87]	**Bird JA, McPhee SJ, Ha NT, Le B, Davis T, Jenkins CNH. Opening pathways to cancer screening for Vietnamese-American women: lay health workers hold a key. *Prev Med* 1998;**27:821–9**[84]** McPhee SJ, Bird JA, Ha NT, Jenkins CNH, Fordham D, Le B. Pathways to early cancer detection for Vietnamese: Suc Khoe La Vang! (Health is Gold!). *Health Educ Q* 1996;**23**:S60–75[85] McPhee SJ, Bird JA, Davis T, Ha NT, Jenkins CNH, Le B. Barriers to breast and cervical cancer screening among Vietnamese-American Women. *Am J Prev Med* 1997;**13**:205–13[86] Bird JA, Otero-Sabogal R, Ha NT, McPhee SJ. Tailoring lay health worker interventions for diverse cultures: lessons learned from Vietnamese and Latina communities. *Health Educ Q* 1996;**23**:S104–21[87]
Dennis 2002[88]	**Dennis CL, Hodnett E, Gallop R, Chalmers B. The effect of peer support on breast- feeding duration among primiparous women: a randomised controlled trial. *CMAJ* 2002;166:21–8**[88]**
Dickson-Gomez 2003[89,90]	**Dickson-Gomez J, Knowlton A, Latkin C Hoppers and Oldheads: Qualitative Evaluation of a Volunteer AIDS Outreach Intervention. *AIDS Behav* 2003;7:303–15**[89]** Latkin CA, Sherman S, Knowlton A. HIV prevention among drug users: outcome of a network-oriented peer outreach intervention. *Health Psychol* 2003;**22**:332–9[90]
Dickson-Gomez 2006[91,92]	**Dickson-Gomez J, Weeks M, Martinez M, Convey M. Times and places: process evaluation of a peer led HIV prevention intervention. *Subst Use Misuse* 2006;41:669–90**[91]** Weeks MR, Dickson-Gomez J, Mosack Ke, Convey M, Martinez M, Clair S. The Risk Avoidance Partnership: training active drug users as peer health advocates. *J Drug Issues* 2006;**36**:541–70[92]
Earp 2002[16,63,93,94]	**Earp JA, Eng E, O'Malley M, Alpeter M, Rauscher G, Mayne L, *et al.* Increasing use of mammography among older, rural African-American women: results from a community trial. *Am J Public Health* 2002;92:432–51**[63]** Earp JA, Viadro C, Vincus A, Alpeter M, Flax V, Mayne L, *et al.* Lay health advisors: a strategy for getting the word out about breast cancer. *Health Educ Behav* 1997;**24**:432–51[93] Earp JA, Flax VL. What lay health advisors do: an evaluation of advisors' activities. *Cancer Pract* 1999;**7**:16–21[16] Flax VL, Earp JL. Counselled women's perspectives on their interactions with lay health advisors: a feasibility study. *Health Educ Res* 1999;**14**:15–24[94]
Elder 2006[95,96]	**Elder JP, Ayala GX, Campbell NR, Arredondo EM, Slymen DJ, Baquero B, *et al.* Long term effects of a communication intervention for Spanish-Dominant Latinas. *Am J Prev Med* 2006;31:159–66**[95]** Elder JP, Ayala GX, Campbell, NR, Slymen DJ, Lopez-Madurga ET, Engelberg M, *et al.* Interpersonal and Print Nutrition Communication for a Spanish-Dominant Latino Population: Secretos de la Buena Vida. *Health Psychol* 2005;**42**:49–57[96]
Emmons 2005[26,97]	**Emmons KM, Puleo E, Park E, Gritz ER, Butterfield RM, Weaks JC, *et al.* Peer-delivered smoking counselling for childhood cancer survivors increases rate of cessation: the partnership for health study. *J Clin Oncol* 2005;23:6516–23**[26]** Emmons KM, Butterfield EP, Puleo E, Park ER, Mertens A, *et al.* Smoking among participants in the Childhood Cancer Survivors Cohort. The Partnership for Health Study. *J Clin Oncol* 2003;**21**:189–96[97]
Gary 2003[98–100]	**Gary TL, Bone LR, Hill MN, Levine DM, McGuire M, Saudek C, *et al.* Randomized controlled trial of the effects of nurse case manager and community health worker interventions on risk factors for diabetes-related complications in urban African Americans. *Prev Med* 2003;37:23–32**[98]** Batts ML, Gary TL, Huss K, Hill MN, Bone L, Brancati FL. Patient priorities and needs for diabetes care among urban African American adults. *Diabetes Educ* 2001;**27**:405–12[99] Gary TL, Symonette V, Brancati FI. Assembly of a representative study sample for a 'real world' effectiveness trial in African Americans with type 2 diabetes mellitus. *Diabetes* 2001;**50**(Suppl. 2):A478[100]

continued

TABLE 7 Included studies *(continued)*

Study ID and main publication reference	Full references[a]
Griffiths 2005[101,102]	**Griffiths C, Motlib J, Azad A, Ramsay J, Eldridge S, Feder G, *et al.* Randomised controlled trial of a lay-led self-management programme for Bangladeshi patients with chronic disease. *Br J Gen Prac* 2005;**55**:831–7[101]** Griffiths C, Ramsay J, Azad A, *et al.* Expert Bangladeshi patients? A randomised trial of a lay-led self management programme for Bangladeshis with respiratory and cardiovascular disease. *Eur Respir J* 2003;**22**:409[102]
Ireys 2001[103]	**Ireys HT, Chernoff R, DeVet KA, Young K. Maternal outcomes of a randomised controlled trial of a community-based support program for families of children with chronic illnesses. *Arch of Pediatr Adolesc Med* 2001;155:771–7[103]**
Kennedy 2007[104–107]	**Kennedy A, Reeves D, Bower P, Lee V, Middleton E, Richardson G, *et al.* The effectiveness and cost-effectiveness of a national lay-led self care support programme for patients with long-term conditions: a pragmatic randomised controlled trial. *J Epidemiol Community Health* 2007;61:254–61[104]** Bower P, Kennedy A, Reeves D, Gately C, Lee, V, Rogers A. Recruitment to a trial of self care skills training in long term health conditions: analysis of the impact of patient attitudes and preferences. *Contemp Clin Trials* 2006;**27**:49–56[105] Kennedy A, Gately C, Rogers, A. *Process Evaluation of the EPP – Report II: examination of the implementation of the Expert Patients Programme within the structures and locality contexts of the NHS in England.* University of Manchester, National Primary Care Research and Development Centre; 2005[106] Richardson G, Kennedy A, Reeves D, Bower P, Lee V, Middleton E, *et al.* Cost-effectiveness of the Expert Patients Programme (EPP) for patients with chronic conditions. *J Epidemiol Community Health* 2008;**62**:361–7[107]
Keyserling 2002[108,109]	**Keyserling TC, Samuel-Hodge CD, Ammerman AS, Ainsworth BE, Henríquez-Roldán CF, *et al.* A randomized trial of an intervention to improve self-care behaviors of African-American women with type 2 diabetes: impact of physical activity. *Diabetes Care* 2002;25:1576–83[108]** Keyserling TC, Ammerman AS, Samuel-Hodge CD, Ingram EF, Skelly AH, Elasy TA, *et al.* A diabetes management program for African American women with type 2 diabetes. *Diabetes Educ* 2000;**26**:796–805[109]
Lorig 1999[110]	**Lorig KR, Sobel DS, Stewart AL, Brown BW, Bandhura A, Ritter P, *et al.* Evidence suggesting that a chronic disease self-management program can improve health status while reducing hospitalization *Med Care* 1999;37:5–14[110]**
Lorig 2003[111]	**Lorig KR, Ritter PL, Gonzalez. VM Hispanic chronic disease self management *Nurs Res* 2003;52:361–9[111]**
Lujan 2007[112]	**Lujan J, Ostwald SK, Ortiz M. Promotora diabetes intervention for Mexican Americans. *Diabetes Educ* 2007;33:660–70[112]**
May 2006[113]	**May S, West R, Hajek P, McEwen A, McRobbie H. Randomised controlled trial of a social support ('buddy') intervention for smoking cessation. *Patient Educ Couns* 2006;64:235–41[113]**
Morrow 1999[114,115]	**Morrow AL, Lourdes Guerrerro M, Shults J, Calva JJ, Lutter C, Bravo J, *et al.* Efficacy of home-based peer counselling to promote exclusive breastfeeding: a randomised control trial. *Lancet* 1999;353:1226–31[114]** Guerrero M, Morrow RC, Calva JJ, Ortega-Gallegos H, Weller SC, Ruiz-Palacios GM, *et al.* Rapid ethnographic assessment of breastfeeding practices in periurban Mexico City. *Bull World Health Organ* 1999;**77**:323–30[115]
Paskett 2006[116,117]	**Paskett E, Tatum C, Rushing J, Michielutte R, Bell R, Foley KL, *et al.* Randomised trial of an intervention to improve mammography utilisation among a tri-racial rural population of women. *Journal of the National Cancer Institute* 2006;98:1226–37[116]** Paskett E, Tatum C, Rushing J, Michielutte R, Bell R, Foley KL, *et al.* Racial differences in knowledge, attitudes, and cancer screening practices among a triracial rural population. *Cancer* 2004;**101**:2650–9[117]
Resnicow 2004[118]	**Resnicow K, Campbell MK, Carr C, McCarty F, Wang T, Periasamy S, *et al.* Body and soul: a dietary intervention conducted through African American churches. *Am J Prev Med* 2004;27:97–105[118]**
Staten 2004[119]	**Staten LK, Gregory-Mercado KY, Ranger-Moore J, Will JC, Giuliano AR, Ford ES, *et al.* 2004 Provider counselling, health education and community health workers: the Arizona WISEWOMAN project. *J Womens Health* 13:547–56[119]**
West 1998[30]	**West R, Edwards M, Hajek P. A Randomised controlled trial of a 'buddy' system to improve success at giving up smoking in general practice. *Addiction* 1998;93:1007–11[30]**
Woodruff 2002[120]	**Woodruff SI, Talavera GA, Elder JP. Evaluation of a culturally appropriate smoking cessation intervention for Latinos. *Tob Control* 2002;11:361–7[120]**
Young 2005[121–123]	**Young RJ, Taylor J, Friede T, Hollis S, Mason JM, Lee P, *et al.* Proactive call centre treatment support (PACCTS) to improve glucose control in type 2 diabetes. *Diabetes Care* 2005;28:278–82[121]** Long AF, Gambling T, Young RJ, Taylor J, Mason JM. Acceptability and Satisfaction with a telecarer approach to the management of type 2 diabetes. *Diabetes Care* 2005;**28**:283–9[122] Mason LM, Young RJ, New JP, Gibson JM, Long AF, Gambling T, *et al. Dis Manag Health Outcomes* 2006;**14**:377–85[123]

a Main references shown in bold.

SECTION 1: STUDIES DESCRIBED BY INTERVENTION FOCUS

In this section, studies are grouped by their intervention focus in chronic care, mental health, breastfeeding, smoking, diet and physical activity, screening and human immunodeficiency virus (HIV) infection prevention. The section begins with a summary table (*Table 8*) of studies' design, setting and outcomes, as well as a brief statement about their intended aim.

For each intervention grouping, the series of intervention dimensions developed in the first phase of this review (see *Appendix 3*) was populated, and placed within a context-mechanism-outcome framework (see *Box 5*).

BOX 5 Series of intervention dimensions

Description of studies

Study design

Context of intervention

Population focus

Location

Referral/recruitment

Mechanism of intervention

Intervention components

Theoretical underpinning

Aims

Origin

Approach

Topic focus

Main activities

Mode of delivery

Role/training

Practitioner type

Level of training

Skill level

Nature of role

Hours

Level of formality

Intensity of intervention

Frequency/hours/duration

Results from studies (outcomes)

Health status

Health behaviours

Participation

Health-care beliefs and knowledge

Health-care use

Costs

Discussion

TABLE 8 Studies summary table

Study	Design	Number of participants	Intervention aims	Study setting	QA[a]	Outcomes stratified[b]	Primary outcomes	Significant change in primary outcome
Anand 2001[80]	RCT	174	Increase physical activity and improve diet	USA	2	No	Physical activity; intake (kcal); fruit and vegetable intake	No
Andersen 2000[42,81,82]	Four-arm cluster RCT	14,080	Increase uptake of mammogram screening	USA	2	Age, income, education level, place of living, employment status	Low users' screening rates	No
Barlow 2000[83]	RCT	602	Increase self-efficacy and determine effectiveness in the UK	UK	1	No	Arthritis self-efficacy	Yes
Bird 1998[84–87]	Controlled before and after trial	645	Increase uptake of mammogram screening	USA	2	No	Screening rates	Yes
Dennis 2002[88]	RCT	258	Increase breastfeeding duration and satisfaction with the breastfeeding experience	Canada	1	No	Breastfeeding rate	Yes
[c]Dixon-Gomez 2003[89,90]	Ethnographic study	30	Understand the dynamics of outreach encounters	USA	Strong	N/A	N/A	N/A
Dixon-Gomez 2006[91,92]	Process evaluation	39	Understand how and why peer-led HIV prevention interventions work	USA	Strong	N/A	N/A	N/A
Earp 2002[16,63,93,94]	Controlled before and after trial	993	Increase uptake of mammogram screening	USA	2	Income level	Screening rates	Yes
Elder 2006[95,96]	Three-arm RCT	357	Improve diet	USA	1	No	Intake (kcal)	Yes
Emmons 2005[26,97]	RCT	796	Get cancer survivor to stop smoking, enhance self-efficacy and social support, increase knowledge, reduce barriers to quitting	USA	1	No	Smoking cessation	Yes
Gary 2003[98–100]	Four-arm RCT	186	Improve glycaemic control	USA	2	No	HbA_{1c}	No
Griffiths 2005[101,102]	RCT	476	Increase self efficacy to manage chronic condition	UK	1	No	Self-efficacy	Yes
Ireys 2001[103]	RCT	161	Enhance the mental health of mothers of children with chronic diseases	USA	1	No	Anxiety and depression	Yes/no (respectively)
Kennedy 2007[104–107]	RCT	629	Increase self efficacy to manage chronic condition	UK	1	No	Self-efficacy	Yes

DOI: 10.3310/hta15090

Study	Design	Number of participants	Intervention aims	Study setting	QA[a]	Outcomes stratified[b]	Primary outcomes	Significant change in primary outcome
Keyserling 2002[108,109]	Three-arm RCT	200	Increase physical activity and improve diet	USA	1	No	Physical activity (kcal)	Yes/ no (respectively)
Lorig 1999[110]	RCT	1140	Improve health behaviours and health status	USA	2	No	Health behaviour[d] and health-care use	Yes
Lorig 2003[111]	RCT	551	Improve self-management behaviours, symptoms, health status, health utilisation and self-efficacy	USA	2	No	Health behaviour, health-care use and self-efficacy	Yes
Lujan 2007[112]	RCT	150	Improve glycaemic control	USA	1	No	HbA_{1c}	Yes
May 2006[113]	RCT	564	Improve rates of smoking cessation	UK	2	No	Smoking cessation rates	No
Morrow 1999[114,115]	RCT	130	Promote exclusive breastfeeding	Mexico	1	No	Breastfeeding rates	Yes
Paskett 2006[116,117]	Two-arm RCT	897	Increase uptake of mammogram screening	USA	1	No	Screening rates	Yes
Resnicow 2004[118]	Cluster RCT	1022	Improve diet	USA	1	No	Fruit and vegetable intake	Yes
Staten 2004[119]	Three-arm RCT	326	Increase physical activity and improve diet	USA	2	No	Physical activity; fruit and vegetable intake	No
West 1998[30]	RCT	172	Improve rates of smoking cessation	UK	2	No	Smoking cessation rates	Yes
Woodruff 2002[120]	RCT	313	Improve rates of smoking cessation	USA	1	No	Smoking cessation rates	Yes
Young 2005[121–123]	RCT	591	Improve glycaemic control	UK	1	No	HbA_{1c}	Yes

HbA_{1c}, glycated haemoglobin; kcal, kilocalorie; N/A, not available; QA, quality assessment.

a Quality assessment: 1 = strong; 2 = moderate; and 3 = weak.

b By age, gender, ethnicity, socioeconomic status.

c Quantitative arm to the study, presented as an attached paper. It is a RCT, with a sample of 250 participants. The outcomes are stratified by age, race and number of arrests in the previous year. The main outcome was engagement with HIV risk behaviours – this decreased significantly in the intervention group.

d Stretching and strengthening, exercise, aerobic exercise, cognitive symptom management and communication with physician.

Chronic care

- Barlow 2000,[83] Gary 2003,[98–100] Griffiths 2005,[101,102] Kennedy 2007,[104–107] Lorig 1999,[110] Lorig 2003,[111] Lujan 2007[112] and Young 2005.[121–123]

Description of studies

Five of the studies reviewed here[83,101,102,104–107,110,111] describe application of lay-led disease management programmes based on the chronic disease self-management programme developed by Kate Lorig in CA, USA.[110] Two of the studies were undertaken by Lorig and coworkers in the USA, and the remaining three studies were UK based. Griffiths 2005[101,102] specifically adapted the intervention to be culturally appropriate to the Bangladeshi community. Both Kennedy 2007[104–107] and Griffiths 2005[101,102] are essentially pragmatic, with few recruitment restrictions. Barlow 2000[83] describes a large trial of a programme specifically limited to arthritis. Lujan 2007[112] targets Mexican Americans, most of whom speak Spanish as a first language.

Study design

Four high-quality RCTs examined a self-management programme targeting people with chronic conditions.[101,102,104–107,110,111] One study focused on a disease-specific management programme (arthritis).[83] Three studies examined the impact of LAs on the management of diabetes.[98–100,112,121–123] The control group received no intervention and were placed on a waiting list for 4 months[83,101,102,111] or 6 months.[104–107,110] The control groups received usual care without a LA in Gary 2003,[98–100] Lujan 2007[112] and Young 2005.[121–123] Gary 2003[98–100] had additional arms in their trial that examined usual care plus nurse case manager, which is not relevant to our review, and usual care plus nurse case manager plus LA, where the impact of the LA alone could not be determined. Patients were the unit of randomisation in all eight studies.

Only Barlow 2000[83] and Lorig 2003[111] applied outcome measurements after the control group received the intervention, and only to the first intervention group in Barlow 2000.[83] Lorig 2003[111] does not explicitly report the impact of the intervention on the control group, hence it is unclear whether the improvements in the intervention group were replicated in the controls when they received the intervention.

Context of intervention

Population focus

Four studies were UK based: three within the general population[83,103–106,121–123] and one with the Bangladeshi community;[101,102] four were US-based, with a population of people over 40,[110] a Hispanic population,[111] Catholic Mexican-American[112] and African-American[98–100] communities. In Gary 2003[98–100] the study took place in East Baltimore, a particularly deprived inner city community. A total of 629 people with any chronic condition were recruited in Kennedy 2007;[104–107] 476 Bangladeshis with diabetes, CVD, respiratory disease or arthritis were recruited in Griffiths 2005;[101,102] and 602 people with arthritis in Barlow 2000;[83] 1140 over-40s with a diagnosis of heart disease, lung disease, stroke or arthritis were recruited in Lorig 1999;[110] and 551 Hispanics in the northern California area, with heart disease, lung disease or type 2 diabetes (other diagnoses were allowed) were recruited in Lorig 2003.[111] The three diabetes studies recruited 150,[112] 186[98–100] and 591[121–123] people with diabetes.

Location

The intervention was generally delivered in non-NHS community settings,[104–107] in general practices or community centres,[101,102] in community-based setting,[83] such as churches, neighbourhood centres and clinics,[110] in a faith-based community clinic with telephone

follow-up[111] or in participants' homes with additional telephone contact[98–100] or by telephone alone.[121–123]

Referral/recruitment

Participants were recruited via general practitioner (GP) registers[101,102] or people with self-defined long-term conditions were recruited within Strategic Health Authorities (SHAs), using community-based recruitment strategies, including posters in GP surgeries and media advertisements.[104–107] In Griffiths 2005,[100,101] a further 14 volunteered after hearing about the programme by word of mouth or local media. Barlow 2000[83] recruited through Arthritis Care's trainers, via the Arthritis Care Branch Network, information was placed in GP practices and rheumatology departments, and public service announcements were made in the local media. In Lorig 1999,[110] subjects had to have a physician-confirmed diagnosis and were refereed using public service announcements in the mass media, flyers left in physicians' offices, community clinics, posters at senior citizen centres, announcements in patient newsletters and from government employees. In Lorig 2003,[111] community outreach to churches, community centres and clinics were used. Participants for the three diabetes studies were recruited via care providers: these were GP registers[121–123] and a faith-based community clinic[112] or medical chart review from two outpatient medical centres.[98–100]

Mechanism

Intervention components

Theoretical underpinning

Although three of the interventions are based on the same programme (Expert Patients Programme), the theoretical model underpinning it was described as incorporating or based on the Bandura's theoretical model of self-efficacy, a sociocognitive theory[124,125] in Griffiths 2005,[100,101] Lorig 1999,[110] Lorig 2003[111] and Barlow 2000,[83] and social learning in Kennedy.[104–107] Young 2005[121–123] based their intervention on the Stages of Change model. Lujan 2007[112] used the middle range theory of community empowerment.[126] Gary 2003[98–100] used the Precede–Proceed model.[127] The model incorporates critical constructs from adult learning, social support and behaviour modification theories, and takes account of predisposing, reinforcing and enabling factors.

Aims

Interventions in Kennedy 2007[104–207] and Griffiths 2005[101,102] aimed to increase self-efficacy in the participant's management of their chronic conditions. In addition, Barlow 2000[83] sought to determine the effectiveness of a US-developed programme for a UK population. Lorig 1999[110] aimed to use a self-management programme to improve health behaviours and health status in a heterogeneous group of patients with chronic disease. Lorig 2003[111] aimed to impact of self-management behaviours, symptoms, health status, health utilisation and self-efficacy. Gary 2003,[98–100] Lujan 2007[112] and Young 2005[121–123] aimed to improve glycaemic control in people with type 2 diabetes. This was done by improving knowledge of diabetes and promoting lifestyle management, treatment adherence and self-efficacy.

Origin

The original programme was developed by researchers at Stanford University, CA, USA, in collaboration with people with chronic conditions.[110] The content was culturally adapted for the Bangladeshi community.[101,102] Barlow 2000[83] draws on the Arthritis Self-Management Programme.[128] In Lorig 2003[111] the intervention was based on the English Chronic Disease Self-Management (CDSM[125]) programme and the Spanish Arthritis Self-Management Program, adapted for the Hispanic community. The intervention in Young 2005[121–123] was based on local guidelines for the management of people with type 2 diabetes; these local guidelines were modelled on the National Institute for Health and Clinical Excellence (NICE) guidelines.[129] The culturally specific 6-month intervention used in Lujan 2007[112] was developed in collaboration

with clinic *promotores* and patients, and adhered to the American Diabetes Association curriculum guidelines (collaborative). The origin of the intervention in Gary 2003[98–100] was not specified; it is therefore reasonable to presume that it was developed by the authors.

Approach

Trainers act as role models and impart information on chronic condition management, as well as goal setting. All three diabetes interventions had information giving components, which were culturally adapted in Gary 2003[98–100] and Lujan 2007.[112] The CHW in Gary 2003[98–100] offered appointment and visit scheduling, monitored behaviours, reinforced adherence to treatment recommendations, mobilised social support and provided physician feedback. Participants were also asked to prioritise their needs from a pre-established list of areas related to diabetes control, so that intervention could be tailored. Lujan 2007[112] promoted health change through the use of linguistically and culturally adapted messages. In particular, the *promotores* were acknowledging and integrating the Mexican-American belief in divine fatalism and familialism into relevant interactions to improve health. In Young 2005[121–123] the intervention consisted of a Pro-Active Call Centre treatment support, with regular telephone calls to patients, which aimed to support and guide them towards the best possible management of their diabetes. It also allowed referral to a diabetes nurse specialist if supplementary lifestyle counselling or medication adjustment was required.

Topic focus

In Barlow 2000,[83] Griffiths 2005,[101,102] Kennedy 2007,[104–107] Lorig 1999[110] and Lorig 2003[111] the focus of the interventions was on management of chronic conditions. However, within this, general health topics, such as communication with health professionals, diet and exercise, were also addressed. In Gary 2003,[98–100] Lujan 2007[112] and Young 2005[121–123] the primary focus was the management of diabetes. This included advice on drug treatments and lifestyle advice, such as exercise and diet. Depending on participants' chosen priorities, other foci could include foot care, appointments or smoking cessation in Gary 2003.[98–100]

Main activities

The intervention included sessions on relaxation, diet, exercise, fatigue, breaking the 'symptom cycle', managing pain and medication, decision-making, communication, problem-solving and role-playing. In Lujan 2007[112] great emphasis was put on using participants' faith as a means to convey health-improving messages, and to reinforce the relationships between faith and diabetes self-management. The *promotores* also developed strong, family-like bonds with participants. In Young 2005,[121–123] the call centre application covered four domains: gaps in knowledge (this included weight management, healthy eating, physical activity, stress management and smoking), readiness to change, medication adherence and blood glucose control.

Mode of delivery

The intervention was delivered to groups supported with videos[101,102] course participant text book,[83,110] illustrated leaflet and audiotape[111] or with telephone follow-up.[112] In Lujan 2007[112] participants were also mailed regular inspirational faith-based health behaviour change postcards. In Kennedy 2007[104–107] the sessions were run using a 'tightly scripted format', and in Lorig 1999[110] the lay leaders had a detailed teaching manual. Young 2005[121–123] provided their intervention on a one-to-one basis solely by telephone. Gary 2003[98–100] provided the intervention on a one-to-one basis in participant's homes in addition to telephone contact.

Role/training

Practitioner type

Barlow 2000,[83] Griffiths 2005[101,102] and Kennedy 2007[104–107] used peers with common personal experience, i.e. they had a chronic condition, and in the case of Griffiths 2005[101,102] these peers

were from a shared community, i.e. the Bangladeshi community. In Lorig 1999[110] the lay leaders were volunteers, some of whom also had a chronic condition (71%): they ranged in age from 21 to 80 years. In Lorig 2003[111] most leaders had one or more chronic conditions. Lujan 2007[112] used peers from a shared community, i.e. they were bilingual clinic employees. Gary 2003[98–100] and Young 2005[121–123] used practitioners with no specific relationship with the community that they served (though the health advisor was described as 'local' in Gary 2003[98–100] it was not specified whether he or she is also of African-American origin). All the LAs in Young 2005[120–122] were call centre operatives who were selected for their professional telephone manners.

Level of training

There was intensive technical training in Griffiths 2005.[101,102] In Kennedy,[104–107] the training was intensive and involved attendance at a standardised event, assessment of the delivery of two training courses in order to obtain accreditation, followed by observed practice at least once every 12–18 months and attendance at group supervision once a year. Barlow 2000[83] reports that the leaders are trained by Arthritis Care, but no details on content or duration are provided. In Lorig 1999,[110] 20 hours' training with a detailed teaching manual was received. In Lorig 2003[111] lay leaders received 4 days' training in the use of the programme protocol, including two practice teaching sessions, the final session being evaluated to allow progress to course teaching. Lujan 2007[112] and Young[121–123] used intensive training for their practitioners: two *promotores* in Lujan *et al.*[112] received 60 hours of training each, and the telecarers in Young 2005[121–123] received 3 months of training. The level of training of the health advisor was not specified in Gary 2003.[98–100]

Skill level

Gary 2003,[98–100] Griffiths 2005,[101,102] Kennedy 2007,[104–107] Lujan 2007[112] and Young 2005[121–123] used unqualified lay advisors. In Gary 2003[98–100] the health advisor was a local high school graduate with no formal training in health care before the study. Lorig 1999[110] used volunteers with little previous experience in health education: 23% were health professionals and 15% were students. Lorig 2003[111] and Barlow 2000[83] do not give details.

Nature of role

The tutors were paid £587.10 each to facilitate the 6-week course in Griffiths 2005.[101,102] However, it was unclear whether the tutors were paid in Kennedy 2007[104–107] as they were described as 'lay trainers or volunteer tutors'. Barlow 2000[83] reports only that LAs delivered the programme in pairs, under the auspices of a voluntary organisation, Arthritis Care. In Lorig 1999[110] volunteer lay leaders delivered courses in pairs, acted more as facilitators than as lecturers, and received a stipend of US$100 per leader per course of 15 participants. In Lorig 2003[111] the lay leaders modelled for participants. All of the LAs were stated (or strongly implied) to be employed by the studies in Gary 2003,[98–100] Lujan 2007[112] and Young 2005.[121–123]

Hours

It was unclear in most studies whether the hours were full- or part-time. The health advisors worked part-time in Young 2005.[121–123] It was implied that the advisor worked part-time in Gary 2003[98–100] (was enrolled part-time at college).

Level of formality

The LAs in Griffiths 2005[101,102] are stated to be accredited lay tutors, and those in Kennedy 2007[104–107] and Richardson *et al.*[107] are stated to be subject to quality assurance. Barlow 2000[83] reports that training was provided and the course delivered using a manual. Lorig 1999[110] documented their intervention in a detailed protocol in a 'leaders' manual', and the content of the course has been published as *Living a healthy life with chronic conditions.*[130] Lorig 2003[111] does not provide details. None of the health advisor training schemes were accredited or examined in any way in Gary 2003,[98–100] Lujan 2007[112] and Young 2005.[121–123]

Intensity of intervention

Frequency/hours/duration

Barlow 2000,[83] Griffiths 2005,[101,102] Kennedy 2007,[104–107] Lorig 1999[110] and Lorig 2003[111] examined six sessions, which were delivered over 6 weeks. In Griffiths 2005[101,102] the sessions lasted 3 hours (i.e. 18 hours over 6 weeks), in Kennedy 2007,[104–107] they lasted 2.5 hours (i.e. 15 hours over 6 weeks) and in Barlow 2000[83] approximately 2 hours (i.e. 12 hours over 6 weeks). In Lorig 2003[111] seven weekly 2.5-hour sessions were delivered (i.e. 17.5 over 7 weeks). Lujan 2007[112] provided eight weekly 2-hour classes and telephone follow-up, so they provided approximately 16 hours over 8 weeks. In Young[121–123] the intensity of the telephone contact was determined in relation to people's blood sugar levels at baseline. These calls were performed once every 3 months if the glycated haemoglobin (HbA_{1c}) level was ≤7%, every 7 weeks if HbA_{1c} level was in the range 7.1%–9%, and monthly if HbA_{1c} level was >9%. Each call lasted 20 minutes and was continued over 12 months. Thus they provided between 1 hour 10 minutes and 4 hours of telephone calls over 1 year. In Gary 2003[98–100] the health advisor conducted 45- to 60-minute home visits. Sixty-two per cent of participants in the health advisor group received at least three visits and <20% in the health advisor group received at least seven visits. Many participants (~50%) also received at least one telephone intervention (but the authors did not split this contact according to group). The intervention intensity was calculated on the basis of the number of visits that the authors were aiming to reach (six in 24 months) and was classified as low.

Results from studies

Unless stated otherwise, effect size is derived from Cohen's *d*,[131] which is defined as the difference between means divided by a common SD, and is in relation to between-group differences. Where feasible and appropriate, post hoc power has been calculated in relation to the studies reviewed, generally in relation to generic outcomes.

Health status

General health was measured by a single question in Kennedy 2007[104–107] and did not change significantly. It was not measured in Griffiths 2005[101,102] Neither study showed significant effect on health-related quality of life (HRQoL) as measured by the European Quality of Life-5 Dimensions (EQ-5D) instrument.[132,133] Psychological well-being was measured with five items in Kennedy 2007[104–107] and improved significantly (effect size 0.25 cited by authors). The trial was powered to have a 90% probability of detecting a standardised effect size of 0.25, and, subsequently, the target sample size of $n = 600$ was exceeded by 4.8%. Depression and anxiety were measured using the Health Assessment Questionnaire [Hospital Anxiety and Depression Scale (HADS)][134] in Griffiths 2005,[101,102] but neither changed significantly.

Pain was measured on a five-point Likert scale in Griffiths 2005[101,102] and on a five-item questionnaire in Kennedy 2007.[104–107] Neither measure changed significantly. In Gary 2003,[98–100] Lujan 2007[112] and Young 2005[121–123] energy significantly improved in the study group compared with controls (effect size 0.18, $p = 0.004$), but fatigue did not change significantly in Griffiths 2005.[101,102] Physiological measures and adverse events were not assessed in either study.

Gary 2003,[98–100] Lujan 2007[112] and Young 2005[121–123] did not assess general health, QoL, psychological well-being, pain, fatigue or adverse events. However, in Young 2005[121–123] >90% of intervention participants agreed that the intervention improved their well-being.

Using self-administered mailed questionnaires, Lorig 1999[110] reported significant improvement in treatment subjects compared with controls in five variables: self-rated health, disability, social/role activities limitations, energy/fatigue and health distress ($p < 0.02$). Post-trial assessment of ability reveals 95% power to detect an effect size (Cohen's d[131]) of 0.238, equivalent to detecting, for example, a difference in means between groups of 0.3 assuming a common SD of 1.26 and

a 0.05 (two-sided) significance level. No significant difference was demonstrated for pain or physical discomfort, shortness of breath or psychological well-being. Validated outcomes were used.[135–140] Using the self-rated health item from the medical outcomes studies and visual numeric scales for pain and fatigue, Lorig 2003[111] reported improvements in health status with usual care controls ($p < 0.05$). Post-trial power was 90% to detect a standardised mean difference of 0.279, implying an ability to detect a difference in means of, for example, 1.0, where the common SD is 3.6 and a 0.05 (two-sided) significance level.

Barlow 2000[83] used validated measures, including Health Assessment Questionnaire[141] HADS,[134] and Positive and Negative Affect Scale,[142] and reported statistically significant mean decreases in fatigue (effect size 0.17), anxiety (effect size 0.21) and depression (effect size 0.27) and an increase in positive mood (effect size 0.29) when compared with the control group. No significant changes were reported in the control group. No statistically significant mean changes or between group differences were found on EQ-5D[143] visual analogue scale measures. Power was predetermined at 90% to detect an effect size (difference in means) of 0.35 between groups.

Gary 2003,[98–100] Lujan 2007[112] and Young 2005[121–123] measured HbA_{1c} levels, for which the reference range (that found in healthy persons) is about 4%–5.9%.[144] Young 2005[121–123] found a significant ($p = 0.003$) difference between groups of –0.31% HbA_{1c} (95% CI –0.11 to 0.52) and effect size 0.25 (95% CI 0.07 to 0.43 with estimated pooled variance) at 1 year. The trial was powered to have a 90% probability of detecting a difference of 1% in HbA_{1c} level, assuming a SD of 2% between groups. While there were no significant differences at the 3-month assessment, Lujan 2007[111] found a significant difference of –0.25% HbA_{1c} levels at 6 months (effect size 0.41, 95% CI 0.08 to 0.73). However, there was a difference in the mean baseline HbA_{1c} level between the intervention and control groups, the intervention mean being 0.45% higher. Levels of HbA_{1c} increased markedly in the control group over 6 months (0.3%). It is generally accepted that HbA_{1c} levels rise over time, but at a typical rate of 0.2% per year. Pretrial power was set at 90%, based on unspecified differences in HbA_{1c} levels and Diabetes Knowledge Questionnaire scores.

Gary 2003[98–100] found a similar-sized difference between their groups at 2 years – –0.30% HbA_{1c} (±0.48%, insufficient information for an effect size calculation) – but this was not statistically significant. Gary 2003[98–100] measured other surrogate markers of cardiovascular health, such as low-density lipoprotein (LDL) and high-density lipoprotein (HDL) cholesterol levels, triglycerides, systolic and diastolic blood pressure, and body mass index (BMI). Unfortunately, the absolute changes in outcomes are not reported in Gary 2003[98–100] only the difference between arms, making it difficult to assess whether the reported effects are due to decreases in the trial arms or increases in the controls. The reported changes in systolic and diastolic blood pressure, HDL and LDL cholesterol and triglycerides are mostly in a similar direction to the primary outcome measure, but are not significant. Neither a target difference nor a difference in power were specified; however, defining a clinically significant difference would seem to be the main issue in studies of this nature. That said, the authors claim that the observed difference of –0.8% between the collective treatment group and controls was clinically significant. Therefore, given the statistically non-significant *p*-value, one might conclude that the study may have been underpowered. Nonetheless, the study may prove useful and encouraging to anyone planning further work in this area.

Health behaviours

Self-care behaviour was assessed in Griffiths 2005[101,102] using the Cognitive Symptom Self-Management Scale from the Chronic Disease Self-Efficacy Scale[145] and improved significantly (effect size 1.16, $p = 0.047$). The authors state that their study was 80% powered to detect '... an effect size associated with improvements in behaviour, heath status and healthcare ...' . Subsequent recruitment figures confirm that the trial was sufficiently powered to detect relatively

small effect sizes. Kennedy 2007[104–107] measured exercise (six items) and diet (one item), neither of which changed significantly. Lorig 1999[110] reported significant improvement in four behaviour variables ($p < 0.01$): number of minutes exercise per week of stretching/strengthening exercise and aerobic exercise, increased practice of cognitive symptom management and improved communication with physician. At 4-month comparison, Lorig 2003[111] reported improvements in health behaviours compared with usual care controls ($p < 0.05$).

Barlow 2000[83] used scales developed by the Stanford Arthritis Centre[145] and reported statistically significant mean increases in cognitive symptom management relative to controls (effect size 0.46), communication with physician (effect size 0.24) and no mean change on dietary habit or fluid intake. No significant changes were found in the control group.

Gary 2003[98–100] measured dietary practices using a validated food frequency questionnaire designed to guide cholesterol reduction in low-income individuals;[146] this did not change significantly between the groups. Physical activity was measured using a validated questionnaire about habitual physical activity during leisure time[147] and this increased significantly in the CHW group and CHW/nurse case manager group compared with the control group, all $p < 0.05$ (mean change $+0.26 \pm 0.18$ and $+0.34 \pm 0.18$, respectively).

Participation

Kennedy 2007[104–107] found that social role limitation (assessed with four items) improved significantly in the expert patient group (effect size 0.19). Griffiths 2005[101,102] did not assess participation.

Health-care beliefs and knowledge

The primary outcome for Kennedy 2007[104–107] was self-efficacy, which both studies claimed to improve significantly: and Griffiths 2005,[101,102] effect size of 1.47; Kennedy 2007[104–107] effect size of 0.44. Kennedy 2007[104–107] found no significant differences in self-efficacy among groups with different chronic conditions. Griffiths 2005[101,102] assessed communication with physicians using the communication strategies scale of the Chronic Disease Self-Efficacy Scale,[144] but it did not change significantly. Kennedy 2007[104–107] assessed partnership with clinicians (with four items), which improved significantly in the Expert Patients Programme group (effect size 0.25). Lorig 2003[111] assessed physician visits, which remained statistically unchanged. In Griffiths 2005,[101,102] 51% of intervention participants attended three or more sessions, whereas 21% attended none. The attendance in Kennedy 2007[104–107] was higher, with 60% attending four or more sessions. Neither Griffiths 2005[101,102] nor Kennedy 2007[104–107] measured any other aspects of health-care beliefs and knowledge. At 4-month comparison, Lorig 2003[111] reports improvements in self-efficacy compared with usual care controls ($p < 0.05$). Barlow 2000[83] used the Arthritis Self-Efficacy (ASE) Scale[148] and reported statistically significant mean increases on ASE: other symptoms (effect size 0.43) and pain (effect size 0.41). Small, but statistically significant, increases in ASE pain score (effect size 0.14) were also found in the control group (unverified statistics).

Lujan 2007[112] measured diabetes knowledge and health beliefs using validated questionnaires. The DKQ[149] score mean change of the intervention group was significantly higher than that of the control group at the 6-month assessment, with effect size 0.63, 95% CI 0.29 to 0.97 (baselines of original adjusted for health insurance). With the diabetes health beliefs measure,[150] a higher score indicates a higher belief in the ability to manage diabetes. The mean changes of the two groups decreased, without a significant difference at the 3-month assessment, the decrease was significantly less [$F(1, 148) = 5.97$, $p < 0.01$] for the intervention group than for the control group at the 6-month assessment. The consistent decrease in the diabetes health beliefs mean scores of both of the groups at the two points of assessment indicates that the participants did

not experience an increase in their belief about their ability to manage diabetes, although the intervention group demonstrated more knowledge.

In Gary 2003[98–100] it was expected that individuals would complete six intervention visits before the 2-year follow-up. Their actual participation fell far short of that goal, primarily because of insufficient staff support and participant non-compliance (although figures were not provided). Overall, more individuals were seen in the health advisor groups, which may be related to the fact that they saw the participants in the convenience of their homes. This may be a surrogate indicator of acceptability, which appears to be better in the health advisor group than in the usual care group.

In Lujan 2007[112] 96% of participants completed the classes (i.e. attended at least six of the eight classes) and the overall attrition rate was 6% ($n = 9$). Two of these nine participants also failed to complete the education phase of the intervention. One of the participants, who did not attend either the 3- or 6-month assessment interview, died from pneumonia, two moved to another city, and six reported that they were unable to attend the assessment interviews because of a lack of time. The very high attendance rate of the classes suggests that it was acceptable to most participants.

Young 2005[121–123] noted that withdrawal from the study occurred in 10.7% of usual care subjects and 15.7% of telephone-support patients. This suggests that there may have been some negative issues regarding acceptability in the telephone-support group. They assessed satisfaction with treatment using the validated Diabetes Satisfaction and Treatment Questionnaire,[151] and acceptability of the approach with a purposely designed self-completion questionnaire. Over 90% of participants found the intervention acceptable and agreed that it improved their knowledge and control of diabetes. However, only 50% of intervention participants would rather have this approach than seeing a health professional face to face. Participants generally described the development of strong bonds with the LAs, and liked the personalised format of the intervention. A total of 33% thought it had enhanced their self-knowledge and helped with changes in attitudes and behaviours.

Health-care use

There was no significant difference in health-care visits over 6 months in Kennedy 2007[104–107] or in primary care visits over the previous 3 months in Griffiths 2005.[101,102] Kennedy 2007[104–107] also measured the number of counsellor visits, outpatient appointments, day-case appointments and inpatient days, none of which differed significantly between the two groups. Lorig 1999[110] reported that the treatment group had fewer hospitalisations ($p < 0.05$) and spent, on average, 0.8 fewer nights in hospital ($p = 0.01$). There were no significant differences in visits to physicians ($p = 0.11$). At 4-month comparison, Lorig 2003[111] reports no difference in days of hospitalisation, but the treatment group did show a trend to fewer physician visits. Barlow 2000[83] reports on number of physician visits where arthritis was discussed, but did not find any difference at 4 months between intervention and control groups. However, at 12 months they found significantly fewer mean number of visits to the GP, though these data were uncontrolled.

Costs

The delivery of the Expert Patients Programme cost £123 per participant in Griffiths 2005,[101,102] and £250 per participant in Kennedy 2007.[104–107] Kennedy 2007[104–107] found lower overall costs in the intervention arm that more than compensated for the estimated cost of the intervention (£250). This difference was driven by a marked (but not statistically significant) reduction in inpatient length of stay. The difference, 0.8 days, has a large impact on overall costs owing to the high cost of inpatient stays (cost of £203–486 applied). It is possible that this difference has arisen from a few patients with extended hospital stays.

In Lorig 1999[110] the treatment group reduced visits to physicians slightly more than control group but the difference was not significant. The decreases in the number of hospitalisations and in the number of nights of hospitalisation were significant ($p < 0.05$). Assuming a cost of US$1000 per day of hospitalisation, the 6-month health-care costs for each control participating were > US$820 for each treatment subject. The costs of providing the programme for treatment subjects who completed the 6 months were calculated to be US$70 per participant. This includes US$26 for training leaders. No costs are reported in Lorig 2003[111] and Barlow 2000.[83]

Discussion

Five large, well-described and well-conducted studies evaluated the efficacy of lay-led disease management programme based on the Chronic Disease Self-Management Programme developed by Kate Lorig[110] in California, USA. The studies did not affect general health or QoL, our review's primary outcomes. However, three studies claimed a change in self-efficacy, as their primary outcome did change significantly in the groups in receipt of the programme. It is possible that in the longer term the impact of increased self-efficacy may have been to have a positive effect on general health and QoL at periods > 4–6 months' follow-up. Lorig 1999[110] and Barlow 2000[83] also reported significant improvements in fatigue. Only 51% of the Bangladeshi participants in Griffiths 2005[101,102] attended three or more sessions, compared with 60% of the general population in Kennedy 2007[104–107] who attended four or more sessions. The relatively low rate of attendance in the Bangladeshi community may be suggested to be a surrogate marker of the intervention's acceptability to this community. Although the intervention had been adapted for the Bangladeshi community there were social and spiritual barriers to attendance. Both studies were relatively cheap to implement (£123–£250 per participant). Barlow 2000,[82] Lorig 1999[110] and Lorig 2003[111] present relatively high completion rates, although the Lorig studies are particularly high, with 68% completed at 4 months in Barlow 2000,[83] 83% at 6 months in Lorig 1999[110] and 68% at 1 year in Lorig 2003.[111] This may reflect the high acceptability of the interventions.

Gary 2003,[98–100] Lujan 2007[112] and Young 2005[121–123] evaluated the effect of LAs without explicitly stated common experience on chronic care management in people with diabetes in the US or UK. The two US studies examined Mexican-American or African-American communities, but only in the Mexican-American study were the health advisors specified to be of that community. The three interventions all appeared to come from a biomedical perspective, and emphasised disease-specific knowledge as a way to improve condition management. However, because in the Gary 2003[98–100] study the participants were encouraged to set their own priorities (all being from a predetermined list), 77% of visits by the health advisor addressed needs outside the diabetes-specific focus, such as social (family responsibilities), health insurance and non-diabetic health issues. None of the studies measured general health or QoL.

The three studies showed small reductions in overall blood sugar levels, which were significant in two of the three studies. However, it can be suggested that HbA_{1c} level is a relatively easy outcome to measure, whereas outcomes that may have greater significance to patients, such as activity and participation, are harder to measure and, it can be suggested, harder to change. In the one study[98–100] that assessed other physiological measures that act as surrogate markers of cardiovascular health or BMI none of the measures changed significantly in the health advisor group.

The health-care knowledge and belief findings in Lujan 2007[112] highlight the danger in the assumption that a better level of knowledge will necessarily improve health-care beliefs. However, in this case participants in the intervention group did improve their blood sugar control as well as their knowledge, despite their beliefs score getting worse. There might be a particular message here about how health improvement messages can be delivered to populations for which divine fatalism is core to their faith.

Smoking

- Emmons 2005,[26,97] May 2006,[113] West 1998[30] and Woodruff 2002.[120]

Description of studies

Four studies were identified that examined the impact of LAs in smoking cessation. May 2006[113] was conducted following the positive results from West 1998[30] It was written up by the same authors, and describes the same intervention strategy, but in two different populations using different control strategies and in a larger and longer-scale study. Emmons 2005[26,97] examined a smoking cessation intervention for childhood cancer survivors. Woodruff 2002[120] examined a culturally appropriate smoking intervention for Latinos.

Study design

Four high-quality RCTs examined the impact of LAs on smoking cessation. The control groups received no community health advisor input. The control groups' interventions varied and included attendance at a nurse-led smokers' clinic or group-based smoking cessation intervention, but without the additional buddy support,[30,113] referral to a Spanish-language telephone helpline via two postcards mailed during the study,[120] and a self-help intervention.[26,97] The smokers were the unit of randomisation.

Context of intervention

Population focus

Two studies[26,97,120] were based in the USA, and two in the UK.[30,113] West 1998[30] recruited 172 smokers based in the general population; May 2006[112] recruited 564 smokers from three sites across London, UK. Woodruff 2002[120] recruited 313 smokers in the Latino community, and Emmons 2005[26,97] recruited 796 smokers who were childhood cancer survivors.

Location

The intervention was delivered in people's homes via visits and telephone calls[120] or telephone calls alone.[26,30,97,113]

Referral/recruitment

West 1998[30] recruited smokers from their GP records in south-east London. Participants in May 2006[112] were a subset of those participating in a larger RCT of glucose as an aid for smoking cessation. In this study, smokers were recruited through advertisements in local papers, word of mouth and GP referrals. Emmons 2005[26,97] recruited smokers from the Childhood Cancer Survivors Study[152,153] register, and Woodruff 2002[120] used 11 trained recruiters, who worked at community events, popular neighbourhood shopping centres, and within their own social networks, to identify Latino smokers.

Mechanism

Intervention components

Theoretical underpinning

West 1998[30] and May 2006[113] did not describe any theoretical underpinning. Woodruff's intervention[154] was based on social cognitive principles, including positive reinforcement, stimulus control, modelling, social support, problem-solving, and practical skills and techniques for quitting. Emmons' 2005 intervention[26,97] was based on theories of behaviour change, in particular, Social Cognitive Theory,[154] the Transtheoretical Model,[155] the Social–Ecological Model[156] and on principles of motivational interviewing.[157]

Aims

West 1998,[30] May 2006[113] and Woodruff 2002[120] aimed to improve rates of smoking cessation. Emmons 2005[26,97] aimed to get cancer survivors to stop smoking, enhance self-efficacy and social support, increase knowledge about the health risks of smoking, reduce barriers to quitting, help participants to set goals and provide feedback regarding behaviour change.

Origin

Emmons 2005[26,97] followed recommendations in the clinical practice guidelines for *Treating tobacco use and dependence*.[158] West 1998[30] based their intervention on a study that established the link between smoking cessation and social support.[159] May 2006[113] provides an evidence base as rationale for their study (West 1998[30] is one of the studies, as well as May *et al.*,[113] May and West[160] and Park *et al.*[161]). Woodruff 2002[120] did not state the origins of their intervention.

Approach

West 1998[30] and May 2006[113] used a buddy system where people attempting to stop smoking were paired up to support each other. Woodruff 2002[120] and Emmons 2005[26,97] were mainly information-giving approaches with some support.

Topic focus

The focus of West 1998,[30] May 2006[113] and Emmons 2005[26,97] was solely smoking cessation. Woodruff 2002[120] focused mainly on smoking cessation but the final home visit included a talk about overall lifestyle change (e.g. exercise).

Main activities

In West 1998,[30] smokers allocated to the intervention group were organised into buddy pairs, introduced to each other a week before stopping smoking and encouraged to exchange telephone numbers. In addition, it was proposed that they hand in some money that would be given to charity if either they or their partner failed to last a week of abstinence, and would be returned to them otherwise. It was stressed that this was voluntary. They were invited to telephone or otherwise contact each other at least once a day over the next week and at any time that they needed support. They were scheduled to attend all further sessions together. The content of the buddy's conversation was not specified in any way. Intervention components were the same in May 2006,[113] with the exception that buddies were introduced to each other on their smoking cessation day, that money was left with the researcher, and that buddy pairs attended smoking cessation groups for a period of 6 weeks. Woodruff 2002[120] provided culturally appropriate approaches to set the stage for maximising success of quitting. The *promotora* and participant reviewed past quit attempts, discussed the pros and cons of smoking and quitting, discussed self-monitoring to identify smoking patterns, identified potential reinforcements and substitute behaviours and discussed appropriate coping strategies, set a quit date, discussed experiences while quitting and relapse prevention, and talked about overall lifestyle change. In Emmons 2005 [26,97] the intervention emphasised the smoker's choice, personal responsibility for change and enhancement of self-efficacy. The calls were tailored to the participants' stage of readiness to quit smoking and interest in other health topics and goals. Nicotine replacement therapy (NRT) was discussed, and was made available without cost to the intervention group's participants and their spouses/partners who indicated in the counselling calls that they were ready to make a serious quit attempt.

Mode of delivery

All of the interventions were delivered on a one-to-one basis. The support was delivered via telephone[26,97] or face-to-face meetings in addition to telephone calls.[30,113,120] The contacts were supported with videos and pamphlets[120] and access to free NRT.[26,97]

Role/training

Practitioner type

West 1998[30] and May 2006[113] used peers with common personal experience (fellow smokers attempting to quit). Emmons 2005[26,97] also used peers with a common personal experience, but in this case the common experience was having survived childhood cancer, not smoking. Woodruff 2002[120] used peers from a shared community (Latino community).

Level of training

West 1998[30] and May 2006[113] did not train the smoking buddies, but they received smoking cessation advice at the clinic (as did the control group). The level of training of the peers in Emmons 2005[26,97] was not stated. The Woodruff 2002[120] *promotores* were trained for 25 hours in nine lessons over 5 weeks, but were not examined (intensive training).

Skill level

West 1998,[30] May 2006[113] and Woodruff 2002[120] used unqualified lay trainers. The level of qualification of the counsellors in Emmons 2005[26,97] was not stated.

Nature of role

The smoking buddies in West 1998[30] and May 2006[113] were unpaid, whereas the *promotores* in Woodruff 2002[120] were paid a modest stipend and the peer counsellors in Emmons 2005[26,97] were salaried.

Hours

The smoking buddies in West 1998[30] and May 2006[113] used their time freely, as and when they felt a telephone call was needed. It was unclear in Emmons 2005[26,97] whether the peer supporters were full- or part-time, and in Woodruff 2002[120] advisors had different caseloads, depending on their availability.

Level of formality

West 1998[30] and May 2006[113] were very informal (untrained peers), Emmons 2005[26,97] did not describe if training was provided, and Woodruff 2002[120] provided training but competency afterwards was not assessed.

Intensity of intervention

Frequency/hours/duration

West 1998[29] had one 10-minute face-to-face meeting initially, and 85% of buddy smokers attending after 1 week's abstinence reported speaking to their buddies at least once between clinic sessions (mean 2.5 times). At 4 weeks after quit date, 65% had spoken to their buddy since the last session (mean 2.4 times). The overall intensity was unclear but estimated as low. In May 2006,[113] participants made an average of 2.7 telephone calls in the first week after the quit date. This dropped to 1.2, 1.1 and 0.7 over the following weeks, which was estimated as low intensity. Woodruff[120] provided four home visits, each 1–2 hours long, as well as three telephone calls, typically 15–30 minutes long, over 78 days. So, between 4 hours 45 minutes and 9 hours 30 minutes of support was provided over 3 months.

Emmons 2005[26,97] provided up to six counselling calls of unknown time over 7 months. Both authors report a mean of 3.5 contacts per participant.

Results from studies

Health status

No measures of health status were assessed in any of the studies.

Health behaviours

Woodruff 2002[120] found that attrition rates were significantly different by condition, with 4.5% of comparison group participants dropping out versus 15.4% of the intervention participants ($\chi^2[1] = 10.47$, $p < 0.001$) (effect size 0.18). Participation in the intervention varied from zero to seven sessions with an average of 3.44 sessions. In total, 24% of the control group reported using the smoking cessation helpline.

Emmons 2005[26,97] uses self-reported smoking status at 8 and 12 months; both West 1998[30] and Woodruff 2002[120] use expired air CO_2 monitoring to verify self-reported abstinence, at 1 month and 3 months, respectively. Significantly more remained abstinent from smoking in the buddy support group after 4 weeks [15% difference, effect size 2.79 (95% CI 1.26 to 6.22)] in West 1998[30] but not in May 2006[113] (adjusted OR 1.16, 95% CI 0.76 to 1.78). Woodruff 2002[120] reports that 20.3% of the intervention group had quit at 3 months compared with 8.7% of the comparison group, the comparison group being a statistically significant 2.5 times more likely than the intervention group to be smoking at the 3-month assessment after adjusting for gender and amount smoked per day at baseline. However, these results are based on a per-protocol analysis that ignores differential attrition in the intervention arm. Applying a more conservative intention-to-treat analysis, and assuming that all of those lost to follow-up have relapsed, gives a quit rate of 17.3% in the intervention group and 8.3% in the control group. Emmons 2005[26,97] reported that the quit rate was significantly higher in the peer counselling group than the control group (16.8% vs 8.5%, $p < 0.0003$) at 8 months. This difference was maintained at the 12-month follow-up (15% vs 9%, $p < 0.01$). Controlling for baseline self-efficacy and depression, the peer counselling group was more likely to quit smoking by the 12-month follow-up compared with the control group (12-month OR 1.99, 95% CI 1.27 to 3.14). Post hoc power for this trial was around 87% for a difference of 8.5% (quit rate) between groups, albeit that power to detect differences in proportions was dependent on the location of the difference.

Participation

None of the studies assessed any measures of participation.

Health-care beliefs and knowledge

Emmons 2005[26,97] reported that 74% of the control participants responded that they had indeed received the self-help smoking cessation materials. Of that group, 67% reported having read either a lot, or all, of the materials sent; 56% of participants reported that they found the materials to be somewhat useful, and 21% reported that they were very useful. As expected, recall of receipt and rates of use of the materials were higher among the peer-counselled intervention group participants (95% reported receiving the materials, 79% reported reading a lot or all of the materials).

None of the studies reported any other measures of health-care beliefs and knowledge.

Health-care use

West 1998[30] and Emmons 2005[26,97] reported the rates of use of NRT. There was no significant difference in the use of NRT in the two groups in West 1998,[29] with about 50% of both groups using it. Emmons 2005[26,97] reported that at the 8-month follow-up, 33% of participants in the peer-support condition reported that they had used NRT during the previous 6 months, compared with 8% of the control (self-help) participants. At the 12-month follow-up, 16% of the provider counselling participants indicated that they had used NRT in the previous 4 months compared with 6% of self-help participants. No significance values were given. A total of 14% of those in the self-help group who used NRT reported that they had quit compared with 26% of the peer counselling group, although this difference did not reach significance using intention-to-treat analyses.

Emmons 2005[26,97] does not appear to have recorded NRT use in the control group for the first 2 months of the trial, and this oversight may explain why there is no attempt to adjust for it in the results. NRT has well-established effectiveness data with an OR for the patches of 1.67. There is no mention of NRT in Woodruff 2002,[120] and it does not appear to form a planned constituent of the intervention.

None of the studies showed any other data for health-care use.

Costs

No costs were given in West 1998,[30] May 2006[113] or Woodruff 2002.[120] Emmons 2005[26,97] stated that the total intervention delivery cost per person was US$298.17 for the peer counselling group and US$1.25 for the self-help group. Therefore, the incremental cost-effectiveness of the peer counsellor (PC) condition compared with the self-help (SH) control [($cost_{pc} - cost_{sh}$)/(quit $rate_{PC}$ – quit $rate_{SH}$)] was US$5371 per additional quit at 12 months.

Discussion

These well-described and -conducted studies evaluated the efficacy of the community LAs for smoking cessation in two communities in the USA (Latinos and childhood cancer survivors) and two studies in the UK (general population). The studies did not measure if LHAs had any effect in general health or QoL, our review's primary outcomes. Three studies claimed an improved rate on smoking cessation as their primary outcome, which did change significantly in the groups in receipt of the LA intervention.[26,29,96,119] May 2006[113] reported no such intervention effect. The authors suggest that this may be due to the fact that the level of social support provided by the smoking cessation groups may have limited the possibility for any additional effect to be observed in the buddy intervention arm. No assessments of improvements in knowledge of the effect of smoking on health or smoking cessation strategies were measured, despite these being the main component of the information given in the interventions. However, Emmons 2005[26,97] reported that most participants found the written material useful or very useful. Rates of participation and attrition can be used as surrogate markers for the acceptability of a programme. Woodruff[120] showed that attrition from the study was three times higher in the peer support group. NRT was used in West 1998[30] and Emmons 2005,[26,97] but West 1998[30] found no differences in the rate of use between the groups, and Emmons 2005[26,97] did not report the statistical significance of the difference they found. NRT was used with a proportion of participants in May 2006[113] but the authors do not report on any differential outcome.

Breastfeeding

- Dennis 2002,[88] and Morrow 1999.[114,115]

Description of studies

Two studies were identified which examined interventions to promote breastfeeding. Morrow 1999[114,115] examined the effect on exclusive breastfeeding and Dennis 2002[88] on breastfeeding duration.

Study design

Two high-quality RCTs examined the efficacy of peer support on exclusive breastfeeding and breastfeeding duration.[88,114,115] Morrow 1999[114,115] examined differing counselling frequencies: three and six visits. The control groups received conventional care, i.e. no peer support. Both groups followed the mothers for 3 months[87] or 6 months post partum.[113,114] Patients were the unit of randomisation in both studies.

Context of the intervention

Population focus

The studies were based in semiurban settings in North America: Mexico City, Mexico[114,115] and Toronto, ON, Canada.[88] Morrow 1999[114,115] recruited 130 pregnant women, whereas Dennis 2002[88] recruited 258 primiparous breastfeeding mothers.

Location

The interventions were delivered in mothers' homes by home visits [114,115] or via telephone.[88]

Referral/recruitment

Study mothers were identified in Morrow 1999[114,115] by a semiannual door-to-door census and continuous reporting of new pregnancies in the community by study staff and mothers. Eligible mothers were identified within two community hospitals for the Dennis 2002[88] study.

Mechanism

Intervention components

Theoretical underpinning

None stated in either study.

Aims

The studies aimed to promote exclusive breastfeeding[114,115] and to increase breastfeeding duration and increase satisfaction with the breastfeeding experience.[88]

Origin

The interventions used were culturally-adapted materials from the La Leche League, a mother-to-mother support organisation,[114,115] and a 43-page handbook developed in conjunction with an existing volunteer breastfeeding organisation.[88] This organisation was established in 1993, originally in conjunction with the local regional health department.

Approach

Peers imparted information on breastfeeding and supported mothers.

Topic focus

Unsurprisingly, the focus of these two studies was exclusively breastfeeding.

Main activities

Both the interventions emphasised the benefits of breastfeeding, provided general breastfeeding information and dispelled myths. Morrow 1999[114,115] also provided information on preparation for birth and emphasised the importance of exclusive breastfeeding. They also included counselling to key family members to support the mothers.

Mode of delivery

Morrow 1999[114,115] delivered the intervention face to face in the mother's home supported by a culturally adapted set of visual aids. Dennis 2002[88] provided the intervention via telephone.

Role/training

Practitioner type

Morrow 1999[114,115] used peers from a shared community, some of whom had the common personal experience of breastfeeding. Dennis 2002[88] exclusively used peers with common personal experience of breastfeeding.

Level of training

The level of training varied significantly between the two studies. Morrow 1999[114,115] trained their advisors for over 2 months, whereas Dennis 2002[88] trained their advisors for just 2.5 hours.

Skill level

Both studies used unqualified lay tutors.

Nature of role

The advisors in Morrow 1999[114,115] had previously worked as field data collectors, so it is implied that they were paid. The advisors in Dennis 2002[88] were volunteers, i.e. unpaid.

Hours

It is unclear in Morrow 1999[114,115] whether the lay advisors were full- or part-time, and in Dennis 2002[88] they were part-time (i.e. involved for the duration of the phone calls).

Intensity of intervention

Frequency/hours/duration

The lay advisors in Morrow 1999[114,115] delivered three sessions (one late pregnancy and two by 2 weeks post partum) or six sessions (two in mid to late pregnancy and four by 8 weeks post partum). The length of time of these sessions was not stated, so the overall intensity cannot be calculated. Lay advisors in Dennis 2002[88] were able to provide as much contact as they deemed necessary to support the mother, and logs were kept of this contact, which was on average five 16.2-minute telephone calls to the mother, i.e. 81 minutes over the 3 months of the intervention.

Results from studies

Health status

Neither study assessed any measure of health status of the mothers. Morrow 1999[114,115] measured rates of diarrhoea in infants 0–3 months of age, which was reduced significantly in the supported group (RR = 0.47, i.e. the probability of a baby in the intervention group having diarrhoea is 0.47 that of the control group, or less than a half.)

Health behaviours

Dennis 2002[88] and Morrow 1999[114,115] reported that their intervention groups were significantly more likely to be breastfeeding at 3 months [Morrow 1999[114,115] exclusive breastfeeding only (RR = 1.11); Dennis 2002[88] all breastfeeding, ($p = 0.01$) RR = 1.21] but this effect was not observed

at 3 months when it was measured in Morrow 1999.[114,115] Dennis 2002[88] also noted that the rates of exclusive breastfeeding were significantly higher in the intervention group up to 3 months post partum ($p = 0.01$, RR = 1.21). Morrow 1999[114,115] also provides details of the differential responses in breastfeeding outcomes to peer counselling, finding that multiparous women and those with uncertainty about infant feeding plans were more likely to respond to peer counselling by initiating breastfeeding. It was also demonstrated that peer counselling had the ability to counteract the negative effects of early supplementation on breastfeeding among the subgroup of breastfeeding mothers who have introduced formula within the first day post partum. The study by Morrow 1999[114,115] was powered on a hypothesised difference between a combined intervention group (three and six visits) and a control group; however, results are also reported in relation to differences between the three groups. Post hoc power was 95% in relation to the observed difference of 20% between the combined study group and controls. Dennis 2002[87] powered their study at 90% to detect a difference of 20% located at 60% and 80%; post hoc recruitment figures confirmed power at 90%.

Neither study assessed any other measure of health behaviour.

Participation

Neither study assessed any measure of participation.

Health-care beliefs and knowledge

Dennis 2002[88] found no significant difference in mean satisfaction scores between the two groups on maternal satisfaction, but significantly fewer mothers in the intervention group reported dissatisfaction [RR (intervention vs control) = 0.63, 1.5% vs 10.5%, $p = 0.02$]. Significantly fewer mothers in the peer support group in Dennis 2002[88] indicated that they would breastfeed their next infant differently (RR = 0.68, 23% vs 34%, $p = 0.05$). Morrow 1999[114,115] stated that nearly all (98%) intervention group mothers reported that the peer counsellor was helpful and supportive. In Dennis 2002[88] three mothers indicated dissatisfaction with the peer support, most indicating a preference for a higher frequency of contact. However, a few mothers responded that they did not like a specific aspect of their peer volunteer. For example, only one mother requested to discontinue her participation in the intervention, stating that the peer volunteer frightened her about the potential hazards of not breastfeeding. The peer volunteer's comments made her anxious and diminished her feelings of confidence, despite the fact that breastfeeding was going well. Another mother felt her right to confidentiality was violated when her peer volunteer contacted the public health department without her consent. Although this mother did require professional assistance, the peer volunteer should have discussed the referral with the new mother. Neither study assessed any other measure of health-care beliefs or knowledge.

Health-care use

Morrow 1999[114,115] noted the number of visits to the doctor due to infant diarrhoea but did not compare between the two groups. Dennis 2002[88] reported on health service utilisation but in a format inaccessible to the reviewers in the timescale available.

Costs

Neither study assessed any measure of costs.

Discussion

These medium-sized, well-described and well-conducted studies evaluated the efficacy of HRLA for breastfeeding in two semiurban communities in North America (Mexico City, Mexico and Toronto, ON, Canada). The studies did not assess measures of general health or QoL, our review's primary outcomes. However, both studies claimed a change in rates of breastfeeding as their primary outcome that did change significantly in the groups in receipt of peer support. The

positive effects on mother's health of breastfeeding are very long term and so would be hard to measure in these sorts of studies. However, Morrow *et al.*[114,115] did measure the rates of diarrhoea in the baby's first 3 months and found significantly lowered rates in the children of mothers in the peer support group. Both studies showed high rates of satisfaction with the programmes, but some complaints reported in Dennis 2002[88] show that appropriate training of peer counsellors is essential. Neither study gave any indication of the costs of the interventions.

Mental health

- Ireys 2001.[103]

Description of study

Only one study was identified that addressed mental health issues, in mothers of children with chronic conditions.

Study design

One high-quality RCT examined the impact of a support intervention for families of children with selected chronic diseases.[103] The control group received a 'low dose' of the intervention, as they were given a telephone number through which they could reach an experienced parent, who had received no training and who did not initiate any telephone calls. Fewer than 3% of mothers in the control group called the number. Families were the unit of randomisation.

Context of intervention

Population focus

The study was based in the USA and recruited 161 mothers whose children aged 7–11 years had been diagnosed as having diabetes, sickle cell anaemia, cystic fibrosis or moderate-to-severe asthma, living within a 80-km range of Baltimore, MD, USA.

Location

The intervention for this study was delivered in participants' homes or in nearby coffee shops if requested, as well as in the community (for events organised, such as bowling parties or small group lunches).

Referral/ recruitment

Participants were identified by 11 specialty clinics and five general paediatric clinics.

Mechanism of intervention

Intervention components

Theoretical underpinning

The theoretical underpinning is not stated.

Aims

The intervention aimed to enhance the mental health of mothers of children with selected chronic diseases.

Origin

The programme described in Ireys 2001[103] incorporated elements from previous studies.[162–165]

Approach

Lifestyle advisors provided informational support, linking families with existing health and community resources, and gave information on child behaviour, parenting; and coping; affirmational support by enhancing a mother's confidence in parenting; and emotional support through listening, and demonstrating interest and an empathic understanding.

Topic focus

The focus of the intervention was on mental health, particularly anxiety and depression.

Main activities
Throughout, the intervention identified examples of naturally occurring sources of support, pointed out examples of effective parenting by the mother and discussed opportunities for strengthening these sources of support and existing parenting skills.

Mode of delivery
The intervention consisted of visits to the families' homes, or coffee shops if requested, biweekly telephone contacts and the organisation of events, such as bowling parties or small group lunches, which would allow programme parents to meet one another.

Role/training
Practitioner type
The study used peers with a common personal experience, i.e. they were mothers who have children with chronic conditions. Where possible, they were also in close proximity to those participating in the intervention.

Level of training
Intensive training consisted initially of a 30-hour training programme focused on enhancing skills in listening, reflecting and 'story swapping', from which successful graduates were invited to work as LAs and took part in additional 20 hours of training to reinforce the team aspects of the programme and to review operational procedures.

Skill level
The study used unqualified lay trainers.

Nature of role
The health advisors were paid an hourly rate, although the amount is not clear.

Hours
It is not clear how many hours the health advisors worked; however, it is stated that each advisor was assigned one to seven families.

Formality
The graduation of advisors suggests formal training.

Intensity of intervention
Frequency/hours/duration
The intervention consisted of seven visits of 60–90 minutes, fortnightly telephone calls of at least 5 minutes, and three special events over a 15-month period.

Results from studies
Health status
Levels of anxiety were measured using an 11-item anxiety subscale of the Psychiatric Symptom Index (PSI).[166] Whereas participants in the control group reported higher levels of anxiety after baseline, participants in the experimental group reported lower levels of anxiety post intervention compared with baseline scores. The interventions' effect (reduction in anxiety scores) was especially pronounced for mothers who were highly anxious at baseline, with mean anxiety scores for the highly anxious experimental group mothers decreasing from 33.3 at baseline to 26.4 at 12 months post baseline, and those for the highly anxious mothers in the control group remaining unchanged. Maternal physical health was also an important factor in determining

effects of the intervention. The mean anxiety score for mothers in the experimental group who reported that they were in good, fair or poor health at baseline decreased from 26.4 to 23.9 during the intervention period, whereas for those mothers in the control group who reported being in good, fair or poor health the mean anxiety score increased. Whereas mothers in the experimental group who reported being in very good or excellent health also showed a decrease in anxiety (from 13.4 to 11.5), those in the control group reporting very good or excellent health reported an increase in anxiety in this period (from 15.2 to 17.9). No relationship was found between the effects of the intervention and the number of reported stressful life events or the dose of the intervention. No effect was demonstrated on symptoms of depression as reported on the Beck Depression Inventory.[167] The second step model (using baseline as a covariate) resulted in a standardised 'B coefficient' of 0.145 ($p \leq 0.05$); however, this effect disappears when other covariates are included in the model. Specifically, the effect of each and all of the stage 3 factors make a substantial contribution to the regression coefficient ($R^2 = 0.51$), suggesting that 51% of the variance in post-test PSI anxiety score is explained by the stage 3 model, i.e. it is the most predictive model. In other words, the intervention group was no longer a significant factor.

Health behaviours
Not measured.

Health-care beliefs and knowledge
Not measured.

Health-care use
Not measured.

Costs
No details given.

Discussion

This well-described and well-conducted study evaluated the efficacy of support to mothers of school-aged children with selected chronic illnesses, from mothers of older children with the same condition, for enhancing mental health. The study did not assess general health or QoL, our review's primary outcomes. However, it did claim a change in anxiety – one of the study's primary outcomes – but this did not change significantly in the groups in receipt of the intervention. The intervention effect was particularly pronounced for mothers who were highly anxious at baseline and for those who reported that they were in good, fair or poor health at baseline. There was found to be no relationship between the number of reported stressful life events or the dose of the intervention and the intervention effect. There was no demonstrated effect on symptoms of depression. Health behaviours, health-care beliefs and knowledge and health-care use were not assessed in Ireys 2001[103] and no details of costs were given.

Screening

- Andersen 2000,[42,81,82] Bird 1998,[84–87] Earp 2002[16,63,93,94] and Paskett 2006.[116,117]

Description of studies

No screening interventions for men were identified. The four studies that were identified promoted the uptake of mammography screening for women;[16,42,81,82,84–87,93,94,116,117] one also specifically promoted cervical cancer screening.[84–87]

Study design

Two high-quality RCTs,[42,81,82,116,117] and two high-quality controlled trials[16,63,84–87,93,94] were identified. Women were the unit of randomisation in Paskett 2006[116,117] and participants were randomly assigned to LHAs or no advisor and followed up after 12–14 months. Communities (as defined by a zip code or group of adjacent zip codes) were the unit of randomisation to one of three intervention arms or to a non-intervention control arm in Andersen 2000[42,81,82] The interventions were implemented by volunteer groups, and were 'individual counselling' (IC), 'community activities' (CA) and a combination of both (IC + CA). In the two controlled trials[16,63,84–87,93,94] the intervention was delivered to one community, whereas the control community received no intervention. Samples of women from all of the communities were surveyed after 3 years.

Context of intervention

Population focus

All four studies were based in the USA. Bird 1998[84–87] surveyed 645 Vietnamese-American women in two urban communities (San Francisco, CA – intervention; Sacramento, CA – control). In Andersen 2000,[42,81,82] a cohort of 352 women aged 50–80 years from each of the 40 communities (giving a total of 14,080 participants) was randomly selected and surveyed to assess intervention effectiveness. The communities were located predominantly in rural areas of Washington state. Earp 2002,[16,63,93,94] surveyed 993 rural African-American women in 10 counties in NC, USA; five counties were allocated to each group and they were also geographically separated by the Pamlico Sound. The studies of Bird 1998[84–87] and McPhee *et al.*,[85,86] were conducted in the context of the Breast and Cervical Cancer Control Program (BCCCP), which covers screening fees for all age-eligible, low-income women. Paskett 2006[116,117] assessed the impact of LHAs who were randomly assigned to 453 women individually, with a control group of 444 women receiving normal care. These 897 women were from a rural, low-income, triracial (white, Native American and African-American) population within a county ranked the eighth poorest of the 100 counties in North Carolina and in which one-half of the adults are high school graduates.

Location

The interventions were delivered in participants' homes (Bird 1998,[84–87] by telephone, Paskett 2006[116,117]), in community settings (beauty parlours, churches, bingo halls, clubs, stores, libraries, golf courses)[16,63,84–87,93,94] or in health settings within the community (health fairs, mobile mammography van days).[16,63,93,94]

Referral/recruitment

The LHAs spoke to any woman with whom they came into contact in their social group.[16,63,84–87,93,94] In Paskett 2006,[116,117] women who had been clients of the clinic for at least 2 years and had not had a mammogram in the prior year were randomly selected from the health records of their health-care provider. Participants were randomly selected from a list of women purchased from a mailing list company in Andersen 2000[42,81,82]

Mechanism

Intervention components

Theoretical underpinning

In Andersen 2000[42,81,82] the IC consisted of barrier-specific telephone counselling (BSTC), which is based on theories of decision-making and is designed to help underusing women to overcome their barriers to obtaining a mammogram.[168] The CA component of the intervention focused on developing social norms that were supportive of mammography. Earp's intervention was based on a social–ecological model of behaviour, emphasising linked strategies at the individual social network of the organisational, community and policy levels.[169] In addition, interventions on a one-to-one basis in Earp 2002[16,63,93,94] were informed by behavioural change theory. Paskett's intervention was based on a number of theories: the Precede–Proceed model[170,171] provided a framework to identify screening barriers; social learning theory[172,173] guided the educational programme; the communication/behaviour change model[174] provided an organising framework for choosing specific culturally appropriate messages for delivery; the minority health communication model informed the culturally specific focus of the intervention; and the Transtheoretical Model[175] was used to judge the women's state of readiness.

Aims

All four studies aimed to increase the uptake of mammogram screening. Bird 1998[84–87] also aimed to increase the uptake of cervical smear tests (Pap smears). Paskett 2006[116,117] also aimed to identify and address barriers to the uptake of mammograms.

Origin

In Bird 1998[84–87] the intervention was developed by the authors. Andersen 2000[42,81,82] based their IC component on BSTC, which was developed by other authors and adapted for use by volunteer peer counsellors from the included communities. Earp 2002,[16,63,93,94] Earp and Flax,[16] and Flax and Ear[94] developed the intervention informed by focus groups from the relevant communities and which is also an outgrowth of a HRLA programme launched in 1990 in a semiurban eastern North Carolina county.[176,177] In Earp 2002,[16,63,93,94] community outreach specialists working out of local health agencies were hired to recruit, train and meet with LHAs and to co-ordinate the LHAs activities as well as creating and working with five community advisory groups to guide the lay health worker activities. Paskett 2006[116,117] developed their intervention in several steps, informed by a previous study:[178] community analysis, development of prototype materials, focus group review, pretesting and revision.

Approach

All three studies' peers imparted information on screening, and Earp 2002,[16,63,93,94] supported women's attendance by providing transportation where needed and organising special screening days or raising funds for women who could not afford mammograms. In Paskett 2006[116,117] LAs also helped to schedule mammography appointments. A specificity of Andersen 2000[42,81,82] and Paskett 2006[116,117] was the focus on helping women to overcome their personal barriers to using mammography.

Topic focus

The focus of all four interventions was the promotion of screening.

Main activities

The interventions provided information on the importance of regular screening, breast cancer diagnosis, treatment and risk factors, general prevention and eligibility for screening payment programmes.

Mode of delivery

The interventions were delivered face to face on a one-to-one basis[16,42,63,81,82,93,94,116,117] or in small groups.[84–87] Bird 1998[84–87] and Earp 2002,[16,63,93,94] also made presentations to groups in the community, whereas Andersen 2000[42,81,82] and Paskett 2006[116,117] also used telephone contact. Supportive written information pamphlets were used in all four interventions. CAs, such as video showings and mammography-themed bingo nights[42,81,82] and health fairs,[84–87] were also organised around the promotion of mammography.

Role/training

Practitioner type

All four studies selected women only as peer advisors (common personal experience), women who were indigenous to the communities they served (shared community).

Level of training

Paskett 2006[116,117] provided intensive training, 1 week's training with an examination at the end and additional follow-up sessions throughout the study. Earp 2002,[16,63,93,94] provided moderate training (10–12 hours), mostly structured in three 3- to 4-hour sessions, but the length of time over which these were delivered is not stated. The level of training was unclear in Bird 1998,[84–87] or in Andersen 2000,[42,81,82] though 'a' training session is mentioned in the latter, suggesting minimal training.

Skill level

Two studies used unqualified lay trainers,[16,63,84–87,93,94] whereas Paskett 2006[116,117] used a former nurse, social worker and a research study interviewer. Skill level is unspecified in Andersen 2000.[42,81,82]

Nature of role

Bird 1998[84–87] paid their lay trainers on a sessional basis. Paskett 2006[116,117] states that their LHAs were paid. The advisors in Earp 2002,[16,63,93,94] were volunteers. In Andersen 2000,[42,81,82] volunteers received modest incentives and tokens of appreciation but were not paid.

Hours

Bird 1998[84–87] paid their lay trainers on a sessional basis, which implies part-time working. The other three studies are unclear whether the advisors worked full- or part-time.

Level of formality

Paskett 2006[116,117] conducted an examination after training but training was not externally accredited. The advisors in Earp 2002,[16,63,93,94] had a graduation ceremony and received a certificate for their training. In the Andersen 2000[42,81,82] and Bird 1998[84–87] studies few details were reported about training.

Intensity of intervention

Frequency/hours/duration

In Bird 1998[84–87] the lay advisors provided 10- to 15-minute teaching sessions with discussion afterwards. The average number of these sessions was 232. They were provided over the 30 months of the study. Earp 2002,[16,63,93,94] did not state any parameters of intensity. Andersen 2000[42,81,82] mentions that health advisors were asked to attempt to call at least 10 women monthly over the 3 years' study duration but give no indication of a possible number of contacts or duration of contact per person. The Paskett 2006[116,117] intervention lasted 9–12 months in total; lay trainers worked for 75–105 minutes for the first two sessions, with the second visit being

2–3 weeks after the first; they then provided two telephone calls (of unknown duration) following the second visit during months 2 and 6 of the intervention. Participants in Paskett 2006[116,117] also received two postcard reminders at months 4 and 8, along with a last visit, of unknown duration, in months 10–12.

Results from studies

Health status

Not measured in Andersen 2000,[42,81,82] Bird 1998,[84–87] Earp 2002[16,63,93,94] or Paskett 2006.[116,117]

Health behaviours

Bird 1998[84–87] distinguishes regular users from those who have ever had a mammogram, defining regular users as those who have had at least two mammograms in the previous 5 years with the most recent within 18 months. Andersen 2000[42,81,82] defines regular users as those reporting at least two mammograms with one in the last 2 years (50% of sample), and all other women as underusers.

Bird 1998[84–87] reports the largest gain in regular mammography users. The unadjusted data show an increase of 18% in the intervention arm compared with a fall of 4% in the control. The rates of ever having had mammograms (intervention OR 2.2) and Pap smear (OR 4.5) were significantly raised in the intervention community.[84–87] In addition, the rates of having had more than one screen in the last 5 years were, again, significantly raised in the intervention population for mammograms (OR 2.4) and cervical cancer screening (OR 2.4). The trial had in excess of 80% power to detect clinically significant differences for all primary and secondary outcomes.

Earp 2002,[16,63,93,94] showed that self-reported mammography use in past 2 years increased in the intervention group compared with the controls by a statistically significant 7% (adjusted for age, medical visits, physician recommendation for mammography and perceived susceptibility to breast cancer). The difference between the two populations was even greater when just the low-income (< US$12,000 per year) women in each community were compared: 11% (adjusted, $p = 0.02$ – insufficient data reported to calculate effect size). The high-income women in the two communities did not differ significantly in their use of mammograms. Post hoc power was not assessed owing to the diversity of outcomes.

Paskett 2006[116,117] showed that those in the LHA group were significantly more likely to have reported having a mammogram in the 12 months before the follow-up assessment (RR = 1.56, 95% CI = 1.29 to 1.87, $p < 0.001$). When assessed by racial group (African-Americans, Native Americans and white people), all three groups improved rates of mammography use and there were no statistically significant differences in screening rates observed between racial groups or clinics. A total of $n = 820$ women completed the study resulting in > 80% power to detect a prespecified difference of 10% overall and 20% within racial groups.

Andersen 2000[42,81,82] studied the effect of IC and (IC + CA)/or CA on women who were underusers of mammography at baseline, and on the prevention of relapse for those women who had had mammograms at regular intervals at the baseline interview. Each intervention demonstrated increases in mammography use in both regular users (relapse prevention) and underusers relative to the control communities. The only statistically significant difference is observed among regular users in the CA arm, where 2.9% more women report a mammogram. Andersen 2000[42,81,82] combines the impact of the intervention among regular and underusers to obtain a percentage increase in the number of women using mammography of 2.5% in the CA arm. Given the similar costs for each intervention the authors conclude that CAs are the most cost-effective. This was a large-scale study ($n = 6592$), providing high power to detect small differences between three treatment groups and controls.

Participation

Not measured in Andersen 2000,[42,81,82] Bird 1998,[84–87] Earp 2002[16,63,93,94] and Paskett 2006.[116,117]

Health-care beliefs and knowledge

Bird 1998[84–87] measured whether the women had ever heard of mammography (OR 7.0) or Pap smears (OR 52.7), both of which were significantly increased in the intervention population.

Earp 2002[16,63,93,94] measured increase in awareness of mammography-promoting interventions and materials over the period of the intervention (3 years), which did not differ significantly between the two groups. However, there was a difference between high- and low-income groups, in that although women with a high income had more exposure to the intervention the changes for this group were smaller.

Paskett 2006[116,117] measured knowledge (12 items), barriers (12 items) and beliefs (four items) of mammograms and breast cancer with an unvalidated questionnaire developed for their study. The knowledge scores did not differ significantly between the groups. The barrier score was significantly smaller in the LHA group (insufficient data reported to calculate an effect size). The proportion of women reporting inaccurate beliefs was statistically significantly reduced ($p = 0.034$) in the LHA group (insufficient data reported to calculate an effect size).

Andersen 2000[42,81,82] did not measure health-care beliefs or knowledge.

Health-care use

Not measured in Andersen 2000,[42,81,82] Bird 1998,[84–87] Earp 2002[16,63,93,94] and Paskett 2006.[116,117]

Costs

Not measured in Bird 1998[84–87] and Paskett 2006.[116,117] stated that the total cost of the intervention was US$329,054. The difference in mammography rates between the two groups was 15.2%, which translates into 66 additional mammograms in the LHA group; therefore, each additional mammogram in the advisor group cost US$4986.

Although no exact intervention costs were given in Earp 2002,[16,63,93,94] the programme has entailed 'substantial direct costs' due to staffing costs as a result of the large size of the LA network and the area that it covers (although the LAs volunteered their services, paid staff were involved in the stages of implementation, most intensively in the training phase); the materials for the training workshops and LA activities; consultant expenses, incentive payments, refreshments, tape recorders, tapes and transcription costs associated with the focus groups; and, finally, consultant expenses, development of mock-ups, photography costs and printing costs associated with brochure development.

Although no exact intervention costs were detailed in Bird 1998,[84–87] it is mentioned that the free services that were available at the time of the study allowed the trial to be conducted in a cost-free environment, and therefore, if participants had been subject to fees for screening, increases in receipt and maintenance of tests might have been smaller.

Discussion

These four large, well-described and well-conducted studies evaluated the efficacy of HRLA for increasing attendance at screening in rural communities and one urban community in North America. One study promoted screening for breast and cervical cancers,[84–87] whereas the other three promoted mammography uptake alone.[16,42,63,81,82,93,94,116,117] The studies did not assess measures of general health or QoL, our review's primary outcomes. However, all three studies claimed a change in rates of attendance at screening for breast cancer (mammography) as their

primary outcome, which did increase significantly in the groups in receipt of peer support. Bird 1998[84–87] also showed significant increases in the uptake of cervical cancer screening (Pap smears).

Bird 1998[84–87] and Earp 2002,[16,63,93,94] increased knowledge of screening with LHAs. Paskett 2006[116,117] developed their own knowledge, barriers and beliefs scale, which did not show improvement in overall knowledge but did show a reduction in barriers and erroneous beliefs in the group with LHAs. In Andersen 2000[42,81,82] the IC was targeted at reducing women's personal barriers to accessing mammography, but this was no more effective than CA or a combination of IC and CA at reducing relapses by regular users at baseline. Only the CA intervention arm made a statistically significant difference in mammography use.

Diet and physical activity

- Anand 2007,[80] Elder 2006,[95,96] Keyserling 2002,[108,109] Staten 2004[119] and Resnicow 2004.[118]

Description of studies

We identified five studies examining general health promotion interventions. Two examined healthy diet promotion alone,[95,96,118] and three examined the promotion of healthy diet and greater levels of physical activity.[80,108,109,120] No other studies examining other health promotion activities, such as improving mental well-being or combining health promotion with preventative messages (e.g. don't start smoking), were identified

Study design

All of the identified studies were RCTs. The control group received no intervention/usual care in Resnicow 2004[118] and Anand 2007.[80] Keyserling 2002[108,109] had two comparator groups: one received a clinic-based intervention with IC with a nutritionist and the other received minimal intervention consisting of mailed pamphlets only. Staten 2004[119] had two comparator groups: one received provider counselling and the other received provider counselling and health education. Elder 2006[95,96] had two comparator groups; one received tailored mailed print materials and the other received targeted mailed 'off-the-shelf' materials.

The unit of randomisation was the participants in three studies[95,96,108,109,118] and cluster randomisation in two studies: households[80] and church congregations.[118]

Context of intervention

Population focus

All five studies were conducted in North America: in a Canadian Aboriginal community;[80] in uninsured women, over the age of 50 years, from a mainly Hispanic community;[119] in a Latinas community;[95,96] in African-American church communities;[118] and in African-American women with type 2 diabetes[108,109]). In Anand 2007,[80] 57 households (174 individuals) were recruited; 357 participants in Elder 2006;[95,96] 200 in Keyserling 2002;[108,109] 1022 participants in Resnicow 2004;[118] and 326 in Staten 2004.[119] The rural or urban nature of the studies was not well defined in any of the studies but was probably rural in Anand 2007[80] (on the reservation) and probably urban in Staten 2004[119] (clinics in Tucson). In Anand 2007[80] the household structure was chosen to build upon the strength of family ties and promote healthy lifestyle role modelling. Two of the studies restricted the age of their participants: over 40 years of age[108,109] or over 50 years of age.[119]

Location

The interventions were delivered at home,[80,95,96] home and clinic,[108,109] home, clinic and community,[118] and in church and the home.[118]

Referral/recruitment

Participants were recruited via clinics in two studies,[108,109,119] by telephoning people in the region with Hispanic surnames,[95,96] by recruiting within church communities on a first-come first-served basis,[118] and by recruiting eligible households within the reservation.[80] In Staten 2004[119] the clinics from which participants were recruited were participating in the National Breast and Cervical Cancer Early Detection Program.

Mechanism

Intervention components

Theoretical underpinning

Staten 2004[119] did not state the theoretical underpinning of their interventions. Elder 2006[95,96] states that the tailored materials were based on the person's readiness to change, suggesting that the intervention is informed by the stages of change model.[179,180] Keyserling's intervention was based on the Transtheoretical Model,[181] social cognitive theory[154] and basic behaviour modification principles.[182] Facilitators in the group session's intervention used an active learning discovery approach[183] and adult learning principles.[184] Anand's intervention[80] was based on protection motivation theory, the social learning theory, normative influences and theories of persuasion.[185–188] Resnicow 2004[117] encompassed intervention components from two previous studies.[189–192] They were based upon the social–ecological model,[193] targeting activities at the individual, social network and community levels, and on motivational interviewing.[157,194]

Aims

Three studies examined interventions aimed at increasing activity and improving diet. There were small variations in the specific aims: Keyserling 2002[108,109] aimed to increase moderate-intensity physical activity to 30 minutes per day, to decrease total and saturated fat intake and to improve control and distribution of carbohydrate intake, and to improve diabetes self-care; Staten 2004[119] aimed to increase moderate-to-vigorous activity to 150-plus minutes per week and to promote the consumption of five-plus servings of fruit and vegetables per day; and Anand 2007[80] aimed to reduce energy intake and increase physical activity. Two studies examined interventions aimed at improving diet: Resnicow 2004,[118] by increasing fruit and vegetable intake, and Elder *et al*,[95,96] by reducing dietary fat and increasing fibre intake.

Origin

The intervention was developed by the researchers in consultation with the community in Anand 2007[80] and Elder 2006,[95,96] and on the basis of formative data collection including focus groups with African-American people with diabetes[195] and prior testing[196] in Keyserling 2002.[108,109] The development of the intervention was based upon successful components of two similar studies[189–192] in Resnicow 2004.[118] The origin was not stated in Staten.[119]

Approach

The CHWs imparted information and counselled participants to improved health behaviours in all five studies. Resnicow 2004[118] and Anand 2007[80] provided food preparation classes and recipes. In Staten 2004[119] they also organised bimonthly walks.

Topic focus

The focus of the intervention was healthy diet promotion alone in two studies,[95,96,118] whereas three studies examined the promotion of healthy diet and greater levels of physical activity.[80,108,109,119]

Main activities

The dietary interventions included personalised dietary counselling.[95,96] In Resnicow 2004[118] the intervention was made up of different elements, including church-wide activities, such as health fairs, serving fruit and vegetables after services or church programmes, sponsoring food demonstrations, and having pastor sermons related to health; the distribution of a cookbook with recipes and information about the health benefits of fruit and vegetables, tips for shopping and storing fruit and vegetables and cooking techniques; the distribution of an 18-minute video targeting fruit and vegetable intake using spiritual and secular motivational messages; and one-to-one lay counselling regarding fruit and vegetable intake. The diet and physical activity interventions included 'A New Leaf … Choices for Healthy Living with Diabetes' intervention

including individual, clinic-based counselling with a nutritionist, as well as telephone calls with a LA.[108,109] Health counsellors assessed and set dietary and physical activity goals for each household member, and provided traditional recipes, grocery store tours and food preparation classes. A water cooler was provided per household, as well as two 18-l containers and 24 bottles of spring water (which were provided per week per household), and an after-school activity programme for children was provided to the whole community (both intervention and control groups had access).[80] Staten's intervention included provision of counselling from nurse practitioners regarding the benefits of and barriers to increasing physical activity and consumption of fruit and vegetables, and gave an individualised behaviour change prescription, two health education seminars (one on nutrition and one on physical activity), and a monthly health newsletter, while CHWs provided information support and organised bimonthly walks.[119]

Mode of delivery

The interventions were delivered in a variety of modes. The participants in Elder 2006[95,96] received weekly home visits or telephone calls over a 14-week period, alongside 12 mailed tailored newsletters with homework assignments. The participants in Resnicow 2004[118] had access to church-wide health fairs, education sessions and cooking classes, and received one-to-one lay counselling via two telephone calls. The participants in Staten 2004[119] received provider counselling, along with an individualised behaviour change prescription, two health education seminars and a monthly newsletter, while CHWs provided fortnightly telephone calls and organised bimonthly walks. The participants in Keyserling 2002[108,109] received one 60-minute and three 45-minute clinic-based counselling sessions with a nutritionist and 12 monthly telephone calls from a LA. The participants in Anand 2007[80] received home visits from the health counsellor, who provided individualised dietary and physical activity goals, traditional recipes, grocery store tours and food preparation classes. A water cooler and supplies of spring water were provided per household. An after-school activity programme for children was provided to the whole community (both intervention and control groups had access).

Role/training

Practitioner type

Three studies used peers from a shared community (aboriginal;[80] African-American church-goers;[118] Spanish language-dominant role models within the community[95,96]). Two studies used peers with common personal experience from a shared community [African-American women with type 2 diabetes;[108,109] Hispanic women most of whom (five of the six) were over 50 years of age[119]].

Level of training

Staten 2004[119] gave no training to their CHWs, although four had been previously trained as CHWs to provide outreach, translation services and transportation. Two studies gave moderate levels of technical training[80,118] and one study gave intensive technical training.[108,109] In Elder 2006,[95,96] *promotores* received 12 weeks of training, during which a desirable interaction was modelled by staff followed by opportunities for *promotores* to develop skills through the opportunity to practice and seek feedback and develop solutions to problems that might occur through role-playing in a supportive environment.

Skill level

All the studies used unqualified lay trainers. However, the lay trainer intervention was provided in conjunction with training delivered by qualified nurse practitioners in Staten 2004[119] and a nutritionist in Keyserling 2002.[108,109] In Resnicow 2004,[118] attempts were made to identify individuals with a college degree- or graduate-level education and a background in a helping profession (e.g. teacher, psychologist, nurse, social worker or counsellor).

Nature of role

Four of the five studies did not specify whether the CHWs were paid. It is stated that advisors were volunteers in Resnicow 2004[118]

Hours

None of the five studies specified whether the CHWs were full- or part-time. Elder 2006,[95,96] however, states that the *promotores* were assigned an average of 28 participants over the course of the study (12 weeks), and advisors in Resnicow 2004[118] were asked to make two telephone calls with a minimum of five participants.

Level of formality

The CHWs in Resnicow 2004[118] received a day and a half of training, after which they got assessed for their competencies and were allowed to continue to provide the lay peer service only when they met a minimum standard. However, none of the five studies assessed their training against external standards or accreditation.

Intensity of intervention

Frequency/hours/duration

Three studies used medium-intensity intervention[80,95,96,119] and two used a low-intensity approach.[108,109,118]

Specifically, Staten 2004[119] provided an unspecified number of clinic visits, two seminars, 12 monthly newsletters and fortnightly telephone calls for 12 months. Elder 2006[95,96] provided 14 weekly visits/telephone calls plus 12 newsletters. Anand 2007[79] provided regular home visits over 6 months. Keyserling 2002[108,109] provided three group sessions plus 12 monthly telephone calls. Resnicow 2004[118] provided two telephone calls from CHWs in addition to interventions provided on a church-wide basis, for example health fairs.

Results from studies

Health status

None of the studies identified measured general health status, QoL, pain, fatigue or adverse events. One study measured psychological outcomes: Keyserling 2002[108,109] measured mental well-being on a validated scale,[197] but this did not differ significantly between the groups. Three of the studies measured specific physiological measures: Staten 2004[119] found no significant reductions between waist measurements in the CHW group versus the group that had provider counselling and health education (linear regression adjusted for BMI, ethnicity and age, – insufficient information to calculate effect size). There were significant reductions in systolic blood pressure (approximately 5.4 mmHg – insufficient information to calculate effect size) the CHW group versus both other groups (linear regression unadjusted). They also measured BMI, diastolic blood pressure, total cholesterol, glucose and triglycerides, but these physiological measures did not differ significantly between the groups. Keyserling 2002[108,109] measured HbA_{1c} levels, total cholesterol levels, HDL cholesterol levels and weight, but these physiological measures did not differ significantly between the groups. Anand 2007[80] found that, overall, there were no statistically significant changes in body weight, waist circumference, skinfold thickness or body fat percentage in the intervention versus the usual care group. Resnicow 2004[118] did not assess any measures of health status. Elder 2006[95,96] measured BMI, but failed to report the results.

Health behaviours

Three studies assessed physical activity levels: Keyserling 2002[108,109] measured exercise over a period of 1 week using Caltrac accelerometers – devices worn on the hip and designed to detect and record movement; Staten 2004[119] and Anand 2007[80] rely on self-reported data. Keyserling 2002[108,109] determined that the CHW group was significantly more active at 12 months than the

minimal intervention group [effect size approximate (unadjusted 3.0) ~52 kcal/day], but not significantly different from the group that had access to the clinic intervention. Staten 2004[119] and Anand 2007[80] found no significant difference between the groups' physical activity levels.

Dietary changes were measured in all five studies:

- *Total food energy* Elder 2006[95,96] showed a significant difference in energy immediately after the intervention. This effect did not last to the 6- and 12-month follow-up time points. Keyserling 2002[108,109] and Anand 2007[80] showed no differences in total daily energy intake.
- *Fats* Resnicow 2004[118] found significant reductions in the amount of fat eaten (effect size = 0.26). Anand 2007[80] also found a significant reduction in trans fatty acid consumption [$p = 0.02$, mean difference (D) = 0.8, effect size (ES) = 0.34, 95% CI –0.65 to –0.02] and a reduced consumption of 'fats, oils and sweets' by approximately two servings per day ($p = 0.006$, D = 1.9, ES = 0.12, 95% CI –0.44 to 0.19, compared with the control). However, there were no differences in the percentage of daily calories from fats or in the consumption of 'milk, yoghurt and cheese'. Elder 2006[95,96] found significant reductions in dietary total fat and total saturated fat consumption. These effects did not last to the 6- and 12-month follow-up time points. Keyserling 2002[108,109] found no significant differences between the groups' percentage of calories from saturated fat or dietary cholesterol.
- *Carbohydrates* Elder 2006[95,96] showed a significant reduction in total carbohydrates, glucose and fructose immediately after the intervention, but this difference was not seen at 6 and 12 months' follow-up. Anand 2007[80] found no difference in percentage of calories from carbohydrates or the types of food served (such as 'bread, cereal, rice, pasta').
- *Proteins* Anand 2007[80] found no difference in percentage of calories from protein or the types of food served (such as 'meat, poultry, fish, dried beans, eggs, nuts').
- *Fruit and vegetables* Resnicow 2004[118] found significant improvements in the levels of fruit and vegetables eaten (effect size of 0.39 for the two-item measure and 0.18 for the 17-item measure), but Staten 2004[119] and Anand 2007[80] found no significant differences in the consumption of fruit and vegetables between their groups.
- *Drinks* Only Anand 2007[80] measured consumption of drinks and they found that water consumption increased by ~0.4 of a serving per day ($p = 0.04$, D = 0.04, ES = 0.35, CI 0.03 to 0.67), and carbonated drink consumption decreased by ~0.2 servings per day ($p = –0.02$, D = 0.02, ES = 0.16, 95% CI –0.15 to 0.48).

Participation

Resnicow 2004[118] measured the levels of social support to eat more fruit and vegetables on a scale developed for this study and found it was significantly improved (effect size 0.39). Keyserling 2002[108,109] measured social well-being on a validated scale but this did not differ significantly between the groups.

Three studies[80,95,96,119] did not measure participation.

Health-care beliefs and knowledge

One study measured health-care beliefs: Resnicow 2004[118] measured autonomous/intrinsic motivation and controlled/extrinsic motivation with a validated outcome measure and self-efficacy with a measure developed for this study and found that these all significantly improved in the intervention group (effect sizes of 0.21, 0.33 and 0.22, respectively).

One study measured health-care knowledge: Keyserling 2002[108,109] measured diabetes knowledge with a validated scale (see Dunn *et al.*[198]). Although they stated that there was a significant overall group effect ($p = 0.037$) they did not conduct the analysis to determine which group(s) produced this effect and whether it was significant.

The patient acceptability of the intervention was measured specifically in two studies.[108,109,118] Resnicow 2004[118] measured satisfaction with the programme; 77% of participants reported being very satisfied with the cookbook and educational materials, and 72% of those receiving at least one call reported being very satisfied with their volunteer advisors. Keyserling 2002[108,109] measured programme acceptability. For clinic-based IC, 94% of 117 respondents reported being very satisfied with the amount of information and help the nutritionist gave about diet, and 88% were very satisfied with the counselling provided to enhance physical activity, whereas 15% reported having some difficulty getting to the clinic for these visits. For the community diabetes advisor component, 85% of 59 respondents felt the number of telephone calls was appropriate, 86% felt the role of community diabetes advisors in the programme was important, and 83% strongly agreed that talking to someone else with diabetes was very helpful. One study measured attrition rates between the groups, which can be suggested to be a surrogate marker of acceptability: Elder 2006[95,96] found that the total attrition rate over 12 months was 21%: 23% in the *promotora* group, 24% in the tailored print group and 18% in the control group.

Two studies[80,119] did not assess any measure of health-care knowledge or beliefs.

Health-care use

None of the studies identified assessed any measure of health-care use.

The studies by Keyserling 2002,[108,109] Staten 2004[119] and Elder 2006[95,96] were not powered to detect specific differences. Anand 2007[80] powered their trial at 80% to detect modest changes in total calories and increase in physical activity.

Costs

Elder 2006[95,96] detailed the costs to be US$9 per participant for the control condition, US$45 per participant for the tailored condition and US$135 per participant for the intervention group. In looking at simple costs per unit of pre–post change for the control, tailored and *promotores* groups, respectively, these costs were US$1.30, US$5.11 and US$8.28 per reduced gram of fat; US$3.21, US$17.31 and US$21.09 per reduced gram of saturated fat; and US$0.07, US$3.21 and US$0.36 per reduced calorie.[95,96] Resnicow 2004,[118] although not detailing the costs of the intervention, do state that larger-scale dissemination of the intervention would require 'a considerable cadre of trainers to implement the intervention, which would involve substantial costs'. The other studies did not identify any assessed costs.

Discussion

These well-described and well-conducted studies evaluated the efficacy of the community LHAs for general health promotion in five communities in North America which would have relatively poor access to preventive health-care services. Two of the studies examined the promotion of healthy diet alone[95,96,118] and three promoted a healthy diet along with increased physical activity levels.[80,108,109,119] Three of the studies examined the effect on particular populations,[80,95,96,118] one examined women over 40 years of age only,[119] and one examined diabetic women over 40 years of age only.[108,109]

The five studies identified did not measure if the LAs had any effect on general health or QoL, our review's primary outcomes. Three of the studies assessed a variety of physiological measures, the majority of which did not differ significantly between the groups. However, Staten 2004[119] found small but statistically significant reductions in systolic blood pressure. Three studies assessed physical activity levels: Keyserling 2002[108,109] found that they were significantly increased compared to a minimal intervention group but not when compared with the group with access to counselling sessions from the clinic. However, the size of the increase was small (~52 kcal/day)

and may well be within the range of measurement inaccuracy. Neither Staten 2004[119] nor Anand 2007[80] found any significant differences in physical activity levels.

Two studies assessed participation.[108,109,118] Resnicow 2004[118] found a significant increase in the levels of social support to eat more fruit and vegetables, but the scale was developed for this study and its reliability, sensitivity and validity were not assured. Keyserling 2002[108,109] measured social well-being on a validated scale but this did not differ significantly between the groups. Resnicow 2004[118] found significant improvements in intrinsic and extrinsic motivation, but it is unclear if this split of the scale has been validated. They also found significant improvements in self-efficacy. Acceptability was measured in two studies:[108,109,118] both studies reported high levels of satisfaction with aspects of the interventions. Attrition rates, which can be suggested to be a surrogate for acceptability, were not much different between the *promotora* group (23%) and the tailored print group (24%), and not substantially higher than in the control group (18%).[94,95] None of the studies measured health-care use and only Elder 2006[95,96] measured the cost of the intervention.

HIV infection prevention

- Dickson-Gomez 2003[89,90] and Dickson-Gomez 2006.[91,92]

Description of studies

We identified two studies[89–92] examining strategies to tackle HIV infection prevention in marginalised populations. They were by the same authors and focused on active drug users in Baltimore, MD, and Hartford, CT, USA. In the studies, participants were encouraged to conduct HIV infection prevention outreach, and it was hypothesised that participation in this activity would have an impact on their own HIV risk behaviours as well as that of their close networks.

Study design

The studies used ethnographic methods.[89–92] Dickson-Gomez 2003[89,90] also conducted a network-oriented intervention-controlled trial ($n = 250$), with the control group being designed to be equal to the intervention condition in the number of sessions, duration and interest level. In addition, the experimental group was encouraged to conduct HIV infection prevention outreach among their close social networks. It was hypothesised that outreach activity would reduce participants' own HIV risk behaviours. Interviews were carried out with 30 participants, as well as ethnographers pairing with eight participants for between four and 10 outreach sessions in Dickson-Gomez 2003.[89,90] In Dickson-Gomez 2006[91,92] project ethnographers completed 131 observations, including 67 partnered field training sessions with 39 LAs. In total, the authors completed 50 in-depth interviews.

Context of intervention

Population focus

The studies were conducted in the USA but within different project settings. The two studies were conducted in an urban community of active drug users,[89–92] in which the focus was work with these drug users as LAs. In Dickson-Gomez 2003[89,90] and 2006[91,92] some participants were also HIV sero-positive (20% in Dickson-Gomez 2006[91,92]), or homeless or had a history of sexually transmitted disease (STD) or hepatitis.

Location

The interventions were delivered in the community,[89,90] through outreach[91,92] or in an unspecified training location (Dickson-Gomez 2003[89,90] for the training per se). Settings had a particular impact on intervention effectiveness and acceptability in Dickson-Gomez 2006[91,92] as interactions could take place in the streets or in other public or private places, which could be very transitory in nature.

Referral/recruitment

Participants were identified from a previous study and through street outreach and by direct invitation by the project staff,[91,92] and through outreach, ethnographic observations, focus group and geographical coding of drug-related arrests.[89,90]

Mechanism

Intervention components

Theoretical underpinning

Dickson-Gomez 2003[89,90] used cognitive and affective process strategies from theories of behaviour change and added a social component derived from theories of social influence, social diffusion and social identity (this was particularly relevant, as in the training sessions emphasis was put on superordinate goals of protecting one's community).[199–203] Dickson-Gomez 2006[91,92] used theories of peer modelling, dynamic social impact theory and diffusion theory

(which provides a framework for understanding the process by which innovations such as harm reduction practices are accepted, rejected or transformed by drug users).

Aims

- To conduct a network-orientated HIV infection prevention and outreach intervention for HIV-positive and HIV-negative drug users.[89,90]
- To reach the maximum number of drug users with HIV infection prevention messages and equipment.[91,92]

Origin

The intervention was developed by the researchers[89,90] or developed by the researchers with knowledge developed from previous collaborative research.[91,92]

Approach

The LAs were encouraged to conduct HIV education and risk reduction in their community.[89,90] They also imparted information, demonstrated techniques (e.g. needle cleaning) and counselled participants.[91,92]

Topic focus

HIV transmission prevention within drug-users, via safe sex and clean-needle promotion.[89–92]

Main activities

In Dickson-Gomez 2003,[89,90] and 2006[91,92] the peer educators conducted HIV education outreach with sex and drug partners, friends, family and other community members, with emphasis on drug and sex partners. This included passing out HIV infection prevention kits (including condoms, alcohol swabs, bleach, water, cotton and bottle tops for heating the water and drug solution), talking about HIV infection prevention, and providing information about drug treatment facilities, housing, shelters and other services. In Dickson-Gomez 2006[91,92] the peer educators received a backpack filled with intervention materials, such as bleach kits, crack kits, male and female condoms, and dental dams, a 'flipbook' containing descriptions of intervention materials and practices, and information about HIV/acquired immune deficiency syndrome (AIDS) and other infectious diseases, an identification badge, and colourful badges containing intervention slogans.

Mode of delivery

The intervention in Dickson-Gomez 2003[89,90] took place both in a training location and in private and public places in the community. In Dickson-Gomez 2006[91,92] outreach was delivered in small groups or one to one, as opportunities arose within the community.

Role/training

Practitioner type

Both of the studies used peers with shared experience and community,[89–92] i.e. drug users educated their own community about fellow drug users; some of both were HIV sero-positive.

Level of training

In Dickson-Gomez 2003[89,90] the training consisted of 10 90-minute sessions, using a small-group highly scripted interactive format. In Dickson-Gomez 2006[91,92] the training consisted of 10 2-hour sessions: five in the offices of a community-based research institute and five field training sessions, partnered with a staff member, to practise conducting HIV infection prevention interventions with their peers in community settings.

Skill level

Both of the studies used unqualified LAs.[89–92]

Nature of role

The LAs in Dickson-Gomez 2003[89,90] were paid for their participation in the research (US$20 for baseline interviews, US$25 for follow-up interviews, US$15 for group sessions and US$20 for the time they spent with ethnographers in partnered sessions), but they were not paid for their outreach activities. The LAs in Dickson-Gomez 2006[91,92] were paid US$20 for outreach they did with staff partners; however, this accounted for only 54% of the reported encounters.

Hours

Dickson-Gomez 2003[89,90] and 2006[91,92] did not employ their peer health advisors.

Level of formality

Dickson-Gomez 2003[89,90] and 2006[91,92] did not formally assess the competencies of their LAs.

Intensity of intervention

Frequency/hours/duration

The interventions in Dickson-Gomez 2006[91,92] were opportunistic, and the frequency and duration of which were not specified. In Dickson-Gomez 2003[89,90] interventions were also opportunistic – the peer educators conducted a median of 20 contact forms (range 1–111).

Results from studies

Dickson-Gomez 2003[89,90] comprised both a qualitative and quantitative element (reported in two separate articles); the qualitative element is summarised here, whereas the quantitative element is reported below.

Outreach with adolescents: rapport or conflict Many adult outreach workers felt threatened in places where young people hung out and successful outreach with young people often happened in their homes rather than on the street. Despite this, the use of younger male outreach workers would potentially lead to more conflicts, as they would appear as a greater threat.

The line between respect and stigma Young drug dealers have more money and power than LAs. Attempts at outreach sometimes question this street hierarchy and may cause conflict. LAs take issue with the invasion of street culture (smoking marijuana and cocaine in public) in all public spaces where 'decent' codes were once dominant. Young people often have family members who are/were injecting drug users and feel stigmatised by that. Most LAs recognised that most young people did not inject drugs and would resent any implication that they were. Outreach methods were therefore focused on safer sex messages, which were also sometimes thought of as offensive because of the underlying assumption of promiscuity.

The business of selling drugs: the corner is hot In dealing drugs, young people discourage crowd gatherings as they attract the police. Outreach work is therefore sometimes seen as threatening to business. There were differences in reactions to male and female advisors, as male LAs are confronted to a struggle for recognition of masculine power, whereas women, particularly if older, may be seen as mother figures who are due some degree of respect.

Successful outreach: my children come first The most successful outreach workers were mothers who in the past had failed their parenting due to drug use and wanted to engage with young people.

Dickson-Gomez 2006[91,92] was a qualitative study and did not have results that could be categorised in the same way as those from quantitative studies. The results section focused on the challenges of conducting outreach in public or private drug use sites; the main challenge in public spaces was the drug users' fear of attracting the police. Access to private spaces depended on the

familiarity of the LAs with the space (whether using it themselves regularly), its gatekeeper and the presence, or not, of the ethnographer (which could arouse suspicion). The discussion focused on understanding how or why peer-led interventions work and contrasted traditional outreach with the HRLA model. Some LAs were older, well known and well respected within the drug use community, which enabled them to have a large impact on the HIV infection prevention practices. The strength of the personal ties that LAs had with other drug users was the most important asset in conducting the prevention work. Many LAs incorporated work into their daily routine and carried their backpacks filled with condoms, bleach kits and crack kits with them as they hung out on the streets or in parks. Because a lot of LAs were homeless they were spending a lot of time on the street, which enabled them to reach otherwise hard to reach subpopulations of drug users. Some LAs emphasised the importance of conducting outreach while people were using drugs, so that they could correct misuse of the prevention materials, demonstrate proper needle cleaning and tailor the intervention to the observed needs. LAs had more up-to-date information about drug-using sites and were less likely to be greeted with suspicion or hostility than traditional outreach workers. Some LAs allowed other drug users to use their homes and conducted HIV infection prevention there, which was seen as highly efficient.

Health status

In Dickson-Gomez 2006[91,92] many LAs reported positive experiences related to their own health and well-being, including their knowledge about risk and prevention.

Health behaviours

Dickson-Gomez 2003[89,90] report significant differences between intervention and control participants in overall drug use and unsafe practices: reduction in injection drug use (48% intervention vs 25% control, $p < 0.05$); increase in cessation (44% intervention vs 22% control, $p < 0.05$); and reductions in unhygienic needle use (69% intervention vs 30% control, $p < 0.10$). Some success in reducing risky sexual behaviour is also reported: reduction in unprotected vaginal sex with casual partners (16% intervention vs 4% control, $p < 0.05$); reduction in number of casual partners (18% intervention vs 7% control, $p = 0.05$). There were no changes observed in condom use with regular partners. Regression modelling suggested that the intervention condition was almost three times more likely to result in a reduction in injection drug use than the control condition (OR 2.8) and a significant reduction in the use of unhygienic needles ($\chi^2 = 3.57$, $p < 0.01$) at follow-up. The experimental condition was found to be more than seven times as likely to result in the increased use of condoms with casual partners. However, these results were based on a regression model that ignored any reported increases in risky behaviour (those reporting the same level or increased levels of risky behaviour were coded 0).

Dickson-Gomez 2006[91,92] presents a comparison of pre- and postintervention self-reported data on risk behaviours. The experimental condition was found to report a greater decrease of the number of casual sexual partners ($\chi^2 = 3.33$, $p = 0.05$), and in multiple logistic regression analysis the experimental condition was found to be more than seven times as likely to report increase use of condoms with casual partners.

In Dickson-Gomez 2006[91,92] the programme had a positive impact on many LAs who sought to reduce their drug consumption or stop all together ($p \leq 0.001$). Outreach work provided them with an alternative means of engaging with other drug-using community members. LAs also gained a greater sense of self in doing something useful for their community; many saw outreach work as a first step towards employment and a stable housing arrangement. LAs reported increased usage of condoms ($p = 0.000$), a reduction in the number of sex partners ($p \leq 0.001$), increases in cooking of drug solutions ($p = 0.007$), use of rubber tips among crack users ($p \leq 0.001$), and stopping sharing cookers/drug solutions ($p = 0.35$). A total of 21.3% of

LAs reported having entered a drug treatment programme in the 2 months prior to the closing interview.

Participation

In Dickson-Gomez 2003[89,90] participants' attitudes towards outreach were examined; given that the intervention put emphasis on social belonging, responsibility and participation, engagement in outreach activities can be taken as an approximate of social participation. At 6 months' follow-up, participants in the experimental condition were significantly more likely to report talking about HIV with family members ($\chi^2 = 6.42$, $p < 0.05$), sex partners ($\chi^2 = 6.7$, $p < 0.05$), non-drug users ($\chi^2 = 3.92$, $p < 0.05$), and drug users ($\chi^2 = 5.32$, $p < 0.05$). In Dickson-Gomez 2003[89,90] there were no statistically significant differences between the experimental and control groups in the outreach self-efficacy score [$t(219) = 1.10$, $p = 0.27$). In Dickson-Gomez 2006[91,92] many LAs reported in closing interviews that they had engaged in other activities – for example, independent community action, such as volunteering in homeless shelters or soup kitchens – and working with youth and pastors in their neighbourhood.

Health-care beliefs and knowledge

In Dickson-Gomez 2003,[89,90] 99% of experimental condition participants declared themselves proud to be LAs; 94% thought that they gained respect by doing outreach and were glad to show that they were doing something positive; and 95% and 94% of participants reported that their family and friends were supportive of their outreach respectively.

Health-care use

No study in this category assessed health-care use.

Costs

Although Dickson-Gomez 2003[89,90] and 2006[91,92] reported some of the costs incurred by the study (payment for training attendance, for example), neither of the two studies reported any costs for running an HIV infection prevention programme.[89–92]

Power calculations are not appropriate given the nature of the above two studies.

Discussion

The two qualitative studies[89–92] examined the nature of the role and practices of peer health advisors, as they promoted HIV infection prevention within their drug and sexual networks and in their neighbourhood.

Neither Dickson-Gomez 2003[89,90] nor Dickson-Gomez 2006[91,92] assessed general health or QoL, our review's primary outcomes. Dickson-Gomez 2003[89,90] reported significantly greater sex- and drug-related behavioural risk reduction; LAs were more likely to report talking about HIV to family members, sex partners and drug users at 6 months' follow-up. However, the effect of the outreach activity was measured on the LAs themselves and it remains unclear whether their outreach activities had any impact on their communities.

Dickson-Gomez 2006[91,92] found that the project had had a profound impact on many LAs. Beyond attempts to become free of drugs, many LAs were taking very seriously their role to promote harm reduction practices among active drug users. This was further reinforced by positive feedback and support from community members, which suggests a high degree of acceptability of the intervention. However, Dickson-Gomez 2006[91,92] highlighted the fact that LAs have many competing needs, such as finding housing, food, money and drugs, which sometimes, in the short term, have to take priority over outreach work. In the long term, funding LAs would be key to the success and sustainability of the scheme.

SECTION 2: INTERVENTIONS CONTEXT, MECHANISMS AND OUTCOMES

In this section of the report the synthesis activity is further developed to continue to explore the LA as a health improvement intervention. The review data are interrogated in a number of ways to explore and consider multiple dimensions. In order to build on the programme theory established in Phase I, this analysis began by positioning the dimensions in *Appendix 3* on to the context–mechanisms–outcome framework in order to tease out intervention components and characteristics.

Context

See *Box 6*.

BOX 6 Context

	Dimension	
Whole population within a specified locality	*Population focus*	Particular target groups or local communities
Bottom up, emergent	*Origins*	Top down, mandated
Community setting	*Context*	Health-care setting

Mechanisms

See *Box 7*.

BOX 7 Mechanisms

	Dimension	
Informal	*Level of formality*	Formal
Generic, focus on overall health and well-being	*Topic focus*	Targeted, focus on specific health topics or behaviours
Community outreach	*Referral*	Biomedical referral model
One-off contact	*Frequency*	Iterative, ongoing intervention
Peer or lay led	*Practitioner type*	Professionally driven
Unqualified, low/no skill	*Skill level*	Qualified, highly skilled
Unpaid volunteers	*Nature of role*	Paid employees
Part-time/sessional workers	*Hours*	Full-time advisors/trainers
Group or community work	*Mode of delivery*	One-to-one intervention
Community development and engagement	*Main activities*	Evidence-based lifestyle advice, goal-setting
Nurturing and supporting	*Approach*	Information-giving and signposting

Outcomes

See *Box 8*.

BOX 8 Outcomes

Dimension		
Enhanced capacity and social capital within communities	*Key outcomes*	Health behaviour change within individual clients

In this section, the previous grouping of included studies by intervention focus will be disaggregated to one that enables a rich description of intervention characteristics. In order to attempt to establish potential links between intervention characteristics and achievements, this section is prefaced with an assessment of intervention success (*Table 9*). It is worth noting here that, in a realist perspective, the aim of a synthesis is to refine a programme theory. Thus the hierarchy of evidence applied in the quality assessment process does not apply here. The assessment of intervention success stands not as an equivalent metric to the pooled estimate obtained in standard meta-analyses, but rather as a crude indicator of the extent to which the combination of intervention and contextual components has achieved its intended aim. This is

TABLE 9 Degree of success

Degree of success	Studies	Intervention focus
Low	Gary 2003[98–100]	Chronic care
	Griffiths 2005[101,102]	
	Kennedy 2007[104–107]	
	Lujan 2007[112]	
Medium	Dennis 2002[88]	Breastfeeding
	Morrow 1999[114,115]	
	Barlow 2000[83]	Chronic care
	Lorig 1999[110]	
	Young 2005[121–123]	
	Anand 2007[80]	Diet/physical activity
	Elder 2006[95,96]	
	Keyserling 2002[108,109]	
	Dickson-Gomez 2006[91,92]	HIV infection prevention
	Ireys 2001[103]	Mental health
	Paskett 2006[116,117]	Screening uptake
	Andersen 2000[42,81,82]	
	Emmons 2005[26,97]	Smoking cessation
	May 2006[113]	
	Woodruff 2002[120]	
High	Lorig 2003[111]	Chronic care
	Staten 2004[119]	Diet/physical activity
	Resnicow 2004[118]	
	Dickson-Gomez 2003[89,90]	HIV infection prevention
	Earp 2002[16,63,93,94]	Screening uptake
	Bird 1998[84–87]	
	West 1998[30]	Smoking cessation

thus a broad assessment, defined as the greatest impact for the least cost, but with a weighting for hard-to-reach communities. It was developed collaboratively by the research team. This was determined by developing a calculation based on six criteria:

1. whether they measured general health or QoL (as the focus of this review)
2. whether their primary outcome changed significantly
3. the effect size and relevant contextual information – as missing data prevented the generation of sizes for all studies, in some cases contextual information was used, for example a 0.3% reduction in HbA_{1c} level represents approximately a 3% drop in cardiovascular risks. Impact on health in hard-to-reach communities was also deemed of greater value than in communities with regular contact with health-care organisations.
4. health-related LA's training intensity
5. intervention intensity (see *Appendix 11*)
6. cost consideration.

The first three criteria stand as an approximation of the effectiveness of the intervention in improving health, the area of effect and the size of effect. The next three criteria delineate the costs of the intervention in terms of training resources and the time to train the advisors, the time required to deliver the intervention (and by implication the size of its impact on 'everyday' life of both the advisors and the recipients) and, finally, a crude calculation of the monetary costs of intervention (where this was reported). Full detail of the calculation process for intervention success is provided in *Appendix 12*.

All of the included studies with a low degree of success were focused on chronic care. Young 2005[121–123] are the only exception to this – what distinguishes the study is its lower intervention intensity and the fact that the study primary outcome (HbA_{1c} level) was significant, although the effect size (ES 0.25) was of limited relevance.

For screening, Paskett 2006[116,117] and Andersen 2000[42,81,82] owe their medium success rating to the fact that they conducted an intensive training (thus more costly)[116,117] and did not describe training intensity, compared with the Earp 2002[16,63,93,94] and Bird 1998[84–87] in which the training was of moderate intensity.[42,81,82] In Andersen 2000[42,81,82] the participants were also easily accessible.

For smoking cessation, West 1998[30] was attributed a higher success rating owing to its particularly low cost: peers and participants were fellow smokers supporting each other in their cessation efforts. Peers were not trained but, nevertheless, delivered a high-intensity intervention. In these circumstances, the minimal cost of any cessation renders the intervention highly successful. On the other hand, May 2006[113] which used the same intervention technique, could be classified as reaching only a medium degree of success because of the lack of significance in cessation rates, even after just 1 week.

Staten 2004[119] differed from the other diet/physical activity studies in that the peers had no training and delivered a medium-intensity intervention. Resnicow 2004[118] provided peers with a moderate training, but they delivered a low-intensity intervention, with a significant increase in fruit and vegetable consumption.

Dickson-Gomez 2003[89,90] was allocated a higher rating than Dickson-Gomez 2006[91,92] as a related quantitative study could be identified, which identified successful outcomes.

Context of intervention

See *Box 9*.

BOX 9 Context of intervention

Whole population within a specified locality	Population focus	Particular target groups or local communities
Bottom up, emergent	*Origins*	Top down, mandated
Community setting	*Context*	Health-care setting

By context we are referring to the elements surrounding the intervention that may have influenced its development or execution. Rychetnik *et al.*[71] define context as the 'social, political and /or organisational setting in which an intervention was evaluated'. Pawson and Tilley[204] describe context as social and cultural conditions in which mechanisms or interventions take place. In this framework, contextual issues should include policy directives, population characteristics (in terms of socioeconomic status for example), available evidence, models of health care and an understanding of local needs, for example. However, the series of continuums developed in the early phases of this review was developed as part of an endeavour to characterise HRLA interventions, thus few of the dimensions identified apply here. The following section, however, includes a description of the population focus and location of delivery in the included studies. The origins characteristic identified initially could not be applied to published evidence, as all included studies were developed by the authors.

Population focus

See *Box 10*.

BOX 10 Population focus

Whole population within a specified locality	*Population focus*	Particular target groups or local communities

A detailed analysis of the included studies revealed that this continuum may be simplistic, as the study groups included could be characterised in multiple ways. By logistical necessity, all studies were within defined geographical areas, but all targeted specific groups. The necessity emerged, then, to develop a more detailed categorisation, in eight characteristics that could be used simultaneously:

1. people with a shared belief or cultural background
2. people living in a restricted geographical area
3. people with a shared illness experience
4. people at a similar stage of life
5. people engaging in risky behaviours
6. people seeking to engage with services
7. people with similar economic status
8. homeless people.

The data presentation format (*Table 10*) was selected to allow highlighting of the challenging issue of multiple community definition and allegiances manifested in this review. This emphasises what can sometimes be called a hidden complexity in the aim of recruiting LAs from the 'relevant' community.

In Dickson-Gomez 2003,[89,90] contextual issues had a major impact on intervention development and success. The study took place in Baltimore, MD, USA, where nearly 30% of African-Americans live below the poverty line, and where drug dealing is the 'biggest equal opportunities employer for bright, ambitious inner-city youth' (p. 310). In this context, adolescents often have to manage their product and their finances, as well as keeping an eye on the police or others who could threaten the smooth-running of the business. Outreach could be one such thing.

In Dickson-Gomez 2006,[91,92] 50% of the LAs considered themselves homeless. This had a great impact on their ability to reach other drug users at times and in places where they would not otherwise be reached.

Targeting people with a shared belief or cultural background, people engaging in risky behaviours or people seeking to engage with services seems to lead to increased chances of achieving

TABLE 10 Population focus

Study	Intervention focus	IS[a]	1	2	3	4	5	6	7	8
Dennis 2002[88]	Breastfeeding	M		✓		✓				
Morrow 1999[114,115]		M		✓		✓				
Barlow 2000[83]	Chronic care	M		✓	✓					
Gary 2003[98–100]		L	✓		✓				✓	
Griffiths 2005[101,102]		L	✓	✓	✓				✓[b]	
Kennedy 2007[104–107]		L			✓					
Lorig 1999[110]		M			✓	✓				
Lorig 2003[111]		H	✓		✓					
Lujan 2007[112]		L	✓	✓	✓	✓			✓	
Young 2005[121–123]		M		✓	✓				✓[b]	
Anand 2007[80]	Diet and physical activity	M	✓	✓					✓[b]	
Elder 2006[95,96]		M	✓						✓	
Keyserling 2002[108,109]		M	✓		✓	✓				
Resnicow 2004[118]		H	✓	✓						
Staten 2004[119]		H	✓	✓		✓			✓	
Dickson-Gomez 2003[89,90]	HIV infection prevention	H	✓				✓		✓	
Dickson-Gomez 2006[91,92]		M					✓		✓	✓
Ireys 2001[103]	Mental health	M			✓					
Andersen 2000[42,81,82]	Screening uptake	M				✓				
Bird 1998[84–87]		H	✓							
Earp 2002[16,63,93,94]		H	✓	✓		✓			✓	
Paskett 2006[116,117]		M				✓			✓	
Emmons 2005[26,97]	Smoking cessation	M			✓		✓			
May 2006[113]		M					✓	✓		
West 1998[30]		H					✓	✓	✓[b]	
Woodruff 2002[120]		M	✓	✓			✓	✓	✓[b]	

a Intervention success: H, high; M, medium; L, low.
b Study populations described as of low economic status; the assumption is made that the study sample was equally deprived.

intervention success. On the other hand, targeting people with a shared illness experience or at a similar stage of life does not seem to, in itself, lead to successful interventions. Determining people's participation by their place of living or by their socioeconomic status does not seem to bear any impact on intervention success.

Location of intervention delivery

See *Box 11*.

BOX 11 Location of intervention delivery

Community setting	*Context*	Health-care setting

Few of the included interventions took place in a health-care setting, and quite a number of them were taking place in participants' home (*Table 11*). This meant that, again, a two-dimensional continuum could not describe the breadth of interventions. Location of delivery may be an indicator of important contextual characteristics of level of formality, attendance and access issues. Location may also be determined by the fact that a LA is delivering the service and the location opportunities this provides in comparison with a standard care provider.

Griffiths 2005[101,102] is the only study that described an intervention that took place in both general practices and community centres. Keyserling 2002[108,109] describes an intervention that was both based in a clinic and made home telephone calls. Ireys 2001[103] and Bird 1998[84–87] describe an intervention that takes place in the home and which also involved organised activities in the community. Staten 2004[119] described an intervention in the home and clinic, with the organisation of group walks in the local area, and Resnicow 2004[118] describes an intervention that took place both in the home and in African-American churches. It has to be noted that although Keyserling 2002,[108,109] Lujan 2007[112] and Griffiths 2005[101,102] conducted the intervention in a primary care clinic, this was with people with a chronic condition who were probably well used to being in health-care settings.

In Dickson-Gomez 2003[89,90] while most outreach activities took place in the community, the LAs (for whom the intervention was deemed to lead to risk reduction behaviour) were trained in small groups in an unspecified location. Sometimes, the community was not the most conducive location, as outreach on the street was following the same patterns as other street interactions and could become a struggle for power or be seen as an infringement on adolescents' hard-won territory. Conversely, in the home, the street code becomes less important than family relationships.

In Dickson-Gomez 2006[91,92] location was quite crucial, as the authors highlight that different types of outreach could be conducted in different locations. For example, conducting outreach where drug users were getting high enabled them to correct risky practices, and it would be difficult to demonstrate appropriate needle cleaning on the streets. Because LAs were active drug users, they had the most up-to-date knowledge about the sites most used, as public drug use sites frequently changed location.

In Dickson-Gomez 2006[91,92] 50% of the LAs considered themselves homeless. This had a great impact on their ability to reach other drug users at times and in places where they would not otherwise be reached.

TABLE 11 Intervention location

Location	Studies	Intervention focus	IS[a]
Home (visits/telephone/both)	Dennis 2002[88]	Breastfeeding	M
	Morrow 1999[114,115]		M
	Gary 2003[98–100]	Chronic care	L
	Young 2005[121–123]		M
	Anand 2007[80]	Diet/physical activity	M
	Elder 2006[95,96]		M
	Keyserling 2002[108,109]		M
	Resnicow 2004[118]		H
	Staten 2004[119]		H
	Ireys 2001[103]	Mental health	M
	Andersen 2000[42,81,82]	Screening uptake	M
	Bird 1998[84–87]		H
	Paskett 2006[116,117]		M
	Emmons 2005[26,97]	Smoking cessation	M
	West 1998[30]		H
	May 2006[113]		M
	Woodruff 2002[120]		M
Health-care setting	Griffiths 2005[101,102]	Chronic care	L
	Lujan 2007[112]		L
	Keyserling 2002[108,109]	Diet/physical activity	M
Community	Barlow 2000[83]	Chronic care	M
	Griffiths 2005[101,102]		L
	Kennedy 2007[104–107]		L
	Lorig 1999[110]		M
	Lorig 2003[111]		H
	Resnicow 2004[118]	Diet/physical activity	H
	Staten 2004[119]		H
	Dickson-Gomez 2003[89,90]	HIV infection prevention	H
	Dickson-Gomez 2006[91,92]		M
	Ireys 2001[103]	Mental health	M
	Andersen 2000[42,81,82]	Screening uptake	M
	Bird 1998[84–87]		H
	Earp 2002[16,63,93,94]		H

a Intervention success: H, high; M, medium; L, low.

Andersen 2000[42,81,82] described two intervention arms, one consisting of telephone counselling and the other one of an array of CAs. Although they compared the effectiveness of either approach or a combination of both, it seems that intervention effectiveness was linked more to the amount of time volunteers spent implementing the intervention than to the intervention setting per se.

Interventions that took place in the community tended to be more successful than those taking place in health-care settings.

Mechanism

See *Box 12*.

BOX 12 Mechanism

	Dimension	
Community outreach	*Referral*	Biomedical referral model
Part-time/sessional workers	*Hours*	Full-time advisors/trainers

Exploration of the mechanism aspect of the HRLA interventions is with the intent of enabling the surfacing of the detail of the intervention. In this section, studies are grouped according to the components of the interventions described and the characteristics of the LAs delivering the interventions, in order to facilitate an understanding of which components of the HRLA interventions contribute to, or hinder, an interventions' effectiveness and acceptability. Components considered are the interventions' aim, theoretical underpinning, approach, the practitioners' type, level of training, the nature of their role, and the intervention intensity. The dimensions of referral route and hours of work, while important in practice, were not reflected in the studies included, as participants were invited to take part in a study (rather than referred to a service), and LAs were recruited to undertake the study, rather than being employed.

Intervention aim

See *Box 13*.

BOX 13 Intervention aim

Generic, focus on overall health and well-being	*Topic focus*	*Targeted*, focus on specific health topics or behaviours

All of the interventions described were targeted to particular topic areas (*Table 12*). It thus became quickly evident that a classification of 'generic versus targeted' would not do justice to the breadth of interventions described, and the reviewers decided to place intervention activities on a continuum of health improvement, targeting groups of people considered at risk, well or with a diagnosed chronic condition.

Of note is the fact that no intervention tackled health maintenance, in any population. That is to say, studies on chronic conditions, for example, focused on the management of the chronic condition or on health issues directly related to it, rather than on other aspects of people's health. An exception to this, however, is Kennedy 2007[104–107] who examined exercise and diet. Similarly, for people identified at risk of a particular issue, interventions focused on preventing this from happening, rather than encouraging them to be otherwise healthy or to take up screening (e.g. in Anand 2007[80] participants had an average BMI of 34.8 at the onset of the study).

It is of note that with the exception of Gary 2003[98–100] and Keyserling 2002[108,109] (although other issues such as social issues or smoking cessation, are said to be addressed, no outcomes have been measured for these) all of the studies targeting people with a shared illness experience focused on that illness in their intervention. This is also true of studies that targeted people engaging in risky

TABLE 12 Intervention aim

Intervention activity	Population	Studies	Intervention focus	IS[a]
Health promotion	At risk	Anand 2007[80]	Diet/physical activity	M
	Chronic condition	Keyserling 2002[108,109]	Diet/physical activity	M
	Well	Dennis 2002[88]	Breastfeeding	M
		Morrow 1999[114,115]		M
		Elder 2006[95,96]	Diet/physical activity	M
		Resnicow 2004[118]		H
		Staten 2004[119]		H
		Ireys 2001[103]	Mental health	M
Disease prevention	At risk	Dickson-Gomez 2003[89,90]	HIV infection prevention	H
		Dickson-Gomez 2006[91,92]		M
		Emmons 2005[26,97]	Smoking cessation	M
		May 2006[113]		M
		West 1998[30]		H
		Woodruff 2002[120]		M
	Chronic condition	Barlow 2000[83]	Chronic care	M
		Gary 2003[98–100]		L
		Griffiths 2005[101,102]		L
		Kennedy 2007[104–107]		L
		Lorig 1999[110]		M
		Lorig 2003[111]		H
		Lujan 2007[112]		L
		Young 2005[121–123]		M
Screening participation	Well	Andersen 2000[42,81,82]	Screening uptake	M
		Bird 1998[84–87]		H
		Earp 2002[16,63,93,94]		H
		Paskett 2006[16,117]		M

a Intervention success: H, high; M, medium; L, low.

behaviours: they all focused on these behaviours, rather than, for example, on diet and physical activity. The reverse is also true: studies that focused on diet/physical activity, breastfeeding or screening uptake did not identify engagement in risky behaviours (i.e. smoking).

Interventions that engaged in health promotion (regardless of the health status of participants) and screening participation tended to lead to successful outcomes. Interventions that aimed at disease prevention tended to be more successful when they targeted people at risk of disease (rather than people already diagnosed).

Theoretical underpinnings

Although not described in the original series of continuums, most studies described some theoretical underpinning. It was thus thought important to describe these (*Table 13*). The theoretical bases of studies were collated and grouped in three broad categories: those aiming at individual behaviour change, those building on social learning or influence, and those with an emphasis on communication or learning strategies.

Although Lorig 2003[111] do not mention the theoretical basis of the intervention, it is based on the same theory as their previous study,[110] so it seems reasonable to assume that it borrowed from

TABLE 13 Theoretical underpinnings

Aim	Theoretical underpinning	Studies	IS[a]	Intervention focus
Behaviour change	Stages of Change Model	Elder 2006[95,96]	M	Diet/physical activity
	Transtheoretical model of change	Keyserling 2002[108,109]	M	Diet/physical activity
		Paskett 2006[116,117]	M	Screening uptake
		Emmons 2005[26,97]	M	Smoking cessation
	Motivational interviewing	Resnicow 2004[118]	H	Diet/physical activity
		Emmons 2005[26,97]	M	Smoking cessation
		Young 2005[121–123]	M	Chronic care
	Behaviour modification principles	Keyserling 2002[108,109]	M	Diet/physical activity
		Gary 2003[98–100]	L	Chronic care
	Cognitive and affective process strategies from theories of behaviour change	Dickson-Gomez 2003[89,90]	H	HIV infection prevention
	Behavioural change theory	Earp 2002[16,63,93,94]	H	Screening uptake
	The communication behaviour change model	Paskett 2006[116,117]	M	Screening uptake
	Theoretical model of self-efficacy	Griffiths 2005[101,102]	L	Chronic care
		Lorig 1999[110]	M	Chronic care
	Self-efficacy theory	Barlow 2000[83]	M	Chronic care
Social learning/social influence	Social learning theory	Anand 2007[80]	M	Diet/physical activity
		Paskett 2006[116,117]	M	Screening uptake
		Kennedy 2007[104–107]	L	Chronic care
	Social Cognitive Theory/principles	Keyserling 2002[108,109]	M	Diet/physical activity
		Emmons 2005[26,97]	M	Smoking cessation
		Woodruff 2002[120]	M	Smoking cessation
	Theories of social influence, social diffusion and social identity	Dickson-Gomez 2003[89,90]	H	HIV Prevention
	Normative influence	Anand 2007[80]	M	Diet/physical activity
	Network diffusion model and Dynamic Social Impact Theory	Dickson-Gomez 2006[91,92]	M	HIV infection prevention
	Social–Ecological Model	Resnicow 2004[118]	H	Diet/physical activity
		Earp 2002[16,63,93,94]	H	Screening uptake
		Emmons 2005[26,97]	M	Smoking cessation
	Social support	Gary 2003[98–100]	L	Chronic care
	Middle range theory of community empowerment	Lujan 2007[112]	L	Chronic care
Communication/learning principles	Active learning discovery approach	Keyserling 2002[108,109]	M	Diet/physical activity
	Adult learning principles	Keyserling 2002[109,110]	M	Diet/physical activity
		Gary 2003[98–100]	L	Chronic care
	Theories of persuasion	Anand 2007[80]	M	Diet/physical activity
	Minority Health Communication Model	Paskett 2006[116,117]	M	Screening uptake
	Theories of decision-making	Andersen 2000[42,81,82]	M	Screening uptake

a Intervention success: H, high; M, medium; L, low.

self-efficacy models. Although Ireys 2001[103] do not reference supportive theory, they based the intervention on previous studies that stated the importance of social networks for well-being.

Elder 2006[95,96] is the only study that reported relying on behaviour change theories only. The evidence suggests[202,205] that this may not lead to the most successful outcomes, and most other studies used behaviour change in conjunction with other models. Perhaps interestingly, the three studies that reported using self-efficacy theory[83,101,102,110] focused on chronic care. Kennedy 2007[104–107] and Resnicow *et al.*[118] measured self-efficacy as an outcome, but did not report using this model. Most of the studies included in this review based their intervention on theoretical bases that capitalise on social networks and influences.

Interventions involving theoretical underpinning seemed to have no bearing on intervention success status.

Intervention approach

See *Box 14*.

BOX 14 Intervention approach

Community development and engagement	*Main activities*	Evidence-based lifestyle advice, goal-setting
Nurturing and supporting	*Approach*	Information-giving and signposting

None of the studies included in this review reported on community development or engagement activities (although some describe efforts to engage participants, this was seen as a mean to participation in the study rather than an outcome to be assessed). The approaches adopted were more complex and often multicomponent, rendering the second continuum insufficient to describe the interventions included. The following distinctions were used to describe intervention approaches (*Table 14*): (1) delivery of a standardised message; (2) nurture population groups into behaviour change in line with those messages; (3) create a social context within which change is more likely to happen; and (4) remove barriers to access services or change behaviour.

Dickson-Gomez 2003[89,90] described a unique approach, in that the lifestyle advice activity was deemed to impact on the LAs themselves (impact on the community not measured), as the activity sought to capitalise on African-American drug user's strong sense of community identity, and to increase the participants' sense of self-identity as community members who could improve the health and well-being of family and friends. The LAs in Dickson-Gomez 2003[89,90] were often perceived as visible signs of failure by the youth encountered on the street, particularly if the advice was given in a moralising tone.

Dickson-Gomez 2006[91,92] describe on the surface a very straightforward distribution of prevention materials and slogans, but because they achieved very good penetration of an otherwise hard-to-reach population group, it would be insufficient to describe the intervention as information-giving. Because many LAs were living on the streets, they were available to drug users in a way that no other outreach worker could be. Some of the LAs who had a home, and were making it available to drug-using members of their close network, were in a privileged position to nurture these drug users to use harm reduction strategies. They described drug users knocking on their door in the middle of the night to ask for prevention material as they became known for their prevention work.

TABLE 14 Intervention approach

Studies	Intervention focus	IS[a]	Message delivery	Nurturing for behaviour change	Creation of supportive social conditions	Barrier removal
Earp 2002[16,63,93,94]	Screening uptake	H	✓			✓
Bird 1998[84–87]		H	✓			
Andersen 2000[42,81,82]		M	✓			✓
Paskett 2006[116,117]		M	✓			✓
Gary 2003[98–100]	Chronic care	L	✓	✓		✓
Young 2005[121–123]		M	✓	✓		
Barlow 2000[83]		M	✓			
Griffiths 2005[101,102]		L	✓			
Kennedy 2007[104–107]		L		✓	✓	
Lorig 1999[110]		M	✓	✓	✓	
Lorig 2003[111]		H			✓	
Lujan 2007[112]		L		✓	✓	
Woodruff 2002[120]	Smoking cessation	M	✓			
West 1998[30]		H			✓	
May 2006[113]		M			✓	
Emmons 2005[26,97]		M	✓			✓
Anand 2007[80]	Diet/physical activity	M	✓	✓		✓
Elder 2006[95,96]		M		✓		
Keyserling 2002[108,109]		M	✓			
Resnicow 2004[118]		H	✓			
Staten 2004[119]		H	✓		✓	
Dennis 2002[88]	Breastfeeding	M		✓		
Morrow 1999[114,115]		M	✓			
Ireys 2001[103]	Mental health	M			✓	
Dickson-Gomez 2003[89,90]	HIV infection prevention	H	✓		✓	
Dickson-Gomez 2006[91,92]		M	✓		✓	✓

a Intervention success: H, high; M, medium; L, low.

Interventions that used a strategy of nurturing to facilitate behaviour change tended to be less successful than others; this is true too of interventions that used multipronged approaches (interventions using three of the strategies listed).

Intervention delivery mode

See *Box 15*.

BOX 15 Intervention delivery mode

Informal	Level of formality	Formal
Group or community work	*Mode of delivery*	One-to-one intervention

These two continuums were combined in one bidimensional figure (*Figure 5*), with the intention of mapping out the breadth of intervention delivery modes and, potentially, identifying gaps.

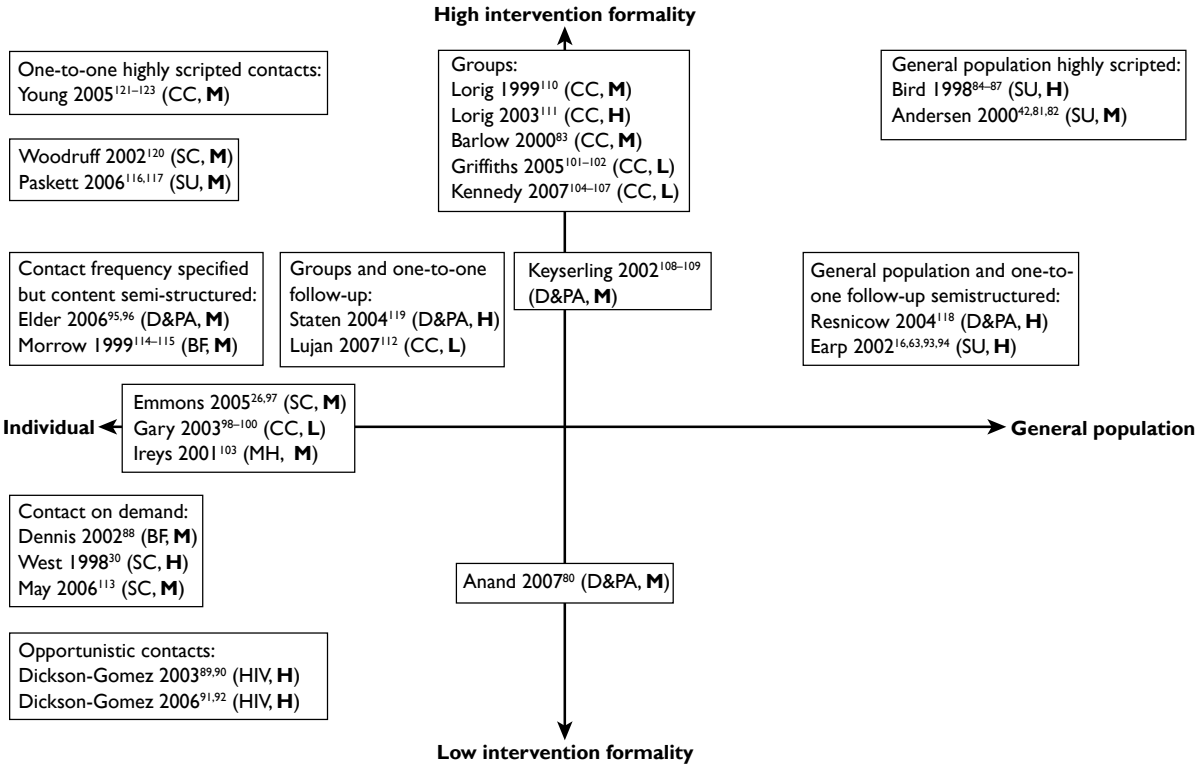

FIGURE 5 Intervention formality. BF, breastfeeding; CC, chronic conditions; HIV, HIV intervention; MH, mental health; D&PA, diet and physical activity; SC, smoking cessation; SU, screening uptake. Intervention success: H, high; M, medium; L, low.

Figure 5 situates included studies according to whether they targeted individuals, groups or the general population, and according to the degree of formality of the intervention. Degree of formality was assessed by taking into account the degree of intervention standardisation of both the number and content of contacts with study participants.

Most interventions are situated in the upper half of the chart, indicating greater intervention formality, and towards the left-hand side, indicating a preference for individually targeted interventions. Interventions targeted at people with chronic conditions most often targeted groups, as per the Lorig 1999[110] model. Anand 2007[80] is the only intervention targeting families and allowing LHAs to tailor frequency and content of contact. Dickson-Gomez 2003,[89,90] and 2006[91,92] are the only interventions describing opportunistic meetings with drug users, at times and places most suited to them. The review does not include any informal intervention targeted at wider population groups. Interventions that were either highly formalised and targeting the general population or informal but targeting the individual tended to be more successful.

Role/training

Practitioner type

See *Box 16*.

BOX 16 Role/training

Peer or lay led	*Practitioner type*	Professionally driven

None of the studies included described a professionally driven intervention. Equally, none distinguished between peer and lay roles. *Table 15* describes three kinds of peer roles: peer with common personal experience; peer with a shared community; peer with both a common experience and community; and not a peer.

It is of note that studies that tended to use peers with a common cultural/socioeconomic background were more often conducting general health promotion activities (*Table 15*). The detail of peership is unclear in Gary 2003[98–100] as although the LA is described as 'local'; the details of this locality (geographical or cultural) or their gender (75% of the participants were female) or life experience with regards to diabetes are not given.

In Dickson-Gomez 2003[89,90] LAs were older, previous or current drug-using African-Americans, targeting younger people often involved in selling drugs. The study highlights how intervention by men could lead to a struggle for respect, whereas there was more chance of a successful outreach encounter when the LA was more mature woman who could be perceived as a mother figure.

TABLE 15 Practitioner type

Practitioner type	Studies	Intervention focus	Details of 'peership'	IS[a]
Peer with common personal experience	Dennis 2002[88]	Breastfeeding	Multiparous volunteers with at least a 6 months' positive experience of breastfeeding	M
	Kennedy 2007[104–107]	Chronic care	People with chronic conditions	L
	Lorig 2003[14]			H
	Lorig 1999[110]			M
	Barlow 2000[83]			M
	Ireys 2001[103]	Mental health	Mothers with children with the same chronic conditions	M
	Emmons 2005[26,97]	Smoking cessation	Smoking survivors of childhood cancer	M
	May 2006[113]		Smoking buddies	M
	West 1998[30]		Smoking buddies	H
Peer with a shared community	Morrow 1999[114,115]	Breastfeeding	Resident of San Pedro Mártir, Mexico	M
	Lujan 2007[112]	Chronic care	Mexican-Americans	L
	Anand 2007[80]	Diet/physical activity	Aboriginal origin	M
	Elder 2006[95,96]		Spanish-Latinas	M
	Resnicow 2004[118]		African-American churchgoers	H
	Staten 2004[119]		Hispanic women	H
	Dickson-Gomez 2003[89,90]	HIV infection prevention	African-American people living in Baltimore, MD	H
	Andersen 2000[42,81,82]	Screening uptake	Women between 50 and 80 years old from 40 communities in Washington state	M
	Bird 1998[84–87]		Vietnamese-speaking women	H
	Earp 2002[16,63,93,94]		African-American women in five counties of NC	H
	Paskett 2006[116,117]		Native American and African-American women	M
	Woodruff 2002[120]	Smoking cessation	Latino paraprofessional community members	M
Peer with both a common experience and community	Dickson-Gomez 2006[91,92]	HIV infection prevention	Drug using experiences in the intervention area	M
	Griffiths 2005[101,102]	Chronic care	Bangladeshi people with chronic diseases	L
	Keyserling 2002[108,109]	Diet/ physical activity	African-American women with type 2 diabetes	M
Not a peer	Gary 2003[98–100]	Chronic care	A local high school graduate	L
	Young 2005[121–123]		Call centre operatives	M

a Intervention success: H, high; M, medium; L, low.

In Earp 2002[16,63,93,94] women who were interviewed about their experiences of interactions with LAs indicated that 'the LAs own mammography behaviour did not influence whether they listened to the LAs' advice or decided to get mammograms', perhaps questioning the need for health-related LAs to have common personal experience. In Earp 2002,[16,63,93,94] however, those who had received counselling from LAs did assign credibility to the LAs for having had personal or professional experience of breast cancer.

Although in Resnicow 2004[118] efforts were made to recruit LAs with a college degree or graduate-level education, and a background in a helping profession, they were classified as peers with a shared community as, in common with the study participants, they were African-American churchgoers. Where possible, advisors in Ireys 2001[103] were also in close geographical proximity to the participants.

Interventions using peers with a shared community tended to be the most successful.

Level of training

See *Box 17*.

BOX 17 Level of training

Unqualified, low/no skill	Skill level	Qualified, highly skilled
Unpaid volunteers	*Nature of role*	Paid employees

LAs' qualification status prior to the study was not always described, and most LAs were paid a fee for their participation in the study, but this could not be described as a salary. However, some level of training was most often described and is categorised in *Table 16*:

- *No training*
- *Moderate technical (health-related) training* If training was < 10 hours overall, or if the training was purely related to intervention delivery or communication skills (as opposed to more in-depth knowledge about health or disease)
- *Intensive training* If it was 10 hours or more, and focused on technical health/disease related issues
- *Not described*
- *Professionally trained* If the health advisor had had previous professional training (as a nurse for example) or if they had a minimum of 1 year's practice experience in a field directly relevant to the intervention.

The level of LA training was only partly related to their experience, as both people who were not peers[116,117,121–123] and people who both had a personal experience and a cultural/socioeconomic background in common with study participants[91,92,108,109,114,115] received intensive training before the start of the intervention. This is true too of their professional background, as, although the LAs were provided with a moderate technical training, they had previously been professionally trained in Resnicow 2004.[118] Of note is Paskett 2006[116,117] in which some LAs were professionally qualified (as a nurse and social worker), but nevertheless received intensive training in order to enable them to increase awareness of the importance of mammogram screening and increase the uptake of it.

TABLE 16 Level of practitioner training

Intensity of training	Studies	Intervention focus	IS[a]	Training focus
Intensive technical training	Morrow 1999[114,115]	Breastfeeding	M	Breastfeeding technique and promotion
	Lujan 2007[112]	Chronic care	L	Diabetes self-management
	Young 2005[121–123]		M	Diabetes and motivational interviewing
	Griffiths 2005[101,102]		L	Expert Patients Programme standard training procedure
	Lorig 1999[110]		M	Focus of the training is not described
	Lorig 2003[111]		H	Training in the use of the protocol and practice teaching sessions
	Kennedy 2007[104–107]		L	Includes a large amount of observed delivery of sessions, after which feedback is given
	Barlow 2000[83]		M	Very little detail given[b]
	Keyserling 2002[108,109]	Diet/physical activity	M	Diet and physical activity in diabetes management, general diabetes care, diabetes resources, listening skills, skills in stress management, goal-setting and problem-solving
	Dickson-Gomez 2003[89,90]	HIV infection prevention	H	Sexual and drug risk reduction
	Dickson-Gomez 2006[91,92]		M	Harm reduction and health advocacy
	Ireys 2001[103]	Mental health	M	Enhancing skills in listening, reflecting and 'story swapping'
	Paskett 2006[116,117]	Screening uptake	M	Breast cancer development and screening
	Woodruff 2002[120]	Smoking cessation	M	Didactic methods, motivational interviewing
Moderate technical training	Dennis 2002[88]	Breastfeeding	M	Breastfeeding, communication skills
	Anand 2007[80]	Diet/physical activity	M	Assessment and setting of dietary and physical activity goals
	Resnicow 2004[118]		H	Motivational interviewing techniques
	Earp 2002[16,63,93,94]	Screening uptake	H	Brest cancer screening
No training	Staten 2004[119]	Diet/physical activity	H	No training
	May 2006[113]	Smoking cessation	M	No training
	West 1998[30]		H	No training
Training not described	Gary 2003[98–100]	Chronic care	L	Not described
	Elder 2006[95,96]	Diet/physical activity	M	Insufficient details given
	Andersen 2000[42,81,82]	Screening uptake	M	Not described
	Bird 1998[84–87]	Screening uptake	H	Not described
	Emmons 2005[26,97]	Smoking cessation	M	Not described

a Intervention success: H, high; M, medium; L, low.
b Although Barlow *et al.*[83] provided very little detail about the training format, but they mention that training was provided by Arthritis Care and they work on the model developed by Lorig and Holman,[127] so the assumption was made on training intensity.

May 2006,[113] Staten 2004[119] and West 1998[30] are the only studies in which LAs received no training, as they were 'buddies' in a smoking cessation intervention, and attempting to stop smoking themselves in May 2006[113] and West 1998,[30] and women previously trained as CHWs in Staten 2004.[119] The training in Elder 2006[95,96] is different from most of the other studies, as the sessions were based on informal discussions between those training to become *promotores*.

Interventions that used moderate or no technical training tended to be the most successful.

Intensity of intervention

See *Box 18*.

BOX 18

One-off contact	*Frequency*	Iterative, ongoing intervention

A review of the interventions described quickly revealed that frequency was only one dimension of intervention intensity. What is meant here by intervention intensity is the amount of intervention exposure received by participants (*Table 17*). It has been calculated taking into account the population level targeted (general population, small groups of people, family,

TABLE 17 Intervention intensity

Intensity of intervention	Studies	Intervention focus	Details	IS[a]
High intensity	Barlow 2000[83]	Chronic care	Six 2-hour sessions held weekly	M
	Griffiths 1998[101,102]		Six weekly 3-hour sessions	L
	Kennedy 2002[104–107]		Six 2.5-hour group sessions held weekly	L
	Lorig 1999[110]		Seven 2.5-hour group sessions held weekly	M
	Lorig 2003[111]		Six 2.5-hour group sessions held weekly	H
	Lujan 2007[112]		Eight weekly group sessions; telephone conversation and postcards biweekly for 16 weeks	L
Medium intensity	[b]Morrow 1999[114,115]	Breastfeeding	Three or six sessions	M
	[c]Anand 2007[80]	Diet/physical activity	Regular home visits	M
	[b]Elder 2006[95,96]		Fourteen home visits/telephone calls and 12 newsletters	M
	[b]Staten 2004[119]		Provider counselling, monthly newsletter, two health education sessions, two weekly telephone calls	H
	Dickson-Gomez 2003[89,90]	HIV infection prevention	Intervention was the training of LAs	H
	Ireys 2001[103]	Mental health	Seven visits of 60–90 minutes, telephone calls, three special events over a 15-month period	M
	Woodruff 2002[120]	Smoking cessation	Four home visits, 1–2 hours long, three telephone calls 15–30 minutes long, over 78 days	M
Low intensity	Dennis 2002[88]	Breastfeeding	Five or more telephone calls over 3 months	M
	Gary 2003[98–100]	Chronic care	Sixty-two per cent of participants received at least three visits over the 2 years	L
	Young 2005[121–123]		Four to 12 20-minute telephone calls over 12 months	M
	Keyserling 2002[108,109]	Diet/physical activity	On average, 9.7 calls per participant	M
	[d]Resnicow 2004[118]		Not all participants got intervention exposure	H
	Andersen 2000[42,81,82]	Screening uptake	One telephone call/3 years and/or CA	M
	[d]Bird 1998[84–87]		Not all participants got intervention exposure	H
	[d]Earp 2002[16,63,93,94]		Not all participants got intervention exposure	H
	Paskett 2006[116,117]		Regular home visits and follow-up telephone calls	M
	[b]Emmons 2005[26,97]	Smoking cessation	Up to six telephone calls over a period of 7 months	M
	[b]May 2006[113]		In the first week, 2.7 telephone calls. This dropped to 1.2, 1.1 and 0.7 in the following weeks	M
	[b]West 1998[30]		On average, 3.5 times over the 4-weeks study	H

a Intervention success: H, high; M, medium; L, low.
b Studies for which contact duration was not stated and was estimated at 20 minutes/telephone call and 30 minutes/home visit.
c Study in which neither the number nor the duration of contacts was reported; it was classified as 'medium intensity'.
d Studies in which the general population was targeted, and in which not all participants were exposed to the intervention – they were therefore classified as 'low intensity'.

individual); the nature of the contacts with the LA (group sessions, telephone calls, face to face); supporting intervention components (leaflets, newsletters, provision of NRT, referral to other professionals, etc.); and the average number of sessions, average duration of sessions and the overall duration of the intervention. An intensity score was developed from this (see *Appendix 11*). Scores < 15 are considered as a low intervention intensity; 16–69, medium intervention intensity; and > 70, high intervention intensity.

Six studies reported on a high level of intervention intensity; all of them targeted people with chronic conditions. They used a variety of LA training intensity and all LAs were peers.

Seven studies reported on medium-level intervention intensity, even if for four of these the rating had to be based on estimates. They used a variety of training intensity, but they all involved LAs with a shared community, except Ireys 2001[103] who used LAs with a shared experience, who were also geographically close to participants where possible.

Twelve studies reported on low-level intervention intensity. Of note is that all of the screening uptake studies belong to that category. Dennis 2002[88] found a lack of association between frequency of LA contact and infant feeding practices. It was not possible to assess intervention intensity in Dickson-Gomez 2006.[91,92]

Interventions of a high intensity tended to be the least successful, and those of a moderate intensity tended to be the most successful.

Outcomes

See *Box 19*.

BOX 19 Outcomes

Enhanced capacity and social capital within communities	*Key outcomes*	Health behaviour change within individual clients

None of the studies included measured enhanced capacity or social capital. However, few measured individual behaviour change, and most assessed some measure of health status, sometimes as an indicator of behaviour change. *Tables 18–20* report on the outcomes measured in the included studies, grouped in measures of health status, behaviour change and change in beliefs and attitudes.

Health status (body function)

Chronic care interventions measured the majority of health status outcomes. No such outcomes were measured for interventions targeting breastfeeding, smoking cessation, HIV infection prevention or screening.

Health behaviours (activity)

Because most interventions included had a single intervention focus, their outcome measurement related to the behaviour change required to tackle that focus.

TABLE 18 Measurement of health status

Measure	Studies	Intervention focus
General health	Barlow 2000[83]	Chronic care
	Kennedy 2007[104–107]	
	Lorig 1999[110]	
QoL (measured by EQ-5D)	Griffiths 2005[101,102]	Chronic care
	Kennedy 2007[104–107]	
Psychological well-being (included anxiety and depression, positive and negative affect)	Barlow 2000[83]	Chronic care
	Griffiths 2005[101,102]	
	Kennedy 2007[104–107]	
	Lorig 1999[110]	
	Keyserling 2002[108,109]	Diet/physical activity
	Ireys 2001[103]	Mental health
Physiological measures (HbA_{1c}, cholesterol, blood pressure)	Gary 2003[98–100]	Chronic care
	Lujan 2007[112]	
	Young 2005[121–123]	
	Keyserling 2002[108,109]	Diet/physical activity
	Staten 2004[119]	
Pain	Barlow 2000[83]	Chronic care
	[a]Griffiths 2005[101,102]	
	Kennedy 2007[104–107]	
	Lorig 1999[110]	
	Lorig 2003[111]	
Fatigue	Barlow 2000[83]	Chronic care
	Griffiths 2005[101,102]	
	Kennedy 2007[104–107]	
	Lorig 2003[111]	
	Lorig 1999[110]	
Weight/BMI/waist circumference, skinfold thickness, body fat percentage	Gary 2003[98–100]	Chronic care
	Anand 2007[80]	Diet/physical activity
	Keyserling 2002[108,109]	
	Staten 2004[119]	

a Also measured shortness of breath.

Health-care beliefs and knowledge (personal factors)

In Anand 2007[80] change in knowledge about diet was assessed in children but not in adults. Paskett 2006[116,117] also measured change in reported barriers to mammography uptake. There were no measures of self-reported competency, confidence or complaints.

Self-efficacy was measured only in studies tackling chronic care as part of an Expert Patients Programme.[101,102,104–107] Dickson-Gomez 2003[89,90] measured self-efficacy in conducting outreach but found no statistical difference between the intervention and control groups. Interestingly, Keyserling 2002[108,109] was the only study targeting people with chronic conditions, adopting a health promotion approach and assessing the knowledge gained as a result of it. No other study using a health-promoting approach measured the knowledge gained as a result of it.

In Dickson-Gomez 2006[91,92] LAs reported increased knowledge about HIV infection risk prevention, and many reported engaging in safer practices, reducing their drug consumption or stopping usage altogether.

TABLE 19 Measurement of health behaviours

Measure	Studies	Intervention focus
Physical activity (duration of exercise, energy expenditure)	Gary 2003[98–100]	Chronic care
	Kennedy 2007[104–107]	
	Lorig 1999[110]	
	Lorig 2003[111]	
	Anand 2007[80]	Diet/physical activity
	Keyserling 2002[108,109]	
	Staten 2004[119]	
Self-care	Griffiths 2005[101,102]	Chronic care
	Gary 2003[98–100]	Chronic care
Consumption of tobacco	Emmons 2005[26,97]	Smoking cessation
	May 2006[113]	
	West 1998[30]	
	Woodruff 2002[120]	
Diet (energy intake, intake of fats, fruits and vegetables)	Gary 2003[98–100]	Chronic care
	Kennedy 2007[104–107]	
	Anand 2007[80]	Diet/physical activity
	Elder 2006[95,96]	
	Keyserling 2002[108,109]	
	Resnicow 2004[118]	
	Staten 2004[119]	
Breastfeeding	Dennis 2002[88]	Breastfeeding
	Morrow 1999[114,115]	
Safe sex/drug use	Dickson-Gomez 2003[89,90]	HIV infection prevention
Uptake of/up-to-date screening	Andersen 2000[42,81,82]	Screening uptake
	Bird 1998[84–87]	
	Earp 2002[16,63,93,94]	
	Paskett 2006[116,117]	

TABLE 20 Measurement of health-care beliefs and knowledge

Measure	Studies	Intervention focus
Self-efficacy	Barlow 2000[83]	Chronic care
	Griffiths 2005[101,102]	
	Kennedy 2007[104–107]	
	Resnicow 2004[118]	Diet/physical activity
Knowledge	Lujan 2007[112]	Chronic care
	Keyserling 2002[108,109]	Diet/physical activity
	Bird 1998[84–87]	Screening uptake
	Paskett 2006[116,117]	
Change in attitudes and beliefs	Lujan 2007[112]	Chronic care
	Resnicow 2004[118]	Diet/physical activity
	Paskett 2006[116,117]	Screening uptake
Communication with health-care providers	Griffiths 2005[101,102]	Chronic care
	Kennedy 2007[104–107]	
	Lorig 2003[111]	

Intervention acceptability

Dennis 2002[88] studied participants' degree of satisfaction with their peer support experience. Only three mothers (of the 130 participants) were dissatisfied with the support offered by the LA, but all of the participants felt that every new breastfeeding mother should be offered peer support. Dennis 2002[88] also found that the frequency of LA contact was significantly related to the mother's perceptions of peer support (data not provided). In Dickson-Gomez 2003[89,90] the intervention proved highly acceptable to the LAs, who felt that they had become more valued part of their community through it. The context of their intervention on the street impacted greatly on the acceptability of their approach to the young people they were targeting. This is very similar in Dickson-Gomez 2006[91,92] where LAs reported gaining support and respect from their community members for their prevention work. In Gary 2003[98–100] intervention participation was much higher in the LA group versus nurse case manager, suggesting greater intervention acceptability.

In Earp 2002[16,63,93,94] most of the respondents who had received counselling by the LAs indicated that they felt comfortable talking to the LA about breast cancer screening – they felt close to the LAs; the LAs were a credible source of information and were seen as friendly, understanding, open-minded, 'plain talking' and able to motivate. However, there may be a need to treat these results with caution, as the LAs themselves suggested the names of interviewees and were often related to them.

Resnicow 2004[118] measured the acceptability of the intervention, finding that 77% of participants reported being very satisfied with the cookbook and educational materials, and 72% of those receiving at least one call reported being very satisfied with their volunteer advisors.

Young 2005[121-123] measured satisfaction with treatment and intervention acceptability and found a 50% support rate for this intervention format.

West 1998[30] mention that the intervention was well accepted. However, while the authors advised buddies to contact each other at least once a day for the first week, the average frequency of contact was only 2.7, which may suggest moderate intervention acceptability.

Keyserling 2002[108,109] measured programme acceptability. For the health advisor component, 85% of 59 respondents felt the number of telephone calls by the LA was appropriate, 86% felt the role of the advisors in the programme was important, and 83% strongly agreed that talking to someone else with diabetes was very helpful.

SECTION 3: ANALYSIS OF COST-EFFECTIVENESS

Introduction

The impact of behaviour and lifestyle changes on HRQoL and health-care costs is highly dependent on the potential disease risks averted and the impact of behavioural changes on those risks. The assessment of the cost-effectiveness of LA programmes has been considered separately, therefore, for each behaviour change or disease risk averted. Within the eight areas identified in the review, the papers typically report common outcome measures, allowing comparisons where appropriate. Estimates of the effectiveness of the LA programmes are informed from the studies reviewed. Few studies reported costs; hence these have been estimated where necessary. Likewise, few studies measured changes in quality-adjusted life-years (QALYs). The long-term gains in HRQoL arising from changes in behaviour are estimated from appropriate literature sources. The synthesis of the resulting cost and outcome data provides estimates of the cost-effectiveness of LAs in each of the eight areas identified. The resulting evaluations indicate in which disease/behaviour areas application of LAs may be cost-effective, and where they are not, although the estimates are subject to considerable uncertainty. Only one of the included studies specifically compared a lay- and professional-led intervention, and, consequently, the economic analysis has not specifically compared the cost-effectiveness of lay- versus professionally-led interventions. A comparison with professional-led services has been undertaken whereby data are available (smoking cessation). In all other cases the LA intervention is compared with no intervention.

Implementing health economic evaluations

Despite the documented difficulties there is increasing literature on the economic evaluation of public health initiatives.[206,207] The majority of evaluations are cost–consequence analyses or cost-effectiveness analyses, although a minority do report outcomes in QALYs or disability-adjusted life-years (DALYs).[208] A number of authors have developed or applied models to estimate the long-term health gains from public health interventions.[209–215]

It may not always be necessary to construct a model to estimate health gains; published results from studies examining clinical interventions can sometimes be applied to public health interventions seeking to promote service use or lifestyle changes leading to similar physiological outcomes. Mason *et al.*[123] have illustrated a method of estimating the cost-effectiveness of promoting behavioural changes from data on the impact of the intervention on behaviour, and an estimate of the underlying cost-effectiveness of the behaviour change.[123] The approach is similar to a previous evaluation of a church-based mammography promotion intervention undertaken by Stockdale *et al.*[216] Both approaches stem from the observation that the cost-effectiveness of a health promotion programme is a ratio of the change in total costs to the change in total benefits, with the total costs being the sum of the costs of the health promotion intervention and the costs incurred from the underlying behaviour change promoted. This formulation is easily manipulated to isolate the cost-effectiveness of the underlying behaviour change added to a 'loading factor' representing the impact of the health promotion. A simplified version of the derivation from Mason *et al.*[123] is reproduced below:

$$\begin{aligned} \text{Policy cost-effectiveness } \Delta CE_p &= \Delta C_p / \Delta B_p \\ &= (\Delta c_i + \Delta C_t) / \Delta B_p \\ &= (\Delta p_i \times \Delta c_i / \Delta b_t) + \Delta CE_t \end{aligned} \qquad \text{[Equation 1]}$$

where:

- ΔCE_p is the cost-effectiveness of the programme
- ΔCE_t is the cost-effectiveness of the underlying behaviour change
- ΔC_p is the change in overall costs from the programme
- ΔB_p is the change in overall health benefits from the programme
- Δc_i is cost of the health promotion programme
- ΔC_t is the change in costs from the underlying behaviour change
- Δp_i is the proportional effect of the health promotion programme on the underlying health behaviour relative to the change required to achieve a gain of Δb_t
- Δb_t is the health benefit from the change in the underlying health behaviour.

This formulation highlights the fact that health promotion programmes can never be more cost-effective than the cost-effectiveness of the underlying behaviour change. Promotion programmes are unlikely to be cost-effective if the health care promoted is marginally cost-effective. Despite its simplicity there are drawbacks to this approach. Lifestyle changes such as smoking cessation and increasing physical activity are unlikely to increase health-care resource utilisation; in fact they are likely to reduce it. The resulting negative cost-effectiveness ratios ΔCE_t are rarely reported. Data from medical trials require careful scrutiny, as calculated cost-effectiveness ratios may include health-care resource utilisation not relevant to a public health intervention. Care is also required in the consideration of relapse rates.

Cost-effectiveness estimates in this chapter

While the approach of Mason *et al.*[123] has value, it is not readily applicable to behaviour changes that reduce health-care costs. We applied data on the costs and health gains of behaviour changes and the costs of LA interventions, rather than utilising reported cost-effectiveness ratios in *Equation 1*. We took estimates of effect sizes and costs of LA interventions from the studies reviewed. Estimates of health benefits are subject to inevitable uncertainty, but this approach is a standard method of estimating the benefits of medical interventions.[217] However, considerable additional uncertainty is introduced through the estimation of relapse rates. Where data are unavailable, and relapse rates are likely to influence cost-effectiveness conclusions, we present sensitivity analysis over a range of values.

We took a conservative approach in each evaluation: where interventions proved not to be cost-effective we based calculations on generous assumptions; where they appeared to offer good value for money we applied conservative assumptions. Despite this, there was a wide variation in incremental cost-effectiveness ratios (ICERs) across different intervention areas, allowing some relatively robust inferences to be made. An explanation of the derivation and use of ICERs is provided in *Appendix 13*.

Cost estimates

We used costs reported in the studies reviewed where these were available. Costs in US dollars (US$) or euros (€) were converted to UK pounds sterling (GBP) at an appropriate rate,[218] and inflated to 2008 prices using hospital and community health services (HCHS) indices.[219] In the absence of cost data we had to estimate programme costs. Estimates of staff time and role were based on intervention details in the reviewed studies. An appropriate unit cost, including all overheads, was then applied from *Unit costs of health and social care*.[219] Where assumptions have been made about the future reapplication of interventions to maintain adherence, costs are discounted at 3.5% per annum.

Chronic care

Expert Patients Programmes

Introduction

Three of the five studies reviewed are UK based, and Kennedy 2007[104–107] evaluates the Expert Patients Programme, which has been implemented across the UK. Griffiths 2005[101,102] and Kennedy 2007[104–107] provide costs and all three UK studies provide outcomes measured with EQ-5D. In addition, a sister publication to Kennedy 2007[104–107] provides a robust cost-effectiveness analysis.

Assessing evidence of effectiveness

All of the studies provide evidence of significant improvements in patient self-efficacy and self-care behaviour. In addition, there is evidence of an impact of the intervention on participants' perceptions of their conditions. Griffiths 2005[101,102] and Barlow 2000[83] demonstrate improvements in anxiety and depression using HADS, although these changes were not statistically significant in Griffiths 2005,[101,102] Kennedy 2007[104–107] and Lorig 2003[111] find significant improvements in psychological well-being and health distress attributable to the intervention. The evidence of an impact on physical health is mixed. All three UK studies applied the EQ-5D, although in Barlow 2000[83] this was limited to a subset of the participants. Only Kennedy 2007[104–107] observed a difference that was statistically significant, after allowing for baseline characteristics, in favour of the intervention. Only Lorig 2003[111] finds a significant reduction in pain.

Evidence is limited on whether health improvements are maintained following the intervention. Barlow 2000[83] and Lorig 2003[111] applied outcome measurements after the control group received the intervention, and Lorig 2003[111] demonstrates that improvements in the intervention group are maintained. Barlow 2000[83] presents plots of several outcome measures for the intervention group at 4 and 12 months, and for the control group at 4 months. Results at 12 months suggest a slight deterioration in the improvements observed 8 months after the intervention. The controls in this study showed improvements in the outcomes measured at 4 months, albeit not as great as in the intervention arm, and may have continued to improve at 12 months without the intervention. Hence it is possible that the additional benefits from the intervention are short term. The intervention may have accelerated the acquisition of long-term disease management skills that would have been acquired through experience over time.

Reviews of professionally-led Expert Patients Programmes concur with these findings. In their analysis of self-management patient education programmes, Warsi *et al.*[220] found modest improvements in clinical outcomes, although there was evidence of publication bias. Chodosh *et al.*[221] report similar findings and suggest that the modest benefits observed derive from increased medication compliance.

Hence findings that the Expert Patients Programme improves self-efficacy and symptom management appear uncontroversial. The evidence for an improvement in HRQoL is weak. The findings by Kennedy 2007[104–107] were not replicated in Griffiths 2005[101,102] or Barlow 2000,[83] and are not supported by the literature. It is possible that Expert Patients Programmes provide a very small improvement in HRQoL.

Evidence from the studies of a reduction in health-care utilisation is inconsistent. Kennedy 2007[104–107] examined a comprehensive range of health-care utilisation and reports reductions in both primary and secondary care. Analysed by category, none of the differences are statistically significant, but the reduction in inpatient days in the intervention arm is sufficient to offset the cost of the programme. Griffiths 2005[101,102] and Barlow 2000[83] examined only primary care

contact, and found no evidence of a reduction in health-care utilisation attributable to the intervention. Lorig 1999[110] found a reduction in hospital stay but no reduction in primary care. Lorig 2003[111] found a reduction in physician and emergency room visits attributable to the intervention, but no change in hospital stay. These results may reflect the diverse morbidities of participants in these studies, with considerable heterogeneity in resource use.

Evidence from the literature on costs of profession-led Expert Patients Programmes is mixed. A number of studies, including evidence from the CDSM programme[222] and evaluations of self-care programmes in CVD,[223] and asthma,[224] have suggested that patient self-management programmes are cost saving. However, in their review of the cost-effectiveness of interventions to support self-care, Richardson *et al.*[225] conclude that most are methodologically flawed or limited in scope. They cite evidence from the UK in which only one out of six studies found evidence of cost-effectiveness.

Estimating the cost-effectiveness

Richardson *et al.*[107] undertake a cost-effectiveness analysis of the trial results reported by Kennedy 2007.[104–10] The authors used bootstrapped samples of the trial data[226] to produce a cost-effectiveness acceptability curve[227] and conclude that there is a 94% probability the intervention is cost-effective at a threshold of £20,000 per QALY. While this analysis appears to be robust, some caution needs to be exercised in interpreting the findings. The majority of cost savings observed in the intervention arm derive from a reduction in length of hospital stay. We might expect a reduction in primary care contacts rather than hospitalisations following improvements in self-efficacy and symptom awareness. The possibility remains that the cost differences observed by Kennedy 2007[104–107] were driven by a few resource-intensive patients who may not be truly representative of their populations.[228] This possibility is supported by examination of the *baseline* characteristics of participants in Lorig 2003[111] Despite random assignment of 443 participants, those in the intervention arm report more than twice the number of hospital days in the previous 4 months compared with the controls. Nevertheless, it is quite possible that improved disease management results in reduced health-care utilisation that entirely offsets the small costs of these programmes.

Discussion

Expert Patients Programmes offer the possibility of combining patient empowerment with long-term savings for the NHS. Per-patient costs are fairly small; Kennedy 2007[104–10] uses estimates from the Department of Health of £250 per patient. While direct evidence of cost savings is mixed there is evidence that patient self-management courses can lead to measurable improvements in clinical indicators of disease control for diabetes[229] and CVD.[223] The potential for cost savings from improved disease control in these two areas is likely to be considerable.[230,231] In areas such as arthritis management the scope for savings may be small. While it is tempting to conclude that, overall, these programmes lead to small reductions in resource use that offset their cost, there is insufficient evidence to conclude that the costs of the Expert Patients Programme are offset by savings across all major chronic disease areas.

It is unclear whether improvements in self-efficacy and symptom management translate into gains in HRQoL. However, the impact of chronic diseases on HRQoL is likely to be considerable,[232] and Expert Patients Programmes may provide support, reassurance and coping strategies that are valued by participants, particularly those without extended networks of support in the community. For these patients the value of the programme may well outweigh the cost before any considerations of long-term cost savings. Further research on Expert Patients Programmes might consider ways to capture the value participants place on their experience of these programmes.

Diabetes

Introduction

All three interventions use lay-led counselling to improve lifestyle and disease management in poor, urban populations with type 2 diabetes. The impact of each intervention is measured by assessing the level of the glycated haemoglobin marker HbA_{1c}, a well-recognised marker of diabetes control.[233,234] Although the population in Young 2005[121-123] is a little older than that of the American studies, baseline HbA_{1c} levels are similar in each study (7.9%–8.6%). For the purposes of the economic analysis we assume that the target populations are the same. The three interventions report different methods of delivering lay-led lifestyle and disease management advice to disadvantaged patients with diabetes. The telephone-led intervention described by Young 2005[121–123] appears to be less resource intensive than the face-to-face interventions. An economic analysis of the intervention in Young 2005[121–123] has been published[123] and provides data on costs. The economic analysis presented here will consider all three interventions as alternative programmes to promote diabetes disease management in marginalised urban populations.

Assessing evidence of effectiveness

Effect sizes based on differences between intervention and control arms will be applied for the modelling of interventions based on Gary 2003[98–100] and Young 2005[121–123] As noted earlier, regression to the mean may have exaggerated the upwards trend observed in the control arm in Lujan 2007[112] Regression to the mean would act to exaggerate the treatment effect in the intervention arm, but this might be offset by an expected rise of 0.1% in HbA_{1c} level over 6 months.[235] Hence, the effect size for the intervention was taken as the absolute fall observed in the treatment arm over the 6-month period.

Estimating the health gain from changes in effectiveness

Two large trials in the UK[235] and USA[236] have examined the long-term impact of control of HbA_{1c} level. The United Kingdom Prospective Diabetes Study (UKPDS) ran from 1977 to 1991 and examined the benefits of intensive blood glucose control in patients with type 2 diabetes. It also contained a nested trial examining the impact of lower blood pressure. Intensive drug treatment initiated a rapid fall in HbA_{1c} level of 0.9%. This difference between intervention and control was maintained over the 10-year observation period, although HbA_{1c} level steadily increased in both arms with time. The trial reported a 25% risk reduction in microvascular complications and a 16% (non-significant) reduction in coronary heart disease (CHD) events in the intervention arm.

A number of models of diabetes have been published,[237–244] many utilising the UKPDS data. The Centers for Disease Control and Prevention (CDC) model[241] examined the cost-effectiveness of intensive drug treatment in a typical cohort of newly diagnosed type 2 diabetes patients. In the base-case analysis, a reduction in HbA_{1c} level from 7.9% to 7.0% yielded a lifetime QALY gain of 0.192 (discounted at 3%). The base case ignored any impact of lowered HbA_{1c} level on CHD. Including CHD events increased the QALY gain to 0.333. Based on typical US practice, intensive drug treatment to reduce HbA_{1c} level increased overall costs by US$7927 ('1997' US$). However, under UK management style, costs were US$1309 lower in the intervention arm. The UKPDS Outcomes Model[242] examined the same data and predicted a lifetime gain of 0.27 QALYs for a 0.9% reduction in HbA_{1c} level. Bagust *et al.*[237,238] sought to examine the impact of improved HbA_{1c} level control for health providers and their cost estimate (£2026 increase) explicitly includes the indirect medical costs arising from prolonged longevity.

Two groups have modelled the impact of lowering HbA_{1c} levels. The CORE[240] model (*Table 21*) uses data from the National Health and Nutrition Examination Survey (NHANES)[245] and the INITIATE[246] study. The 'typical' patient in the model is 59 years old and has had diabetes for 12 years; hence the model simulates the effects of an intervention to reduce HbA_{1c} levels in the existing diabetes population rather than from diagnosis. Costs and outcomes for three scenarios

are reported: lowering HbA_{1c} level from 9.5% to 8.0%, from 8.0% to 7.0% and from 7.0% to 6.5%. A similar modelling exercise using the DiabForecaster model[239] (*Table 22*) provides health outcomes and costs from a UK perspective for 1% reductions in HbA_{1c} level over the range 6%–11%. The results are tabulated below.

Hence, estimates of the health gain of a reduction in HbA_{1c} level from 8% to 7% from the CDC, UKPDS, CORE and DiabForecaster models fall in the range of 0.3–0.4 QALYs. The health gain from the CORE model (0.38 QALYs), which is slightly lower than that from DiabForecaster, will be assumed for a 1% reduction in HbA_{1c} level. The DiabForecaster model estimates of cost, which exclude specific drug treatment costs and indirect medical care costs, will be applied. The study suggests a £600 saving for a fall from 8% to 7% in HbA_{1c} level. The cost year is unclear in the report but appears to be 2004, hence this value was inflated to pounds sterling in 2008 (£686).

Costing the interventions

Mason *et al.*[123] provides detailed costs of the telephone counselling intervention. First-year costs are £93,700, including one-off commissioning costs of £9000 ('2003' GBP). Long-term running costs inflated to pounds sterling in 2008 are £101,800, giving a cost per participant of £258. The intervention supported the 394 patients randomised to the centre but could have supported 600. If we assume the centre operates at 90% capacity (540 patients) then the cost per patient would be £189.

Cost data from Gary 2003[98–100] and Lujan 2007[112] are limited. The intervention in Gary 2003[98–100] appears to have employed a full-time nurse and a CHW for the 2-year duration of the intervention, with the CHW spending half of his/her time with the participants in the CHW arm. A yearly cost of £31,043 was assumed for the CHW based on the cost of a social work assistant,[219] giving a per-participant cost of £757. Lujan 2007[112] reports that two *promotores* provided the

TABLE 21 The CORE model predictions for HbA_{1c} level change

HbA_{1c} change (%)	Change in life expectancy[a]	Change in QALYs[b]	Change in costs (US$)[c]
9.5–8.0	1.11	0.58	–5209
8.0–7.0	0.72	0.38	–3099
7.0–6.5	0.33	0.18	–1637

a Undiscounted.
b Discounted at 3%.
c Discounted at 3%, 2005 US$.

TABLE 22 The DiabForecaster predictions for HbA_{1c} level change

HbA_{1c} change (%)	Change in QALYs[a]	Change in costs (£)[b]
11–10	0.6	–2900
10–9	0.6	–1600
9–8	0.4	–1200
8–7	0.4	–600
7–6	0.2	–400

a Discounted at 1.5%.
b Discounted at 6%.

3-month intervention to four groups. It seems unlikely that these ran concurrently, hence it assumed that the *promotores* were employed for 1 year. In addition, transport was provided for the participants. Applying the same cost estimated for the CHW to the *promotores* gives estimated staff costs of £62,086 for the year. It was assumed that 50% of the participants utilised the transport with costs of £20 per trip, giving total transport costs of £12,000. Hence the overall cost was estimated at £74,086 (£988 per participant).

Consideration of relapse rates

The three studies report HbA_{1c} levels over different time periods. The long-term effectiveness of the interventions in sustaining reduced HbA_{1c} levels is unclear. The economic analysis in Mason *et al.*[123] applied best- and worst-case scenarios and a 'best guess'. The best-case scenario assumes that the intervention effects last for the life of the participants. The worst-case scenario assumes that they last for only the duration of the intervention. The 'best-guess' scenario assumed that maintaining reduced levels of HbA_{1c} required 50% of the intervention costs in each subsequent year. The model based estimates assume that the changes in physiology are maintained for the patient's life.

In principle, each of the interventions could be repeated yearly (or biannually for Gary 2003[98–100]). In practice that might be overkill. We assumed that repeating the intervention at 3, 6 and 10 years ensures that 50% of participants maintain the behaviour change. This is in line with the estimates that 50% of those who quit smoking subsequently avoid relapse. The benefit of the interventions for the other 50% of participants was assumed to be zero. The base-case analysis applied the trial costs reported in Mason *et al.*[123] to the telemedicine intervention (first-year costs and 394 participants). Sensitivity analysis explored the impact of changing these assumptions by varying the proportion of those who relapse between 25% and 75%. Further sensitivity analysis explored the impact of applying long-term costs by ignoring set-up costs and assuming 90% capacity for the telemedicine intervention, and halving the per-participant costs calculated for Gary 2003[98–100] and Lujan 2007.[112]

Estimating the cost-effectiveness

Cost-effectiveness estimates for each intervention are presented in *Table 23*. Costs are calculated assuming that the intervention is repeated at year 3, 6 and 10 (discounted at 3.5%). The assumption that 50% of participants relapse was implemented by halving the estimated benefit (0.38 QALYs) and costs avoided (£686) for the reported changes in HbA_{1c} level. The benefits and costs of lowering HbA_{1c} level were assumed to vary linearly with the magnitude of the change.

In the base-case analysis the telephone-based counselling intervention, Young 2005[121–123] is cost-effective if decision-makers apply a threshold of £30,000 per QALY. The CHW intervention in Gary 2003[98–100] is more expensive per participant than the telephone counselling intervention, and less effective in reducing HbA_{1c} level. It is dominated, and consequently not effective. The ICER for the *promotora* intervention[112] suggests that it is highly unlikely to be cost-effective at a threshold of £30,000. These conclusions are robust to the sensitivity analysis applied here. Assuming that only 25% of participants subsequently relapse and return to previous HbA_{1c} levels, or halving the estimated costs for the *promotora* intervention, fails to bring the ICER for Gary 2003[98–100] below £30,000. If 75% of participants relapse (i.e. only 25% of participants benefit from the programme) the ICER for the telephone intervention is just below £30,000.

Costs saved by the intervention have little impact on the overall costs; hence, conclusions on cost-effectiveness rest on the estimates of the health gain from the interventions. The benefit estimate we used is likely to be conservative as it is estimated purely on the change in HbA_{1c} levels. In reality, lifestyle improvements by the participants may have resulted in falls in blood pressure and cholesterol levels, too. Nevertheless, it is prudent to consider how the results change when the

TABLE 23 Cost-effectiveness calculations for the Chronic Care diabetes interventions

Intervention	Cost (£)	Mean percentage fall in HbA_{1c} level	QALYs gained	Costs averted (£)	Overall cost (£)	Incremental cost (£)	Incremental benefit	ICER
Base case								
Young 2005[121–123]	905	0.31	0.0589	106	799	799	0.0589	13,565
Lujan 2007[112]	3467	0.45	0.0855	154	3313	2514	0.0266	94,511
Gary 2003[98–100]	2656	0.30	0.057	103	2553			Dominated
Sensitivity analysis assuming 75% patients relapse to old lifestyle								
Young 2005[121–123]	905	0.31	0.0295	53	852	852	0.0295	28,881
Lujan 2007[112]	3467	0.45	0.0428	77	3390	2538	0.0133	190,827
Gary 2003[98–100]	2656	0.30	0.0285	52	2604			Dominated
Sensitivity analysis assuming 25% patients relapse to old lifestyle								
Young 2005[121–123]	905	0.31	0.0884	159	746	746	0.0884	8439
Lujan 2007[112]	3467	0.45	0.1283	231	3236	2490	0.0399	62,406
Gary 2003[98–100]	2656	0.30	0.0855	155	2501			Dominated
Sensitivity analysis assuming lower running costs								
Young 2005[121–123]	663	0.31	0.0589	106	557	557	0.0589	9457
Lujan 2007[112]	1734	0.45	0.0855	154	1580	1023	0.0266	38,459
Gary 2003[98–100]	1328	0.30	0.057	103	1225			Dominated

estimate of the health gain from reducing HbA_{1c} level is varied. The base-case analysis assumes that only 50% of participants benefit. This is equivalent to assuming that 100% of the participants gain half of the estimated health gain (0.19 QALYs). The sensitivity analysis varies the number of patients who relapse (and gain no health improvement) between 25% and 75%. Assuming that 75% of participants relapse reduces the benefit gained from the intervention by 50% compared with the base case. Assuming that 25% of participants relapse increases the benefit gained from the intervention by 50%. Hence the sensitivity analysis where the relapse rate is varied between 25% and 75% is equivalent to varying the benefit of HbA_{1c} level control by ± 50% (0.19–0.57 QALYs).

Economic analysis in Mason *et al.*[123]

Mason *et al.*[123] provided an evaluation of the intervention in Young 2005[121–123] using the framework elaborated in the introduction (*Equation 1*). Estimates of the underlying cost-effectiveness of reducing HbA_{1c} (ΔCE_t, US$7927/0.1915 QALYs = US$41,400) and the health gain (Δb_t, 0.1915 QALYs) were taken from the CDC model.[241] Mason *et al.*[123] converted the ICER to UK pounds sterling (£26,900 per QALY) to estimate ΔCE_t. The programme costs Δc_i were calculated under the assumption that 50% of the costs were required on an ongoing basis per participant to maintain adherence and discounted at 5%. The resulting 'loading factor' for the programme of £16,500 per QALY was added to ΔCE_t (£26,900) to generate an ICER for the telemedicine programme of £43,400 per QALY. The authors conclude that the programme is unlikely to be cost-effective.

As noted earlier, the estimate of ΔCE_t from the CDC model is based on US costs and the authors note that under a UK cost scenario the cost of intensive drug management is less than the costs of complications averted. This would give a negative value for ΔCE_t in a UK setting, but a value of zero might be a reasonable, conservative assumption. If we apply a value of zero for ΔCE_t then

the cost-effectiveness of the telemedicine intervention is simply the loading factor £16,500 (as estimated in Mason *et al.*[122]). This would indicate that the intervention in Young 2005[121–123] is cost-effective in a UK setting, although this rests on a series of assumptions about the long-term cost and effectiveness of the programme required to calculate the loading factor. An ICER of £16,500 is close to our calculation.

Discussion

This analysis suggests that the telephone intervention described by Young 2005[121–123] is cost-effective at a threshold of £30,000 per QALY. That conclusion rests on a number of assumptions, chiefly that the intervention needs to be repeated four times over a typical participant's lifetime, and that doing this ensures that 50% of participants maintain improved control of their HbA_{1c} levels. Conclusions are sensitive to the assumptions on relapse rates. It would appear feasible to reapply the telephone counselling intervention in subsequent years to maintain and reinforce behavioural change. In practice, a low-intensity telephone contact might be maintained with each participant after the initial intervention. The same assumptions have been applied to Gary 2003[98–100] and Lujan 2007[112] and these interventions are not cost-effective at a threshold of £30,000 per QALY. The trial data suggest that the *promotora* intervention in Lujan *et al.*[112] is more effective, but far more expensive. The reduction in HbA_{1c} levels does not justify the additional resources.

Smoking cessation

Introduction

The evidence from May 2006[113] suggests that the 'buddy system' of pairing smokers to provide mutual support is not effective; hence it was not evaluated. The target group in Emmons 2005[26,97] (cancer survivors) may represent an untypical group who might be particularly receptive to motivational literature and counselling on the risks of smoking. In addition, there are some doubts over the veracity of self-reported cessation rates in that trial. Woodruff 2002[120] describes an intervention adapted to a specific, marginalised group delivered by LAs within that community, and, as such, it is probably representative of individual, LA-delivered ethnically targeted smoking cessation services. Consequently, the economic analysis considers the intervention in Woodruff 2002.[120] Effectiveness was based on the ITT analysis in Woodruff 2002[120] rather than the primary results, which ignored those lost to follow-up. Unfortunately, the impact of NRT is not discernible, but it is reasonable to assume that a smoking cessation intervention delivered by LAs to marginalised groups would utilise NRT where appropriate. Only Emmons 2005[26,97] provides cost data; hence costs are estimated.

Estimating the health gain from changes in effectiveness

There is considerable literature on the health benefits of quitting smoking and the demonstrable health gains are large.[247] A number of groups have modelled the epidemiological data to estimate the life-years gained through quitting.[248–251] Conservative estimates of around 1.5–2 years may be low in the light of recent evidence.[252] Fewer studies have estimated the QALYs gained by quitting. Publications by Fiscella and Franks[253] (1.98 QALYs) and Cromwell *et al.*[254] (1.97 QALYs, 1.46 life-years saved) concur. The estimate of 1.97 QALYs is likely to be conservative in the light of recent evidence, but it will be used for the current analysis.

Rates of relapse from quitting have also been investigated. Relapse rates over the first year suggest that 65–75% of abstainers at 1 month will have relapsed after 1 year.[51,52] Recent evidence on long-term relapse rates suggests that rates of 30–40% are too low and that 50% of those abstaining for 1 year may eventually relapse.[53] We assumed that 75% of 1-month abstainers and 50% of 3-month abstainers would have relapsed at 1 year. Further, we assumed that 50% of 1-year abstainers would subsequently relapse, and that all those who relapse gain no overall health benefits. This means that 25% of the 3-month quitters reported by Woodruff 2002[120] are estimated to quit permanently, gaining 1.97 QALYs each, or a gain of 0.49 QALYs per 3-month quitter.

Estimating overall costs

Emmons *et al.*[26,97] gives the total cost of the intervention; Woodruff 2002[120] does not but states that *promotores* were paid a modest stipend. The intervention consisted of four home visits of 1–2 hours' duration and three telephone calls (15–30 minutes), giving a total time of around 7 hours for all seven sessions. Mean participation was 3.5 sessions. We applied a rate of £31 per hour (alcohol health worker)[219] to an estimate of 3.5 hours' contact time to give a cost of £109 per participant. We also assumed that recruiters were paid £20 per participant recruited. Finally, we assumed that the intervention required co-ordination by a full-time employee for 3 months. The cost of a social work team leader (£53,651 per year, including all overheads)[35] was applied (£13,413 over 3 months). The total costs are £33,537 for the 156 participants or £215 per participant. This is in line with costs per participant of US$300 reported in Emmons *et al.*[26,97]

There is considerable debate over the long-term cost savings from quitting smoking.[255,256] Direct health-care costs saved have been calculated by a number of authors and are considerable.[249,257–259] The impact on indirect health-care costs is less well established but it seems likely that these will rise. Some studies[260,261] have suggested that these costs outweigh the direct cost savings but this

has been contested.[262–264] Indirect costs are often ignored in economic evaluations but, strictly speaking, they should be included. It seems likely that quitting smoking has a positive overall impact on health-care costs but we have taken a conservative assumption that the impact is neutral, with no long-term cost savings.

Estimating the cost-effectiveness

To fully evaluate the cost-effectiveness of this intervention we need to compare it with the reasonable alternatives that might be provided. Around one-third of smokers attempt to quite each year, mostly without help,[265] with 1% succeeding,[250] suggesting that around 3% of motivated quitters succeed unaided. Estimates of the effectiveness of brief advice vary, with American estimates being higher than those in the UK.[249,250,254,266,267] We apply an annual quit rate of 4% as assumed in the 2002 HTA assessment of the effectiveness of NRT and bupropion[268] and a cost of £47 based on data from Stapleton *et al.* (£33 in '1998' GBP).[250] Pharmacy services also provide smoking cessation services; we apply the data collected by Boyd and Briggs[269] in a recent evaluation. We assume annual effectiveness rate of 10% for smokers' clinics in line with published evidence.[249,270,271] Estimated costs of these clinics vary. Godfrey *et al.*[271] estimated an average cost per user of £161, Boyd and Briggs[269] report the costs of a smokers' clinic in Glasgow at £350 per user, and data on smokers' clinics in Health Action Zones[272] suggest that the average cost per user is £450 (all figures inflated to '2008' GBP). We apply the figure reported by Boyd and Briggs.[269] Cost-effectiveness calculations are presented in *Table 24*.

These results should be interpreted with considerable caution. The data suggest that smokers' clinics are more effective than an IC from LAs. Costs are similar. The data support a view that smokers' clinics (as the most effective intervention) are cost-effective and the intervention of choice. However, this intensive group-based therapy may not be the service of choice for many smokers. Tailoring services to smokers' choices would seem to be very important, given the central importance of motivating services users. The LA intervention might be considered as an alternative to expanding pharmacy services or as a supplemental service. Costs are higher than the pharmacy service but the trial data suggest that a tailored LA-delivered intervention is more effective, providing additional health gains for a reasonable cost.

In practice it probably makes sense to offer all of these services. Boyd and Briggs[269] argued that the pharmacy service and the smokers' clinic they assessed served different groups and should not be compared as alternatives. It is likely that many smokers will try more than one service before they quit. As such, they might be seen as complementary, yielding quitters from the proportion of users for whom their services are particularly effective.

TABLE 24 Cost-effectiveness calculations for smoking cessation services

	Cost (£)	Annual quit rate (motivated smokers) (%)	QALY gain	Incremental gain (QALYs)	Incremental cost (£)	ICER (£)
Willpower	0	3	0.0295	–	–	–
Brief advice	47	4	0.0394	0.0099	47	ED
Pharmacy services	55	5	0.0493	0.0099	8	2800
LHA counselling	215	8.7	0.0857	0.0364	160	4400
Smokers' clinics	350	10	0.0985	0.0128	135	10,500

ED, extendedly dominated.

Discussion

Some care needs to be taken in estimating the effectiveness of a LA smoking cessation service from the results of one trial. Effectiveness in practice may be considerably less than the trial results would suggest. Nevertheless, this intervention appears to be cost-effective. Costs are relatively small and the health benefits that accrue to the small number of successful quitters are significant. There are insufficient data to determine whether LAs would be more effective than the currently available alternatives within the context of a marginalised group. However, it is quite likely that some of the people reached by LAs would not seek help from conventional services, even if they are effective for those who do. In this respect smoking cessation services from LAs may deliver additional health gains to marginalised communities in a cost-effective manner.

Breastfeeding

Introduction

Of the two studies in the review, the Canadian setting for Dennis 2002[88] is more similar to the UK than Mexico, where the Morrow 1999[114,115] studies was set. The Canadian intervention consisted of conventional care plus telephone support from a woman experienced with breastfeeding. The results of the Canadian study are used as the basis for an exploration of the cost-effectiveness of a breastfeeding support programme in the UK.

Assessing evidence of effectiveness

Dennis 2002[88] found that the peer support programme was effective in increasing the number of mothers who breastfeed. Risk ratios were calculated at 4, 8 and 12 weeks. Data on the number of babies breastfed at 6 weeks in the UK (2005) are available in the *Infant Feeding Survey*.[273] Using the reported figures in a least-squares regression, an estimate of the risk ratio at 6 weeks was calculated to be 1.12 (95% CI 1.01 to 2.00). Applying this to the 2005 UK data suggests that the peer support programme could raise the percentage of women breastfeeding at 6 weeks from 48% to 54% (95% CI 48% to 96%). We assumed that the 12% increase in the numbers of women who breastfeed their children at 6 weeks translates into an overall increase in women breastfeeding of 12%, in order to model the effect of this in terms of outcomes associated with breastfeeding.

Estimating the health gain from changes in effectiveness

Quinn *et al.*[274] examined the association between breastfeeding and cognitive development. Between 1984 and 1985 they followed 3880 children from birth to 5 years and found a strong positive relationship between breastfeeding and cognitive development. When compared with a child who was not breastfed, females who were breastfed at 6 months had a mean difference of 8.2 (5.8 for males) in the Peabody Picture Vocabulary Test Revised (PPVTR). On average, and assuming a causal link, infants whose mother took part in a peer-supported programme would have an increased PPVTR score of 0.99 if they were female and 0.70 if they were male.

Research has also linked obesity to breastfeeding: Gillman *et al.*[275] found that children who were breastfed for longer periods were less likely to be overweight during adolescence. They found a risk ratio of 1.28 (95% CI 1.10 to 1.52), of being overweight associated with not being mostly breastfed, among children aged 9–14 years.

Childhood type 1 diabetes has also been linked with breastfeeding. Sadauskaite-Kuehne *et al.*[276] found that breastfeeding for longer than 5 months was associated with an risk ratio of 0.54 (95% CI 0.36 to 0.81), breastfed children being half as likely to have type 1 diabetes.

Estimating the cost-effectiveness

We assumed that full-time LAs could support roughly 1000 mothers per year at a cost of £31,043 (social work assistant[219]). Hence, in a notional population of 1000 mothers, the variable costs of the programme would be roughly £30,000. And this would increase the number of infants being breastfed, at 6 weeks, from 480 to 540. Each pound spent on breastfeeding support, delivered by an Early Years practitioner, would increase the rate of breastfeeding, in one notional mother, at 6 weeks by 0.4%.

The results of the analysis are summarised in *Table 25*. Each pound spent on the breastfeeding support programme would increase cognitive ability by 0.0232 for males and 0.0328 for females. In the notional population the £30,000 expenditure would result in increases of 420 in the total PPVTR scores across the population of 500 males and 500 females. Each pound spent would also result in a 0.0112% reduction in the risk of being obese for one adolescent, or the notional

TABLE 25 Summary of the estimated effects of a breastfeeding programme

Outcome	Estimate
Cognitive ability at 5 years	Increase in PPVTR of 0.0232 (0.0328) in one male (female) for every £1 spent
Obesity between 9 and 14 years	Each pound spent 'buying' a reduction in risk of 0.0112% in one child
Childhood type 1 diabetes	Each pound spent resulting in 0.00216% reduction in the risk of type 1 diabetes

£30,000 expenditure would yield a 3.3% reduction among the population of 1000. Combining the estimates of the link between diabetes and insulin-dependent diabetes with the efficacy of the support programme gives a cost-effectiveness ratio of 0.00216 for reducing the risk of type 1 diabetes, each pound spent 'buying' a reduction in risk of 0.00216% in one child. The hypothetical £30,000 spent would almost halve the risk of diabetes in 60 of the 1000 children.

Discussion

The results of the Canadian study[277] were not replicated in a study in a deprived area of the UK; McInnes *et al.*[277] found that increases in breastfeeding at birth were not maintained at 6 weeks, despite peer support. The control arm in the Canadian study reported a rate of breastfeeding that is greater than the 2005 UK average. There is evidence to suggest that increases in breastfeeding, over time, are best maintained in areas with high initial rates of breastfeeding,[278] unlike most of the UK areas where peer support programmes have been introduced. Potential differences in the socioeconomic backgrounds of the study participants and the general UK population also raise concerns. Research[279,280] has shown that breastfeeding rates vary with socioeconomic and racial status. These factors are highly likely to be associated with any health outcomes associated with breastfeeding. The cost-effectiveness estimates presented here rely on epidemiological studies of the association between breastfeeding and outcomes in later life. In such studies it is very difficult to control for confounding sociodemographic characteristics (and others that may confound the estimates), and quite possible that these confounders are exaggerating the reported benefits of breastfeeding.

The current analysis did not consider potential savings resulting from breastfeeding. These could result either from a reduction in medical costs associated with ill health or from a reduced number of working days lost by working parents caring for their children. In his study of the economic benefits of breastfeeding, Weimar estimated cost savings of a minimum of US$500M ('1998' US$) in medical and other indirect costs (such as time off work) if breastfeeding rates at 6 months were raised from 29% to 50%.[281]

Insufficient data exist to perform any meaningful sensitivity analysis because of the small number of studies and their differing choice of observation times. However, the Dennis 2002[88] estimates should be viewed as the upper bound of potential effectiveness. Nevertheless, the comparative baselines in Dennis 2002[88] and the UK in 2005 do suggest there is scope to increase the numbers of women breastfeeding their infant.

Mental health – families of children with chronic diseases

Introduction

The single study in this area included no cost data or utility measures. No attempt has been made to estimate the benefit of the intervention in terms of HRQoL.

Assessing evidence of effectiveness

The small study reports a statistically significant improvement in anxiety levels in the intervention arm compared with the control arm. The intervention was assessed against a 'usual care' control, the telephone number of an experienced but untrained mother of a child with a long-term health problem. Only two mothers in the control arm contacted their support, suggesting the possibility of selective demoralisation of the control arm.

Estimating the cost-effectiveness

With over 10 hours of contact time plus telephone support from the trained and paid peer advisors, in addition to support from a clinical specialist, costs of the intervention are likely to be significant. Whether these costs are justified depends on the value placed on the outcome – a mean improvement of 2.1 points on the PSI[282] (range 0–100). It is possible that a less intensive and a cheaper intervention might also have lowered anxiety levels. Anxiety levels rose in the control arm but the offered support was not utilised, which may suggest that it was not the best comparator.

Discussion

Without any measure of benefit it is difficult to gauge whether the reduction in anxiety for participants justifies the required resources to support this programme. The use of utility measures in the field of mental health is limited, driven by concerns that they do not capture the benefits that interventions in this area provide.[283] An alternative approach might be to measure the value families place on interventions such as this through contingent valuation methods.[284]

Screening uptake

Introduction

Three of the reviewed studies target a broadly similar population of poor, rural women, although the interventions are of different intensity. Paskett 2006[116,117] describes a resource-intensive intervention. The intervention arms in Andersen 2002[82] are all relatively inexpensive. Earp 2002[16,63,93,94] does not provide costs, but this study probably lies somewhere in between. The setting and approach used in Bird 1998[84–87] are different; the population targeted is recent immigrants, many of whom have little English. It seems likely that the barriers to mammography in this community are different, and might require a very different approach to overcome. Consequently, the analysis will consider two 'types' of intervention: a cheap, low-intensity intervention focusing primarily on community events and mass mailshots as described in Andersen 2002[82] (CA arm), and a more resource-intensive intervention using CA to support IC as described by Earp 2002[16,63,93,94] and Paskett 2006.[116,117]

Estimating the health gain from changes in effectiveness

Health benefits from mammography depend on the user's age, and risk profile and whether screening is maintained. Breast cancer rates increase sharply with age[285] but the disease is often less aggressive in older women, and the benefits of treatment are smaller.[286] Consequently, modelling studies indicate that the largest health gains occur for women aged 60–69 years,[287] and the benefits of screening women between the ages of 40 and 50 years are contested.[288–290] A number of studies have modelled the cost-effectiveness of mammography, with early studies typically reporting life-years saved.[291–303] Data from these studies are shown in *Table 26*. The Forrest report,[296] which examined the feasibility of a national screening service in the UK, used a very simple estimate of life-years saved and considered only the costs of screening and additional biopsies. Recent studies have used more sophisticated models to provide estimates of the lifetime benefits of mammography in the range 0.0324–0.0386 QALYs for biennial or triennial screening.[295,298,299] We used the estimate of 0.0386 QALYs from Rojnik *et al.*,[298] which most closely matches UK screening policy (triennial from 50 to 70 years of age).

A marginal cost from triennial screening of €191 and an ICER of €4953 (cost year not reported, assumed to be 2004 euros) is reported in Rojnik *et al.*[298] Publications from the UK[296,297,304] report ICERs of similar magnitude (around £3500), but costs per individual are not discernible; hence the cost data from Rojnik *et al.*[298] were used. The marginal cost was converted to 2008 pounds sterling (£148). Costs and ICERs from the US studies are notably higher, which may reflect higher health-care costs in the USA.

The calculations in Rojnik *et al.*[298] assume screening from age 50 to 70 years. Women over 50 years commencing screening for the first time will incur smaller additional costs and smaller benefits. As the additional costs from new users of mammography are tiny compared with the costs of promotion programmes, applying these estimates will overestimate the benefits of mammography promotion.

Estimating the cost-effectiveness

The follow-up period in each of the studies is fairly short and it is far from certain that new users will remain mammography users in 5 or 10 years. Clearly, the effectiveness of these interventions hinges on whether the changed behaviour is maintained. We have assumed that the intervention needs to be repeated at years 3, 6 and 10 to ensure that relapse is restricted to 50% of participants. Sensitivity analysis examines the impact of assuming 50% relapse without reapplication of the programme and 0% relapse without reapplication of the programme. The data are presented in *Table 27*. In the base case, the ICER for the low-intensity intervention is over £250,000, and the

TABLE 26 Modelling studies examining the costs, benefits and cost-effectiveness of mammography

Study	Year	Country	Ages (years)	Screen interval	Marginal cost	Currency[a]	Discount rate (%)	Life-years saved (LYS)	QALYs gained	ICER[b]	ICER[b] (QALY)
Forrest 1986[296]	1986	UK	50–65	Triennial	£23	1984 GBP	5	0.00755		£3000	£3300
Rosenquist 1994[287]	1994	USA	50–85	Annual		1994 US$?	0			US$16,800	
Szeto 1996[303]	1996	New Zealand	50–69	Biennial		1991 NZD	5			US$14,597	
Salzmann 1997[295]	1997	USA	50–69	Biennial	US$704	1995 US$	3	0.0329	0.0324	US$21,400	US$21,700
Boer 1998[297]	1998	UK	50–69	Triennial		1996 GBP?	6			£2522	
Norum 1999[302]	1999	Norway	50–69	Biennial	£75.4	1996 GBP?	5	0.0088		£8561	
Wang 2001[301]	2001	Norway	50–69	Biennial		1996 US$?	4.5			US$3750	
de Koning 1991[292]	2006	Netherlands	50–69	Biennial						US$3825	US$4050
Stout 2006[291]	2006	USA	40–79	Annual[c]		2000 US$	3				US$36,500
Rojnik 2008[298]	2008	Slovenia	50–69	Triennial	€191.2	2004 €	3	0.0434	0.0386	€4405	€4953
de Gelder 2009[300]	2009	Switzerland	50–69	Biennial		2004 €?	3			€11,512	
Ahern 2009[299]	2009	USA	40–79	Biennial[d]	US$1300	2004 US$	3		0.0357		US$35,500
				Annual	US$1600				0.0406		US$39,400

€, euros; GBP, pounds sterling; LYS, life-years saved; NZD, New Zealand dollars; US$, US dollars.
a Where the cost/year is not stated it has been estimated (indicated by '?').
b ICERs reported or calculated versus no screening, except de Gelder *et al.*,[298] where the comparator is opportunistic screening.
c Cohort simulation modelling gains from screening the US population from 1990 to 2000.
d The biennial strategy modelled here includes clinical breast examination in the year in between mammography.

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TABLE 27 Cost-effectiveness calculations for mammography promotion

Intensity	Programme cost (currency)	Costs converted to '2008' GBP	Total costs including repeats (£)	Effectiveness (%)	Additional QALYs	Additional costs of new users (£)	Total additional cost (£)	Incremental costs (£)	Incremental gain	ICER ('2008' GBP)
Screening triennially from 50 to 70 (cohort of 1000 women) assuming replication of programme at years 3, 6 and 10 and 50% relapse rate										
Low intensity	34,000 ('1995' US$)	34,000	119,313	1.25	0.4825	1850	121,163	121,163	0.4825	251,000
Higher intensity	730,000 ('2000' US$?)	657,000	2,305,554	7.60	2.9336	11,248	2,316,802	2,195,639	2.4511	896,000
Screening triennially from 50 to 70 (cohort of 1000 women) with no replication of programme and 50% relapse rate										
Low intensity	34,000 ('1995' US$)	34,000	34,000	1.25	0.4825	1850	35,850	35,850	0.4825	74,000
Higher intensity	730,000 ('2000' US$?)	657,000	657,000	7.60	2.9336	11,248	668,248	632,398	2.4511	258,000
Screening triennially from 50 to 70 (cohort of 1000 women) with no replication of programme and 0% relapse rate										
Low intensity	34,000 ('1995' US$)	34,000	34,000	2.50	0.9650	3700	37,700	37,700	0.9650	39,000
Higher intensity	730,000 ('2000' US$?)	657,000	657,000	15.20	5.8672	22,496	679,496	641,796	4.9022	131,000

higher intensity intervention ICER is much higher. Even at the extreme assumption of 0% relapse without reapplication of the programme, the interventions are not cost-effective at a threshold of £30,000 per QALY.

Andersen 2002[82] undertake a cost-effectiveness analysis of promotion of mammography using the cost and effect estimates from the CA arm of the trial. The trial data are modelled to calculate a cost per life-year saved of US$56,000 ('1995' US$) or £56,000 ('2008' GBP). The calculation appears to assume that all new users maintain mammography use for life. Details of the modelling are very brief. It is unclear what discount rate was used, or even if the promotion of mammography was considered as an alternative programme to the provision of mammography without promotion. Nevertheless, the figure supports the conclusion that the programme would not be considered cost-effective in the UK.

Discussion

We applied costs and outcomes for women commencing a 20-year triennial screening programme at 50 years, which is likely to overestimate the benefits of promoting mammography to women over 50 years of age. Nevertheless, under the most generous assumptions regarding relapse, neither programme is cost-effective at a threshold of £30,000. Under reasonable assumptions these programmes offer very poor value for money.

Diet and physical exercise

Introduction

Each of the reviewed studies utilises LAs to deliver IC and advice with the goal of increasing physical exercise and/or improving diets. Keyserling 2002[108,109] provides an intervention to diabetic women; all four other studies target healthy adults. Only Elder 2006[95,96] provides costs.

Assessing evidence of effectiveness

The evidence of improvements in diet, based on self-reported intake, is weak given the strong evidence of under-reporting of consumption. There is evidence of some improvement in fat intake and fruit and vegetable consumption, but no evidence of weight loss. Physiological evidence reported in Staten 2004[119] is mixed, but Keyserling 2002[108,109] reports no improvements in HbA_{1c} levels in either of the intervention arms, despite extensive health advice and counselling tailored towards a diabetic population with significantly raised HbA_{1c} levels. The evidence of unreliability of self-reported dietary intake also casts doubts on the self-reported evidence of increased physical activity. Again, it is notable that none of the studies observed any weight loss in the intervention arms compared with baseline or controls at follow-up.

Elder 2006[95,96] reports significant improvements from the *promotora* intervention at 3 months, which dissipated at 6- and 12-month follow-up. They conclude that repetition of the intervention may be necessary to maintain change. It is also possible that intensive counselling in the intervention group increased the tendency to under-report food consumption, a tendency that wore off after the intervention had ended. Overall, the physiological data collected do not seem to support the self-reported data showing improvements in diet, and there is evidence that changes are not sustained. The results of these studies give little confidence that long-term lifestyle changes can be achieved through IC from LAs; hence these interventions are unlikely to be cost-effective.

HIV infection prevention

Introduction

The reviewed studies describe the use of trained LAs to deliver HIV infection prevention messages – primarily advocating condom use and the sterilising of drug injection equipment – to illegal drug users. The LAs were predominantly drug users who were recruited and trained to provide outreach work – counselling, education and materials distribution – to drug-using peers. Both studies are primarily qualitative. However, quantitative data on the impact of each intervention on risky behaviours among LAs have been published and are analysed here.

Assessing evidence of effectiveness

The small increase in hygienic injection practices among LAs reported in Dickson-Gomez 2006[91,92] following the intervention suggests that it was not effective in changing injection risk behaviours, given the possibility that LAs felt additional pressure to under-report at review. The increase in reported condom use and reductions in the number of sexual partners are more impressive, and suggest that the programme may have been effective in reducing risky sexual behaviours. The use of a control group who received an appropriate comparison intervention lends more weight to the results reported in Dickson-Gomez 2003.[89,90] The intervention appears to have been effective at reducing both risky sexual and injection behaviours. However, the use of an ordinal scale to define the magnitude of risky behaviours makes it difficult to estimate the absolute reduction following the intervention, as does the decision to ignore any reported increases in risky behaviour. The study design in Dickson-Gomez 2003[89,90] is more robust and this study will be used to inform estimates of behaviour change following outreach interventions amongst drug users.

Estimating the reduction in risky behaviour

Evaluation of the health gains from reduction in risky behaviours requires quantification of changes in behaviour. The number of LAs reporting increases in condom use during casual sex is small (18% intervention vs 5% control) and limited to the small proportion (31, 14%) of LAs reporting casual sex. Of these respondents, 26 were in the intervention arm and they reported a mean of 2.4 casual sex partners. Applying a conservative assumption that the reduction in the frequency of unprotected sexual encounters is 25% would result in an absolute reduction of $2.4 \times 0.25 \times (0.18 - 0.05) \times 26 = 2.03$ unprotected sexual contacts in the intervention arm compared with the control. Applying a more generous assumption of a 50% reduction in unprotected sex would double this, but, either way, the effect is small.

A small proportion of LAs (22, 19% of injectors) report sharing needles at baseline. Of this group, roughly one-half reported sharing more than once a month, and one-half once a month or less. Applying an estimate of the frequency of needle sharing of three times a month to the first group, and once a month to the second, gives an estimate of 12 incidents of needle-sharing per LA who shares over 6 months. At review, 69% report reductions in unhygienic needle practices compared with 30% in the control group. The number of needle sharers in the intervention arm is not reported but participants were randomised in the ratio 2 : 1 between the intervention and control arms, giving an estimate of 10 LAs reducing unsafe practices in total in the intervention arm, and an estimated increase of six LAs reducing unsafe practices over and above that achieved by the control programme. Again, we do not know by how much those reporting reducing unhygienic needle practices actually reduced incidents. Applying a conservative assumption of a 25% reduction in incidents of needle sharing for those who report reductions gives an estimate of nine incidents of needle sharing over the 6-month period per LA reporting reductions. This gives an estimate of the reduction in the overall number of incidents of needle sharing of $(12 - 9) \times (10 - 6) = 12$ incidents avoided. Given that the likelihood of infection from shared

needles is higher than from unprotected vaginal sex (although not unprotected anal sex),[305] and the change in number of incidents is far higher, only the impact of reduced needle sharing will be considered further.

Estimating the number of HIV cases avoided

Translating risk reduction behaviours into health gains requires an estimate of the number of infections avoided. Estimates of infections avoided are usually based on a Bernoulli process model of transmission, where probability of infection is a function of the number of unsafe acts, the risk of transmission from an unsafe act and the general prevalence of disease.[306] Application of trial data on risk behaviour is combined with literature estimates of the risk of transmission and survey data on the prevalence of disease, to estimate the number of infections averted through the reported reduction in risk behaviour. A conservative assumption that the observed reduction in risk behaviour occurs only for the duration of the intervention is generally applied, but the analysis assumes that those protected from infection do not subsequently become infected.

A simplified Bernoulli model is presented in *Equation 2*. The equation estimates the probability of infection from sharing injection equipment, assuming that shared injection equipment has previously been used by one other user. Using this equation we can calculate the risk of infection and the number of infections in the absence and the presence of the programme. The difference represents the estimate of the number of infections averted by the programme.

US setting

$$\text{Probability of infection } p = 1 - \{(1 - \pi) + \pi[1 - (\alpha_d \times \alpha_i)]\}^n \qquad \text{[Equation 2]}$$

where:

- π = HIV prevalence = 0.2[89,90]
- α_d = risk of infection of needle used by seropositive user = 0.9[307]
- α_i = risk of infection from infected needle = 0.0067[308]
- n = number of incidences of needle sharing.

Without the programme, $n = 12$ and $p = 0.0144$, but with the programme $n = 9$ and $p = 0.0108$. Hence the programme reduces the probability of infection by $0.0144 - 0.0108 = 0.0036$. For the 10 users who report a reduction in risk behaviour, the number of HIV cases averted is 0.036. Application of the control programme would have averted $0.0036 \times 4 = 0.0144$ cases. The additional gain from the programme is an additional 0.0216 cases averted.

UK setting

The prevalence of HIV in the UK is much lower than in the USA (around 0.13%[309]). A prevalence of around 4.0% is observed among injecting drug users in London, but outside London HIV prevalence among injection drug users in England is low (0.6% in 2007).[310] These values have a dramatic effect on the number of HIV cases averted by the programme (*Table 28*) and, consequently, its cost-effectiveness. Applying *Equation 2* with the same parameter and programme estimates, but applying a background HIV rate (π) of 0.04 (London) and 0.006 (outside London), allows calculation of the potential HIV cases averted in a UK setting (*Table 28*).

Estimating health gains

Early work estimated that an infection averted generated a health gain of around 11 QALYs (discounted at 3%).[311] However, it is likely that the health gain from HIV infection prevention

TABLE 28 HIV cases averted by risk reduction behaviours in drug-using LHAs

	London: $\pi = 0.04$	Rest of England: $\pi = 0.006$
Infection risk without programme	0.002891	0.000434
Infection risk with programme	0.002169	0.000326
Risk reduction	0.000722	0.000109
Cases averted by intervention	0.00722	0.00109
Cases averted by control programme	0.00289	0.000436

has fallen with the advent of improved antiretroviral treatments (ARTs). More recent modelling estimates suggest that the health loss from HIV infection is 5.37 QALYs.[312] US estimates of the lifetime costs of HIV infection range from US$180,000 to US$303,000.[311,313,314] A recent review highlighted a paucity of evidence on HIV costs in the UK.[315] We used an estimate of £84,500 ('1993' GBP), £143,000 ('2008' GBP), which examined costs over the period 1992–7. Evidence from a review of global costs suggests that treatment costs for patients with AIDS remained constant throughout the 1990s, but costs for HIV infection increased with the introduction of highly active ARTs.[316] Consequently, this figure is likely to be an underestimate.

Programme costs

Dickson-Gomez 2003[89,90] report that participants were compensated US$20 for completing the baseline interview and US$15 for each of the 10 2-hour training sessions they attended. Two-thirds of the 250 participants were randomised to the intervention (approximately 168). The training sessions were conducted in small groups. If we assume that the mean group size was 7, then this would require training 24 groups. With the associated administration this is likely to require a full-time employee for 1 year. The total cost of an alcohol health worker per year of £47,317 was applied.[219] Assuming that mean attendance is five sessions, the participant remuneration costs are US$$[20 + (15 \times 5)] \times 168 =$ US$15,960. Assuming that costs were in year '2001' US$, this is equivalent to £11,800 ('2008' GBP). Hence implementing the programme would cost £59,200.

Estimating the cost-effectiveness of the programme (London)

Applying an estimate of £143,000 saved and 5.37 QALYs gained from each HIV case averted generates the following results for the programme, which costs £59,200 and averts 0.00722 infections.

Compared with the control:

- costs saved = £143,000 × 0.00433 = £619
- QALYs gained = 5.37 × 0.00433 = 0.0233 QALYs.

Compared with no intervention:

- costs saved = £143,000 × 0.00722 = £1032
- QALYs gained = 5.37 × 0.00722 = 0.0388 QALYs
- marginal cost = £59,200 – £1032 = £58,168
- ICER = £58,168/0.0388 = £1,500,000.

Based on these estimates the programme is not cost-effective. However, the estimates of costs saved and QALYs gained are based only on the reduction in risky behaviour among LAs during the 6-month period of observation. While these very conservative assumptions are typically applied in the HIV infection prevention literature they are likely to underestimate the gains

from such programmes. Clearly, LAs are likely to maintain reductions in risky behaviour for at least some time after the intervention, and at least some will undertake outreach work that leads to risk reductions in their community as well. We can accommodate the impact of extended behavioural changes and outreach in a crude fashion by multiplying the estimated number of cases averted with a scaling factor. Assuming that LAs maintain their behaviour change for 3 years would give a scaling factor of 6. (The estimation of HIV cases from the Bernoulli model does not scale linearly with time, but the difference is negligible. The calculated HIV cases averted over 3 years is 0.00428 – multiplying the 6-month estimate by 6 gives 0.00433.) Assuming that LAs achieve similar reductions in risk behaviour by two peers for 18 months would also require a further increase in the scaling factor by 6, giving a scale factor of 12. The impact of varying the scale factor is shown in *Table 29*.

A scaling factor of at least 27 is required to achieve an ICER below £30,000 per QALY. This amounts to a LA reducing risk behaviour for 13.5 years *or* two peers reducing risk behaviour for 7 years. This programme is unlikely be cost-effective in London at a threshold of £30,000, even if the most generous assumptions on the long-term effects of behaviour change and outreach are made. In the rest of England, where HIV prevalence is far lower, the programme would avert only a fraction of the HIV cases averted in London and it is clearly not cost-effective. This programme would not be justified in a UK setting based on HIV cases averted because the background prevalence, even in London, is too low.

Discussion

Pinkerton *et al.*[317] have reviewed studies reporting on the cost-effectiveness of HIV prevention programmes. Each study concluded that the costs averted from HIV infections avoided were greater than the cost of the programmes. However, calculations were based on US-based HIV prevalence rates. Cohen *et al.*[305] examined the relative cost-effectiveness of different HIV infection prevention programmes and concluded that individually focused interventions to change behaviour were generally cost-effective only in populations with a high prevalence of HIV. For communities with a prevalence of HIV of 0.1%, only mass media campaigns were cost saving.

There is some evidence to suggest that programmes targeting risky behaviours in injecting drug users are cost-effective in their US setting, where the prevalence of HIV is high. The mean prevalence rates for HIV among injecting drug users in the USA was estimated at 16% in 2007.[318] Cohen *et al.*'s analysis[305] suggests that programmes that are highly cost-effective at this prevalence are unlikely to remain cost-effective at prevalences below 1%, as observed in injecting drug users in most parts of the UK.

Extremely generous assumptions of the effectiveness of the programme are required for it to be cost-effective in London for prevention of HIV. However, unhygienic needle practices are also likely to spread hepatitis C with long-term cost implications.[319] Prevalences of hepatitis C of 60% among intravenous drug users in London and 35% outside London were reported in 2008.[310] Without firm data on the likelihood of transmission of hepatitis C through shared needles, and

TABLE 29 Impact of extrapolation of changes in risky behaviour in drug users and their peers

Scaling factor	Cases averted	Costs saved (£)	Marginal cost (£)	QALYs gained	ICER (£)
3	0.02166	3097	56,103	0.116	484,000
6	0.04332	6194	53,006	0.233	227,000
12	0.08664	12,390	46,810	0.465	101,000
20	0.1444	20,649	38,551	0.775	50,000
27	0.1949	27,876	31,324	1.047	29,900

on the long-term costs and consequences of hepatitis C infection, it is impossible to estimate the costs saved and health gains from hepatitis C infections averted through a programme such as this. The conclusions on the cost-effectiveness of the programmes in the USA, where HIV prevalence among injecting drug users is 16%, may apply equally well to a UK setting when the impact on hepatitis C infections (35% prevalence among injection drug users) is considered.

Chapter 4

Discussion

This research aimed to identify, describe, classify and analyse the range of models developed to date for delivering HRLA or training, for effectiveness, mechanism of effect, cost-effectiveness, equity and acceptability in improving the health and well-being of individuals and communities, with particular reference to the reduction of inequalities in the UK. One noticeable limitation of the review was the fact that only six of the included studies had taken place in the UK. While much can be learned from intervention components' details in other contexts, the extent of the transferability of the findings remains to be established. The initial phases of the project served to analyse the breadth of the research question, and to clarify the scope of this review. This is a key and complex step of the process,[69] which highlighted the importance of contextual issues and, later, guided the methodology adopted.

Including quantitative and qualitative research designs, the review identified 26 papers appropriate for inclusion in a systematic review. The wide variety of LA models, delivered in a wide variety of settings, and targeting a variety of populations, prevented the reviewers from engaging in establishing firm causal relationships between intervention mode and study outcomes. By convention, meta-analysis is designed to utilise results from several related studies by identifying a common measure of effect size that is modelled via meta-regression. With regard to the current review, however, neither the outcomes under investigation nor the methods used are constant. While most of the studies reviewed adopted a quantitative methodology, primary outcome measures were of either the parametric or frequency variety, thereby rendering direct comparisons impossible. The following section considers the issues surrounding the robustness of the review.

Analysis of the robustness of the review (sensitivity analysis)

The criteria for study inclusion in the review are provided in *Chapter 2* (see *Box 4*). This section of the report provides further information on the quality assessment of the included studies. The purpose is to provide some critical commentary on the strength of evidence on which the review is based. The process has been guided by the principles of quality assessment[69,320] and the work of Jackson and Waters.[64]

To quote from the CRD guidelines,[69] '… the aim of assessing study quality is to establish how near the "truth" its findings are likely to be and whether the findings are of relevance in the particular setting or patient group of interest' (p. 33). This is an issue worthy of comment, as the quality criteria required to achieve inclusion in this review limited data to a particular type of evidence. The consequence is that only a partial representation of the current practice of HRLA interventions may be reported in the review. This issue is further highlighted by drawing on anecdotal, early small-scale and formative evaluation evidence of the PAG with respect to one type of HRLA intervention: health trainers. Current practice activity is described as:

1. broader in focus (i.e. not limited to one health improvement issue)
2. possibly be more likely to reach disengaged populations (as, by nature, in research there is a process of consent to participate, which may alienate people)

3. possibly be more likely to link with other services (such as smoking cessation services, for example)
4. working on longer timescales, thus informally assessing knowledge acquisition and behaviour change
5. having a greater focus on barrier removal, which was addressed only in five of the studies included here
6. having more likely to engage in community development activities, which none of the studies included here did.

Appropriateness of study design

Some aspects of the study designs may have introduced bias. For example, some studies recruited participants from prior studies[26,97] or from existing health-care services.[119]

Some trials were unblinded and combined this with self-report data, for example Earp 2002[16,63,93,94] and Paskett 2006[116,117] This may be difficult to avoid for some of the interventions studied, but there were few efforts to acknowledge or mitigate the problem. Longer follow-up would help to determine the duration of effect. This might also allow for the LA role/HRLA intervention to develop and mould itself to community-specific needs.

Often comparisons were with control groups receiving 'standard care', but studies did not always report clearly what that entailed. Another issue relates to 'background noises' of health education campaigns, which was not acknowledged in any of the studies included here.

It was sometimes difficult to distinguish the effect of diverse intervention components. For example, Anand 2007[80] provided a very brief description of the intervention components, which makes it very difficult to assert what element (information giving, nurturing, removing of barriers, etc.) was the most important to intervention success. This has to be balanced with the fact that complex local needs may be best met with complex interventions, and that a detangling of discrete intervention components may come as a second phase to intervention trial for effectiveness. This is therefore not necessarily an issue of inappropriateness of study design, but a comment about where evidence research on this subject area tends to be placed on the MRC continuum of evidence development.[67]

Choice of outcome measures

Few of the studies included explicitly measured outcomes taking into account socioeconomic profile, making it impossible to comment on equity of outcomes. Another issue for consideration is that many studies focused on rather homogeneous disadvantaged populations, so differential outcomes would be difficult or impossible to measure. Most interventions included aimed at changing behaviour. Assumptions thus appeared to be made about the linearity of the following chain of action: information provision – knowledge acquisition – behaviour change – physiological outcomes. There was very limited description detail of the information provision element (see above about 'background noise'): four studies assessed knowledge acquisition as a result of the intervention,[84–87,108,109,112,116,117] but none related this to subsequent likelihood of behaviour change. Those studies that assessed behaviour change did not relate this to changes in physiological outcomes. This may be because clear links have yet to be established in the health improvement literature, but reports did not acknowledge this issue or bring any methodological solution to it.

The benefits of lifestyle interventions are typically accrued decades into the future for younger people, hence capturing long-term outcomes (such as a reduction in mortality from smoking cessation) simply is not feasible. As such, the surrogate short-term outcomes reported are

appropriate. However, there are concerns that lifestyle changes may not be maintained, and in this respect the very short duration of many studies (few were over 1 year – Gary 2003[98–100] are an example of this) raises concerns. There is also a lack of clarity as to whether maintenance requires continued input from LA – behavioural theory would suggest that a single input is unlikely to maintain behaviour change if the environment that the person is in does not also substantially change, for example drug users remaining in a drug-using community (unhelpful), smokers no longer being able to smoke in public venues (helpful).

Further concerns arise where self-reported data alone (i.e. not backed up by objective measures) are analysed from unblinded trials. There is evidence of inaccuracy in those data (particularly when one of the answers may be more socially acceptable), and a potential for bias in interventions where the trial (but not the control) arm have established a relationship with a LA (in which case the latter should not be involved in data collection). However, it has to be acknowledged that some outcomes that are very important can only be gained from self-report (e.g. QoL, attitude change, satisfaction). This issue might be mitigated by longer follow-up, and it is notable that one publication[95,96] found evidence of mitigation of the intervention effects after only 12 months. This might indicate either relapse from lifestyle changes or decreased motivation to report favourable outcomes (reduction in bias).

Statistical issues

The wide variety of LA models delivered in a wide variety of settings and targeting a variety of population groups and covering a range of health improvement aims prevented the reviewers from engaging in establishing firm causal relationships between intervention mode and study outcomes. Indeed, apart from the fact that the studies have all been designed to test the effect of intervention by LAs, neither the outcomes under investigation nor the methods used are constant. The disparate nature of the studies meant that no standardised method of estimating effect size was viable; hence the reporting of various effect sizes depending on, and restricted to, the topic under investigation. For example, the standardised mean difference is applied when reviewing studies assessing the same outcome but measured differently, for example via different instruments. In such circumstances results are standardised to a uniform scale prior to analysis. The resulting statistic communicates the size of the intervention effect in each study relative to the study's observed variability. However such an approach is clearly not applicable when dealing with different outcomes from dissimilar studies, albeit with a common, or perhaps similar, intervention philosophy.

Quality of reporting

Jackson and Waters[64] comment that 'reviews have been criticised for their focus on individual health education interventions rather than complex environmental or structural interventions and the poor coverage of issues relating to the social determinants of health' (p. 368). In this review, the evidence assessed did focus mostly on individual behaviour change interventions, and attempts were made to counter that by using a realist approach to reporting. This approach is also thought to have extracted the most meaning out of the data available.

Quality of intervention

Assessing the quality of interventions may be problematic 'where there is no preliminary research suggesting that an intervention should be administered in a particular way… it is important to establish to what extent these are standardised, as this will affect how the results should be interpreted'[69] (p. 41). There is a methodological dilemma here, as high-quality research would require replicable interventions, and our synthesis shows that there was a tendency towards standardisation, but the nature of LA intervention may be more intuitive and resistant to the production of 'one-size-fits-all' model of delivery.

With respect to complex interventions typical of public health community-based programmes, 'the quality can be conceptualised as having two main aspects: (i) whether the intervention has been appropriately defined, (ii) whether it has been delivered as planned'[69] (p. 42). As discussed above, the studies included in this review often lacked a detailed description of their intervention mechanisms, as planned and as delivered. Dickson-Gomez 2006[91,92] in adopting an ethnographic approach, is an exception to this. With this exception in mind, it is of note that this issue is linked to that of the quality of reporting, as detailed descriptive accounts of intervention components, while they would have been considered in a realist synthesis, could not be included in this review.

Interdependency issues

Some studies reported on interventions that would be difficult to implement or be too costly in real-life settings (Dickson-Gomez 2006[91,92] provides an example, in that the LAs would require salary to work in the longer term, and in that the background rates of HIV infection in the UK would mean that this intervention would not be cost-effective in this setting). Interventions are inevitably interdependent on their context, an issue that the realist approach used here has started to tease out, but this is rarely acknowledged in the published literature.

Generalisability

There is a particular issue around generalisability of the interventions described, in that (as described in *Chapter 3*, Section 2, *Interventions context, mechanism and outcomes*) there is no such thing as a 'typical' practice setting for LAs. The specificity of setting and intervention components may well prevent the success of some LA interventions to be generalisable. The strategy adopted in this review, which highlighted specificity, may offer service providers and funders with a 'menu' of intervention characteristics that is flexible enough to allow for local specificity and IK.

While not always granted statistical significance, small effect sizes may be important in public health setting. Indeed, Sorensen *et al.*[321] assert that 'when risk is widely distributed in the population, small changes in behaviour observed across an entire population are likely to yield greater improvements on the population-attributable risk than larger changes among a smaller number of high-risk individuals' (p. 380).

It is also worth bearing in mind that the achievement of a small, or even insignificant, effect size in a population, which would not otherwise be accessed by health improvement interventions, is not to be neglected. So while the generalisability of trial results could be statistically questionable, it may be that the consideration of issues of generalisability of interventions' contexts and components could play a key role in addressing health inequalities, for example.

Evaluation approaches and research designs

All research was conducted by professionals/academics, with no peer involvement in the research process; so, for example, when observed by ethnographers[89–92] the peers 'led the ethnographers around', showed them 'relatively' safe environments, and people, and probably showed only behaviours regarded as 'positive' by the researchers. There may be issues of concern regarding the 'not stated'/'not seen' behaviours. For example, Ungar *et al.*[37] showed peers wanting to be 'invisible' to fulfil their roles more effectively.

Evidence application and utilisation: processes and challenges

Given the caveats spelled out in the previous section, some caution has to be exercised in terms of the practice and service messages that can be drawn out in this discussion. The limitations that the review design placed on the type of data that could be included consequently means

that there is an information base about HRLA provision outwith this review (see, for example, a newly developed database at www://piph.leedsmet.ac.uk/main/litreview.htm). Indeed, the quality assessment process that studies had to be submitted to prior to inclusion meant that the review favoured single-focus interventions, with defined and often standardised protocols, with a predominant focus on individual behaviour change rather than community development. This may have eliminated report of practices focusing on engagement or social capital or more overtly tackling health inequalities. Thus the series of continuums proposed in the initial phases of this review (*Appendix 3*), which was based on consultation with practice experts, needed development for a thorough description of the included studies. Equally, few included studies could be positioned on all of the continuums. This highlights the gap that still exists between HRLA practice and research. Mapping this review evidence against a model recently developed[20] allowed the location of this evidence base in the wider HRLA knowledge arena. While that model maps out practice foci, the model developed here (see *Chapter 3*, *Figure 4*) provides a detailing of models of practice within the individual/behaviour change quadrant of Visram *et al.*'s[20] model. This focus on intervention mechanisms, or intervention theories,[79] is a key feature of realist synthesis.

So that this discussion may achieve maximum utility to policy-makers and service providers, *Figure 6* serves as an anchor for the following paragraphs, where each aspect is covered in turn. The ambition for this approach is that it will allow readers to locate the evidence synthesis and the issues arising from that in their particular cultural and organisational context.

Contextual issues

Evidence

Overall, previous reviews suggest that LAs may be of use in improving access to health care, and may reduce health disparities. However, the evidence is variable and can give only limited support to LAs having a positive impact on health knowledge, health behaviours and health outcomes. All of the previous reviews identified the need for future research that was of high methodological quality and high reporting quality. This should clearly identify and describe the character and role of the LA, and the character of the population to whom they delivered the intervention. More research is needed to understand the health effects of HRLA in combination with other interventions. The research should use valid, reliable and sensitive outcomes of importance to the participants and increase community involvement. There is a need for longitudinal research to evaluate the duration of effect of the interventions and more research into the social and health costs of providing such services.

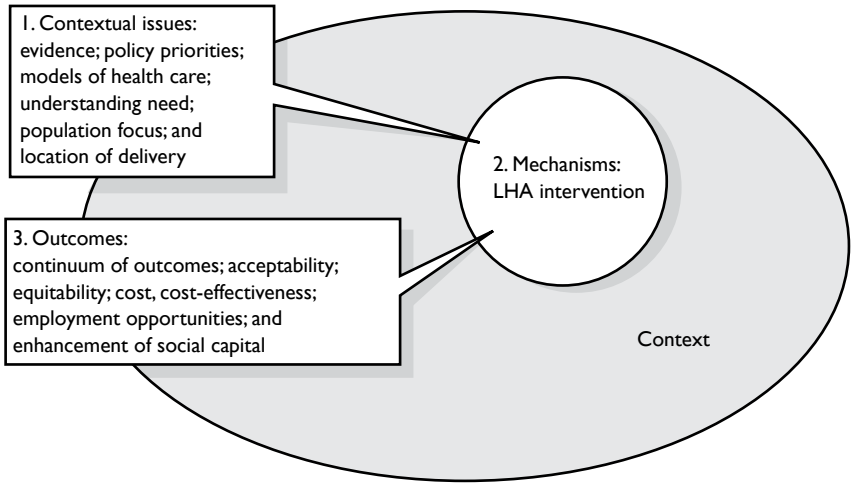

FIGURE 6 Lifestyle advisor intervention.

Policy priorities

Although most included studies stated that their target population was underprivileged and lacked access to services, none referred to tackling health inequalities as a study aim. Some, however, such as the screening interventions, tackled inequalities in that they made the screening more available to otherwise mostly disengaged populations. However, this was not an explicit aim of the study. Maybe more obviously, the HIV infection prevention studies (Dickson-Gomez 2006[91,92] in particular) sought to engage drug users in the delivery of health care. As such, they fulfilled a dual purpose of (1) engaging these hard-to-reach groups and (2) making safe practice advice and materials more available to them, thus reducing barriers to health. The ethnographic design of the study also meant that the message delivered was not solely from on high, but also took local practices and microcultural dimensions into consideration. Dickson-Gomez 2006[91,92] put a particular emphasis on highlighting the benefits of HRLA work on the LAs themselves and described how, for many of them, undertaking the LA role was the first step to employment and a possible end to homelessness and addiction.

Models of health care

In the introduction to this review the LA role was located within a general movement in the public health field away from a paternalistic to a partnership approach. The development of LA roles, most of which are rooted in some way in the target community, is an example of this policy shift. However, in practice this was only minimally presented in this review, with the premise of correcting inappropriate behaviours being at the root of many interventions. Included studies thus illustrate a partnership approach that was operationalised through a change in workforce rather than a change in message focus. This, however, had an obvious impact on social capital in the case of Dickson-Gomez 2006[91,92] for example.

Understanding need

Few of the studies included in this review make reference to accessing or capitalising on IK as a key component of the intervention. As described above, LAs in the included studies acted as translational agents, who sometimes removed barriers to the prescribed behaviour or helped to create a social environment facilitative or supportive to behaviour change. LAs clearly used their IK in Dickson-Gomez 2006[91,92] to access hard-to-reach individuals, and did report, to an extent, on other, unforeseen, local needs and issues. In this case, the use of LAs who were peers with a common experience and who had lived in the community for some time was crucial to intervention success.

However, the ways in which this capitalisation on IK through LA is realised remained unclear in most studies. Questions remain as to what knowledge was lacking to require LA intervention in the first place, how it was sought and how the message was delivered. This issue relates to an operationalisation of an understanding of local needs, for which techniques such as social marketing could offer potential.

Population focus

The original population continuum (see *Appendix 3*) did not allow for detailed description of the complexity of intervention target groups. The studies included showed that multiple characteristics can be used simultaneously to describe intervention target groups (*Table 10*). However, the rationale for selecting a particular combination of characteristics was not made explicit. In particular, although some studies described the local population as hard to reach, the 'hard-to-reachness' of study participants was not always asserted. The quality assessment process that all studies were submitted to allocated lower strength to studies when a low proportion of the population agreed to take part. This suggests that some studies that did target disengaged populations had to be excluded from this review.

Intervention location

Intervention location was a key element of intervention delivery mode and approach, in that, for example, people with chronic conditions were often part of interventions that took place in health-care settings. While both types of interventions were classified as community based, there is a key distinction to be made between screening interventions, which had elements of mass education campaigns, and HIV infection prevention interventions, in which location was crucial to engagement, message delivery and acceptability.

Mechanisms

Intervention aim

No studies described the aim of the intervention in terms of placing themselves on a health maintenance–health promotion–primary, secondary or tertiary disease prevention continuum. Of note is the fact that no intervention tackled health maintenance in any population. That is to say, most studies were narrowly focused on one issue or behaviour pattern, and measured outcomes directly related to this. While this is understandable from the methodological point of view of study design, it comes at odds with the potential of local or IK as operationalised by the use of LAs. Indeed, the problematisation of hard-to-reach communities, whether it is in terms of lack of access to services, high prevalence of risky behaviours or diseases, is unlikely to be linked to single causal elements that can be addressed by a single intervention foci.

Intervention delivery mode

This was particularly relevant to the included studies, in that by necessity of producing and recording evidence (often by means of activity logs), few studies reported on ad hoc informal, but yet informative, conversations. Dickson-Gomez 2006[91,92] was an exception to this, but used an ethnographic study design to observe interactions between drug users and trained LAs.

Figure 5 highlights a gap in evidence of informal interventions targeted at groups of the general population. The relationship of LA with other service provision was not well articulated. This is an important deficit with respect to being a bridge between communities and service providers.

The CDSM and associated programmes deserve particular attention. They have been assessed in this review as potentially cost-effective and have been widely replicated throughout the world. In contrast with the acknowledgement in the *Choosing health*[7] document that one size fits all might not be appropriate; Lorig 1999[110] have developed a highly formulaic intervention, adaptable to a large number of disease groups. There are a few notable differences between this and other HRLA interventions. While groups are defined by behavioural characteristics in the case of interventions targeting healthy eating or screening, for example, they are defined by physiological or physical characteristics in the case of CDSM programmes. The aims of the interventions also differ, in that people with chronic conditions are helped to live with their condition; whereas in other areas, participants are not learning to live with lack of exercise or physical activity, but try to change – thus a change in engagement with risk is a key differential factor.

This diversity is in keeping with the understanding described in UK policy that 'different neighbourhoods will need different types of health trainers'.[7] However, what is not clear from the data is why a particular model was selected and also which model achieves the best results in which environment, and that different models of provision will be required to achieve best outcomes. In other words, the links between contexts, mechanisms and outcomes are not explicitly established.

Intervention approach

Most studies included in this review focused on providing information by an alternative message giver (as was predominantly the case in the diet and physical activities study group, with the

exception of Anand 2007[80] and Elder 2006[95,96]); seven studies used this approach only. The assumption is that the message is thus translated in a more acceptable and effective manner. Less than half of the studies described the creation of supportive social environment to help behaviour change. It thus appears that most interventions included here were in support of standard advice (chronic care, the buddy schemes in smoking cessation or breastfeeding, for example). In a few cases, as in the HIV infection prevention studies or in mental health, they were presented as an alternative and more effective approach to standard care. The screening studies focused on reaching out to populations to bring them to standard screening practices, so fulfilled more the role of a bridge between disengaged populations and standard models of care.

Evidence suggests that few studies use one approach only, but, equally, few studies are explicit about approach components, and their effect in isolation and/or in combination. This suggests that intervention approach may be even less explicit in practice, and left to develop from the IK held by the LAs. The categories of information delivery, nurturing for behaviour change, creation of supportive social conditions and barrier removal were created inductively from the included studies, but may thus be insufficient to describe the complexity of interventions in practice. However, crucially, these categories need further unpicking, as some studies appeared to create favourable social conditions, for example, how this was achieved remains unclear. While it is in keeping with the philosophy of HRLA to capitalise in an informal manner on the knowledge held by LA, this is also preventing an articulation of what approach works in what context.

Training

The relationship of the amount and area of LA training to intervention effectiveness remains unclear. Equally, the effect of training on the lay and/or peer status of LAs remains unexplored. Earp 2002[16,63,93,94] presents the impact of training on intervention acceptability and credibility, as participants nominated the fact that LA had taken a course as one of the reasons why they would feel comfortable talking to them. Some studies followed a pseudoprofessional approach with respect to recruitment, training and remuneration, and the LAs were rarely selected by the community they were intended to serve.

In practice, the LA role is represented by a range of titles that obscure its key characteristics. For example, distinction between peerness and layness was not made in any of the studies included in this review. This is also true in the UK, where HRLA is often delivered by 'health trainers', a title that, in itself, does not assume any degree of peerness or layness. This lack of clarity may have major implications on the mechanisms of action and intervention outcomes.

Outcomes

Although papers included in the review often discuss the content of the intervention, what they do that leads to positive change is very rarely described. So, although it is possible to say that LAs are effective in improving health and well-being, the outcome–causality chain is not clear. Disappointingly, the situation reported by the WHO 20 years ago with respect to CHWs, i.e. a lack of understanding of how to realise the potential of the role[12] continues to plague the LA role. The dominant mechanisms of action appears to balance on the assumption that a change in knowledge leads to change in beliefs, which leads to change in health behaviours, which leads to improvements in health, QoL, activity, participation, etc. Three key issues emerge for comment. First, the time scale of many of the reported studies is too short to allow demonstration of movement along a knowledge to improved health trajectory. The general assumption is that the movement is linear and not dependent on continued or evolving and cumulative interventions. Second, there is a clear need to identify and measure intermediate outcomes to demonstrate progress on such an outcomes continuum. Third, because of the contextual sterility of intervention descriptions, it remains unclear to what extent the LA intervention was a

contributor to other programmatic interventions, as is often the case with respect to public health practice. Thus the partnership or cumulative impact or potential is therefore not clear.

Acceptability

Levels of acceptability appear to be high. However, this is often reported as a generic statement with respect to a HRLA service, rather than providing clarity on what aspect of the LA influenced acceptability. Earp 2002[16,63,93,94] presented an exception to this, as participants explained how important it was to them that the LA was someone local who they knew well and trusted. Other important elements were that the LA had professional or personal experience of breast cancer and had undertaken training. So the key element in here is that participants wanted the health improvement message translated. In Dickson-Gomez 2006[91,92] the delivery setting was a particularly important acceptability factor, as outreach workers were able to deliver messages in settings not usually targeted, such as disused buildings and other drug injection sites.

Equitability

There are clear gaps in HRLA provision, covering both target groups, such as men, older people or homeless people, for example. There was indeed a clear dominance of interventions targeted at women, but the rationale for this was unclear (i.e. women might be clear change agents in some communities, but this was not made explicit). Interventions were always focused and no evidence could be found of holistic interventions (i.e. tackling health promotion, maintenance, primary, secondary or tertiary prevention).

Cost-effectiveness

The economic analysis suggests that lay-delivered smoking cessation interventions are highly cost-effective. Neither promotion of screening nor exercise/healthy eating is cost-effective. Programmes directed towards improved disease management have the potential to be cost-effective. The conclusions on physical activity and healthy eating flow from a lack of evidence of effectiveness in these areas. Where there is evidence of effectiveness, LAs are not always cost-effective. The key driver is the size of the potential health gain from the behaviour promoted. This is large for smoking cessation, and justifies a relatively intensive intervention. The gain from mammography is simply insufficient to justify even a low-intensity promotion programme. The benefits from improved management of diabetes are potentially large, and may justify a low-intensity call centre-based intervention to encourage healthier lifestyles. While the benefits of averting HIV infection are large, the background rate is too low to justify intensive peer-promoted risk reduction programmes for injecting drug users in the UK.

A considerable amount of uncertainty pervades much of this analysis. Estimates of the health gains are likely to be robust in mammography and diabetes management, as they are based on extensive trial data modelled by experienced groups. Less attention has been paid to modelling the health gains from smoking cessation, but extensive epidemiological data suggest that the estimate used here is conservative. Consequently, the conclusions on smoking cessation in this study are likely to be robust, and they are similar to many published studies of cessation services. The analysis of mammography used generous estimates of the benefits of the programme and the results are likely to be robust, although other authors have come to different conclusions. The greatest uncertainty exists over the benefits of breastfeeding. Few would doubt that benefits exist, but the evidence of improvements in cognitive ability and reductions in obesity and type 1 diabetes is controversial given the inevitable environmental confounders. Without an estimate of the health gains from breastfeeding it is very difficult to judge whether promotion is cost-effective. It should be noted that the small number of studies reviewed in each area raises the possibility of publication bias, leading to an overestimate of the effectiveness of LA programmes.

The greatest uncertainty arises with respect to maintenance of behaviour changes. Data from the smoking literature are encouraging, in as much as they suggests that a proportion of quitters remain abstinent. Few data exist on whether changes in diet or physical activity are maintained but the evidence from the weight loss literature is not encouraging.[322] It is quite possible that long-term abstinence from smoking is easier to maintain than dietary improvements and physical activity routines given the financial incentives to abstain. Data on long-term maintenance are essential if judgements on the viability of diet and physical activity promotion programmes are to be made.

Chapter 5

Conclusions

We identified 269 studies that evaluated HRLA. We excluded a further 243 studies owing to a range of methodological factors that made them unsuitable for inclusion in a systematic review. The CRD guidelines[69] acknowledge the limitations of traditional criteria for producing systematic reviews in public health and advocate the use of far more iterative processes. This review has attempted to reconcile the rigour necessary to conduct a systematic review with the necessity to provide in-depth description of the interventions included by working iteratively across intervention foci, context–mechanism–outcome, and economic approaches to analysis.

There is a vast descriptive and process literature on the subject of LAs. Overall, the evidence is not sufficient to support or refute the use of LAs to promote health and improve QoL. Although there is likely to be considerable uncertainty about statements of interventions' cost-effectiveness because of the sparse evidence base for effectiveness, some conclusions can be drawn. The following summarises the health economic analysis conclusions on each intervention focus type, with some descriptive/analytical comments informed by the realist approach.

- Lifestyle advisor interventions in chronic care are cost-effective. The effectiveness of the CDSM approach is linked to their largely engaged target group. Their aim varies from that of some of the other HRLA in that they help people live with a condition, rather than necessarily aiming at behaviour change. For people with chronic conditions, there is a pre-existing problematisation, which happened at the time of diagnosis, whereas this problematisation is introduced by some of the other HRLA interventions, which inevitably impacts on intervention acceptability and impact.
- Lifestyle advisor interventions for smoking cessation are cost-effective, because of the important health gains that derive from cessation. The economic analysis excluded two studies because their effectiveness did not reach statistical significance.[30,113] The buddy schemes explored in these studies present, however, a number of advantages: they are not costly to run and they adopt the kind of unstructured and informal intervention rarely described in the literature. Thus, as a practice model, they may offer potential.
- From the evidence that could be accessed, the cost-effectiveness of LA interventions for breastfeeding is inconclusive. In these interventions, peers were selected for their common past experience in breastfeeding, and the target group was defined by their stage of life, rather than being classified 'at risk' or carrying an existing diagnosis. Thus, for these interventions the aim may be not so much behaviour change as behaviour enhancement, with a dual goal of promoting mother and baby health. These interventions focused on an optimal breastfeeding duration of 3–6 months and do not, therefore, present the same issues of longitudinality of effect as the other intervention types.
- Included studies did not allow the production of conclusive cost-effectiveness estimates for LA interventions for mental health. As for the chronic care intervention model, the problematisation (being a mother of a child with a chronic condition) pre-dated the intervention. This intervention thus uses other HRLA intervention modes (pairing people with similar experiences, as in breastfeeding or smoking cessation) to a group that presents similar characteristics to the CDSM programme.
- Lifestyle advisor interventions for screening uptake are not cost-effective. These interventions did reach, however, a large number of people, presented on the whole high degrees of

acceptability and targeted population groups that tended to be disengaged from mainstream service provision.

- Lifestyle advisor interventions for diet and physical activity are not cost-effective. Of note here is one of the studies,[79] where the intervention target was the whole family, rather than solely the individual. In the context of this review, this is a unique approach that has potential – in particular, it focused on nurturing and barrier removal. While the approach seems to offer an alternative potential, intervention component description was too limited, unfortunately, to draw further lessons.
- Lifestyle advisor interventions for HIV infection prevention were cost-effective, but not in a UK context. They did, however, succeed in reaching hard-to-reach communities and building on social capital, two aims of the health trainer scheme in the UK.[7] As far as research methodologies are concerned, the Dickson-Gomez *et al.*[89] and Latkin *et al.*[90] study offers a unique approach, combining ethnography as a means to understand local needs and cultures as well as quantitative description of intervention effect.

Recommendations for practice

Generally, there is a need to develop theoretically sound interventions that map to different population health needs. These need to be evaluated with increasing rigour, using the early stages of the MRC framework[67] as guiding principles, so as to enable a better mapping of concepts, application and evaluation. The following points detail some specific recommendations:

- Interventions that are low cost – in terms of monetary cost, training costs and low impact on the participants' normal lives – and have some effect are recommended.
- Further recognition of the IK base of the LA may be required. There needs to be a process of surfacing this for the LA, which would also maximise the potential for understanding inequalities to be enhanced.
- The model driving approach to, and level of, training may also be worthy of some consideration. A balance may be required between what the service providers consider is required, with some input from the LA and their self-identified needs for training to fulfil the role.
- The nature of the message should be tailored to the community and the LA delivering it, so that it is acceptable and safe for the LA to deliver. This may be particularly important in harder-to-reach populations. The process of tailoring and the effectiveness of inclusion of different aspects of community allegiance and IK requires further exploration.
- There is a need for clearer definitions of target groups, with their characteristics and particular needs.
- Intervention approaches need to be made more explicit in terms of single versus multiple foci, a positioning on a health maintenance–tertiary disease prevention continuum and a clear intervention aim (from raising awareness to behaviour change to improved health).
- Peership and layness need to be considered and defined for the particular setting.
- Short-, medium- and long-term intervention outcomes need to be clearly identified and measured.

Recommendations for a future programme of research

The following recommendations are focused particularly on the UK, but may be of international relevance. They are in order of priority, and designed to form a programme of research on HRLA, around the identification of needs, the broadening of population focus and intervention aims, the measurement of outcomes and the reviewing of evidence. Given the lack of evidence generated in the UK, the following recommendations bear particular relevance to the UK context.

Identifying need:

- Concept mapping might help identify what people believe helps them adhere to healthy lifestyle advice and triangulate this to the views of public health professionals and community leaders.

Target groups:

- Interventions in missing groups (men, transient populations, homeless people, etc.), broader interventions in groups with specific issues, for example physical health in mental health population groups, and prevention in general health promotion (such as stop smoking plus diet exercise and screening) need further development.

- Research on alternative target groups, which may be of broader focus than health related, such as, for example, faith groups, youth groups, community centres, gangs, playschemes, etc. Within each group, existing leaders could be identified and collaborative relationships nurtured to identify, assess and address local needs. Such schemes are likely to lead to community development activities but would require longitudinal funding schemes.

Intervention aim:

- Research is needed on the building of social capital or community development through LA schemes. This would entail a focus on social, rather than individual, determinants of health inequalities.

- A development of research led by, or conducted in collaboration with, community guides would help to develop ways for health-care providers to maximise the potential of pre-existing 'unofficial' health improvement activities.

Outcome identification and measurement:

This review endorses the need for a strategic movement along the MRC continuum of evidence, so that research evolves from scoping practice to evaluating outcomes.

- Health-related lifestyle advice schemes would benefit from a development of current methodological advancements[323] to help identify and assess short-, medium- and long-term intervention outcomes. In the long term, this would encourage the publication of promising outcomes and thus strengthen the HRLA evidence base.

- There is a need to identify what enables long-term effects, i.e. regular low-cost 'top-up' interventions or multidimensional interventions with changes in approach over time.

Systematic reviewing in public health:

- A greater engagement with realistic review or synthesis principles would allow exposure of contexts and mechanism components that influence a range of outcomes in HRLA interventions. Indeed this review, in using realist principles in the synthesis of the data, has refined programme theories (theoretical underpinning, intervention aim, approach, intensity and delivery mode and role/training) so that they may now be reviewed individually.
- This review supports previously published commentaries[64,69] on the necessity for the development of quality assessment tools that could allow increased methodological flexibility.

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Appendix 1

Review of reviews

Rationale for inclusion of reviews

We wanted to determine if any previous reviews had made conclusions regarding health-related LAs that would inform our review and/or reinforce our conclusions (see *Tables 30* and *31*, for the characteristics of included reviews). Searches were made by two reviewers for existing relevant systematic reviews using Cochrane, Campbell, CRD/Database of Abstracts of Reviews of Effects (DARE) and EPPI-Centre databases. As we were conducting a systematic review (in order to reduce bias and increase the robustness of our conclusions), the reviews included for evaluation had to also be systematic in nature. That is, they had to have searched more than one database, preferably with a stated search strategy. They had to state some form of inclusion and exclusion criteria. They had to give a list of the included studies and preferably their characteristics. Preferably, they would have assessed the methodological quality of the studies included and used this information in the assessment of the reliability of the results they presented. In this way we could identify the studies used in these reviews, and how the study's results informed the review's conclusions. We could also identify where there was overlap with our review, where studies differed and for what reasons.

Preferably, they had to define the character of their health-related LAs delivering the interventions. Reviews that included interventions delivered by health-related LAs and others had to present the results for the LAs separately. We excluded reviews that exclusively evaluated trained health-care professionals or that addressed the treatment of illnesses and their symptoms specifically.

Excluded studies

Twenty reviews were identified but excluded (see *Table 32*, for excluded reviews). One review[324] that was identified involved investigation the effectiveness of any kind of psychological treatment for anxiety and depressive disorders performed by paraprofessionals. The authors wanted to examine whether the results applied to clinically significant disorders. As this is the direct treatment of a mental disorder – rather than the promotion of a healthy lifestyle in people with mental diseases – this study was excluded. Foster *et al.*[325] reviewed studies that primarily addressed self-management of chronic disease. As this was also deemed to be disease focused rather than the promotion of healthy lifestyles this review was excluded. Two other reviews did search more than one electronic database, but Logsdon and Davis[326] included only studies with statistically significant results that could have introduced bias into the review and Persily[327] did not specify the search terms or databases used, and did not clearly define the selection criteria, which, again, could have introduced bias into the review. On the basis of these methodological flaws these two reviews were excluded from consideration. One review[328] assessed 10 techniques used to identify opinion leaders to promote behaviour change. It proposed these 10 techniques as ways to identify health-related LAs, and suggested that the method of identification has impact on the character of training required and the likelihood of long-lasting effects on the community after the initial intervention has finished. Unfortunately, the authors did not cite the 191 studies they claimed to identify, so we could not evaluate the association between the evidence and their conclusions. Therefore, this review was excluded.

The remaining 15 reviews covered a wide variety of areas, some of which are not covered by the systematic reviews included below, but none of them made any claims to be systematic, and

in fact some of the excluded reviews were explicitly opinion pieces that presented a particular argument with no attempt at impartiality. Therefore we did not feel we could include their conclusions because of the significant risk of bias.

Lifestyle advisors engaged in general health improvement or health promotion

Six reviews examined the impact of health-related LAs for general health improvement or promotion. One of these[329] examined telephone support as the mode of delivery of advice from peers with similar or relevant health experience. One review[13] examined the effectiveness of lay health workers in primary or community health care. One[330] examined the effectiveness of CHWs in the USA. Three reviews[331–333] examined interventions in ethnic minority communities, all in the USA. Andrews *et al.*[331] examined CHWs with US ethnic minority women. Rhodes *et al.*[333] examined LHAs in adult Hispanic/Latino communities in the USA. Fisher *et al.*[332] evaluated strategies or interventions using cultural leverage to determine if they are effective at decreasing health disparities for communities of colour.

Two reviews included RCTs alone;[13,329] the remaining four reviews did not limit the methodologies used by their included studies. Three of the six reviews assessed the methodological quality of the papers they reviewed[13,329,332] and used this information to evaluate the reliability of the studies' results. None of these three reviews used the quality standard of the identified studies as an inclusion criterion.

The poor quality of the RCTs' methods meant that we excluded the majority (six of seven) of the studies included in the review of Dale *et al.*[329] in our review (see *Table 33* for review studies included or excluded from this review). Dale *et al.*'s[329] review of telephone support concluded that, although their review of seven RCTs provided some evidence that peer support telephone calls can be effective for certain health-related concerns, few of the studies were of high quality and so results should be interpreted cautiously. There were many methodological limitations, thus limiting the generalisability of findings.

Only 4 of the 43 studies in the review by Lewin *et al.*[13] were included in ours.[14,88,103,114] The review stated that lay health workers show promising benefits in promoting immunisation uptake when compared with usual care. They also showed benefit in condition-specific management, for example acute respiratory infections and malaria. For other health issues, evidence is insufficient to justify recommendations for policy or practice.

Only one of the studies included in Swider[330] met the criteria for inclusion in our review.[84] Swider[330] indicated preliminary support for CHWs in increasing access to care, particularly in underserved populations. They identified a smaller number of studies documenting outcomes in the areas of increased health knowledge, improved health status outcomes and behavioural changes, with inconclusive results. In their opinion, although LAs show some promise as an intervention, the role can be doomed by overly high expectations, lack of a clear focus and lack of documentation.

Four of the 24 studies included in Andrews *et al.*[331] were also included in our review.[63,84,94,108] The integrative analysis[331] concluded that, despite varying roles and functions, the evidence indicates that CHWs are effective in increasing access to health services, increasing knowledge and promoting behaviour change among ethnic minority women. Other advantages of using CHWs are to provide social support and culturally competent, cost-effective care.

Rhodes *et al.*'s review[333] included 37 studies of a variety of methodologies of which only two were included in our review.[87,120] Rhodes *et al.*[333] concluded that given the long history of using LAs

as an approach to health promotion and disease prevention, and the current emphasis of LA approaches as a potential solution to health disparities in general, and among Hispanics/Latinos in particular, few rigorous studies have been published that document the effectiveness of LAs on a variety of public health concerns.

Two of the 23 studies included in Fisher *et al.*'s review[332] were included in our review.[84,98] Fisher *et al.*[332] concluded that the delivery of processes of care or intermediate health outcomes was significantly improved in 23 interventions. Interventions using cultural leverage showed tremendous promise in reducing health disparities, but that more research is needed to understand their health effects in combination with other interventions.

Overall very few of the studies included in these six reviews covering aspects of health-related LAs engaged in general health improvement or health promotion were included in our review. The reviews above often included non-evaluative studies; none excluded studies on methodological quality criteria, and some evaluated areas outside our review's remit. Overall, the six reviews give cautious support for health-related LAs in improving access to health care, particularly in underserved communities. However, they all note the small quantity and generally poor quality of research in the area, and the limitations this imposes on the interpretation of the available data.

Lifestyle advisor engaged in improving diet

One review[334] was identified which assessed the impact of peer education/counselling on nutrition and health outcomes among Latino communities in the USA. The review included 22 studies, did not limit the methodologies used and did assess the methodological quality of the studies. Methodological quality was not used as an inclusion or exclusion criterion. The results of the quality assessment were not presented and it was not obvious how the quality assessment has influenced the authors' assessment of the reliability of the studies' results. Three of the 22 studies were included in our review.[95,112,119] Pérez-Escamilla *et al.*[334] concluded that peer nutrition education has a positive influence on diabetes self-management and breastfeeding outcomes, as well as on general nutrition knowledge and dietary intake behaviours, among Latinos.

Lifestyle advisor engaged in improving maternal and infant health

Five reviews were identified that used LAs to improve maternal and infant health. One review[335] examined traditional birth attendants, one[336] examined interventions for women at risk of preterm or low-birthweight babies (including lay advisors), one[337] examined interventions for pregnant or post partum women with drug or alcohol problems (including lay advisors), and two[338,339] examined interventions to support breastfeeding (including lay advisors). Three reviews assessed random or quasirandomised trials,[336–338] one[335] assessed experimental or quasi-experimental designs. All five reviews assessed the methodological quality of the papers they reviewed and used this information to evaluate the reliability of the studies' results. None of the five reviews used methodological quality as an inclusion or exclusion criterion.

One review[335] was a combined narrative review and meta-analytic review conducted to summarise published and unpublished studies, completed between 1970 and 2002, on the relationship between LA training and increased use of professional antenatal care (ANC). None of the 15 studies was included in our review. This was because many of them evaluated the impact of education on the LAs, rather than LAs' impact on health outcomes for mothers, which would match the focus of our review. Sibley *et al.*[335] concluded that the overall quality of the studies included in this review was variable, making it impossible to attribute causality to the observed outcomes in relation to LA training. Despite this, the results suggest that training may increase ANC attendance rates by about 38%. This magnitude of improvement could contribute

to a reduction in maternal and perinatal mortality in areas where women have access to quality ANC and emergency obstetric care.

One review[336] examined interventions for women at risk of preterm or low-birthweight babies, but identified only two studies[339,340] that assessed lay advisors. They state that the results of these two studies were consistent with the other interventions assessed. The study by McLaughlin *et al.*[340] was excluded from our review as they provided support with a multidisciplinary team that included laywomen, so the impact of the lay advisors alone was impossible to extract. Spencer *et al.*[339] was not included in our review, as the study focused only on infant health. Hodnett *et al.*[336] concluded that while programmes that offer additional support during pregnancy are unlikely to prevent the pregnancy from resulting in a low-birthweight or preterm baby, they may be helpful in reducing the likelihood of caesarean birth.

One review[337] examined interventions for pregnant or post partum women with drug or alcohol problems, and identified two studies[341,342] that used lay advisors. Grant *et al.*[341] reported only outcomes for child health (and so was excluded from our review). Schuler *et al.*[342] reported no significant difference for continued illicit drug use, continued alcohol use or failure to enrol in a drug treatment programme. Overall, the review concluded that there was insufficient evidence to recommend the routine use of home visits for women with a drug or alcohol problem.

One review[338] examined interventions to support breastfeeding and identified nine studies with lay advisors. They concluded that there was significant heterogeneity present in these studies. Two of these studies were included in our review.[88,114] These nine studies demonstrated a significant reduction in breastfeeding cessation at the time of the last study assessment. In the studies of lay support that reported exclusive breastfeeding there was a marked reduction in the cessation of exclusive breastfeeding before the last study assessment.

One review[339] evaluated the effectiveness of interventions which aimed to encourage women to breastfeed. They concluded that health education and peer-support interventions can result in some improvement in the number of women beginning to breastfeed. These 11 trials suggest that larger increases are likely to result from needs-based informal repeated education sessions than more generic, formal antenatal sessions.

Overall, these five reviews examining aspects of HRLA engaged in improving maternal and infant health showed that traditional birth attendants could increase access to professional ANC, and lay advisors may reduce the rates of cessation of breastfeeding. However, there is little evidence of effect on women with drug or alcohol problems, or women at risk of low-birth-weight babies.

LAs to support smoking cessation

Two reviews[160,343] examined the impact of peer support to aid smoking cessation rates. The two reviews examined RCTs and both assessed their methodological quality. The quality assessment was not used for inclusion or exclusion of studies. The effectiveness of the interventions was discussed in relation to the quality of the studies.

Only one study from each review was included in our final review.[30,113] There was substantial overlap of studies between the two reviews, with them having six studies in common. Unsurprisingly, their conclusions were similar. Park *et al.*[161] failed to detect an increase in quit rates after partner support interventions. Limited data from several of the trials suggest that these interventions did not increase partner support either. No conclusions can be made about the impact of partner support on smoking cessation. May and West[160] concluded that the research

methodology in many cases was poor. The evidence would suggest that in the context of a smokers' clinic the use of buddies may be of some benefit. There is a lack of evidence regarding the efficacy of the use of buddies in community interventions. May and West's[160] greater optimism for buddy support may have been influenced by their involvement in the conduct of those studies.

LAs using specific models of intervention

One review[205] aimed to systematically assess the effectiveness of interventions using a stages-of-change-based approach in bringing about positive changes in health-related behaviour. They reviewed 37 RCTs, and assessed their methodological quality. The quality assessment was not used for inclusion or exclusion of studies. The effectiveness of the interventions was discussed in relation to the quality of the studies.

The stages-of-change approach is proposed to be one of the models of interventions used by health-related LAs. In fact, only 5 of the 37 studies evaluated in the review examined interventions delivered by health-related LAs (e.g. telephone counsellors, peer educators), and the results for these studies were not examined separately. The remaining studies were delivered by health-care professionals or via modes such as computers or mailed information sheets. Riemsma *et al.*[205] concluded that given the limited evidence for the effectiveness of interventions tailored to the stages-of-change approach, practitioners and policy-makers need to recognise that this approach has a status that appears to be unwarranted when it is evaluated in a systematic way. In the light of so few studies evaluating the stages-of-change approach in the context of health-related LAs, Riemsma *et al.*[205] could not conclude any effect.

Reviews' research recommendations

All of the reviews identified the need for future research that was of high methodological quality and high reporting quality. The research should clearly identify and describe the character and role of the health-related LA, and the character of the population to whom they delivered. The intervention's mechanism of action, theoretical framework, and the character of the intervention delivered should be clearly defined and described. More research is needed to understand the health effects of health-related LAs in combination with other interventions. The research should use valid, reliable and sensitive outcomes of importance to the participants and increase community involvement. There is a need for longitudinal research to evaluate the duration of effect of the interventions and for more research into the social and health costs of providing such services.

Discussion

Overall, the reviews suggest that health-related LAs may be of use in improving access to health care, and may reduce health disparities – in part by acting as cultural leverage. The evidence is variable and can give only limited support to health-related LAs having a positive impact on health knowledge, health behaviours and health outcomes. It is likely that factors that are often poorly described in the original studies, such as the context (e.g. the character of the advisors and advisees and their communities), mechanism (e.g. proposed mechanism of action, detailed descriptions of the actual delivery of the interventions) and outcomes (e.g. justify the outcomes in terms of relevance to the participants, their community, their reliability, sensitivity, validity, and the minimum size of relevant change, and the costs in terms of time, impact on lifestyle, and monetary costs), are of importance in the development of successful interventions. Without the information on context, mechanism and outcomes, an understanding of which interventions mediated by health-related LAs are likely to succeed or fail will remain elusive.

TABLE 30 Tables of included reviews

Dale 2008[329]	
Study	Dale J, Caramlau IO, Lindenmeyer A, Williams SM. Peer support telephone calls for improving health. *Cochrane Database Syst Rev* 2008; Issue 4, Art. No. CD006903.[329]
Aim	To assess the effects of peer support telephone calls in terms of physical (e.g. blood pressure), psychological (e.g. depressive symptoms), and behavioural health outcomes (e.g. uptake of mammography) and other outcomes
Search strategy	*The Cochrane Library* databases [Cochrane Central Register of Controlled Trials (CENTRAL), DARE, CDSR (issue 4 2007); MEDLINE (Ovid) (January 1966 to December 2007); EMBASE (Ovid) (January 1985 to December 2007); CINAHL (Athens) (January 1966 to December 2007)], trials registers and reference lists of articles, with no language restrictions
Selection criteria	RCTs of peer support interventions delivered by telephone call
Character of peer	The peer is someone selected to provide support because they have similar or relevant health experience
Assessment of risk of bias	We assessed and reported on the risk of bias of included studies in accordance with the guidelines of the Cochrane Consumers and Communication Review Group and the Cochrane Handbook, which recommended the explicit reporting of the following individual quality elements for RCTs: sequence generation (including the method used); allocation concealment (including the method used); blinding (participants, providers, outcome assessors, data analysts); completeness of outcome data; and selective reporting. We incorporated the results of the assessment into the review through systematic narrative description and commentary about each of the these domains, leading to an overall assessment of the risk of bias of included studies and a judgement about the internal validity of the review's results
Data collection and analysis	Two review authors independently extracted data. We present results narratively and in tabular format. Meta-analysis was not possible due to heterogeneity between studies
Results	We included seven studies involving 2492 participants. Peer support telephone calls were associated with an increase in mammography screening, with 49% of women in the intervention group and 34% of women in the control group receiving a mammogram since the start of the intervention ($p \leq 0.001$). In another study, peer support telephone calls were found to maintain mammography screening uptake for baseline adherent women ($p = 0.029$) Peer support telephone calls for postmyocardial infarction patients were associated at 6 months with a change in diet in the intervention and usual care groups of 54% and 44%, respectively ($p = 0.03$). In another study of post myocardial infarction patients there were no significant differences between groups for self-efficacy, health status and mental health outcomes Peer support telephone calls were associated with greater continuation of breastfeeding in mothers at 3 months post partum ($p = 0.01$) Peer support telephone calls were associated with reduced depressive symptoms in mothers with postnatal depression (EPDS > 12). The peer support intervention significantly decreased depressive symptomatology at the 4-week assessment (OR 6.23, 95% CI 1.15 to 33.77, $p = 0.02$)) and 8-week assessment (OR 6.23, 95% CI 1.40 to 27.84, $p = 0.01$) One study investigated the use of peer support for patients with poorly controlled diabetes. There were no significant differences between groups for self-efficacy, HbA_{1C}, cholesterol level and BMI
Conclusions	While this review provides some evidence that peer support telephone calls can be effective for certain health-related concerns, few of the studies were of high quality and so results should be interpreted cautiously. There were many methodological limitations, thus limiting the generalisability of findings. Overall, there is a need for further well designed randomised controlled studies to clarify the cost-effectiveness and clinical effectiveness of peer support telephone calls for improvement in health and health-related behaviour

EPDS, Edinburgh Postnatal Depression Scale.

Lewin 2005[13]

Study	Lewin S, Dick J, Pond P, Zwarenstein M, Aja GN, vanWyk BE, *et al*. Lay health workers in primary and community health care. *Cochrane Database Syst Rev* 2005; Issue 1, Art. No. CD004015.[13]
Aim	To assess the effects of LHW interventions in primary and community health care on health-care behaviours, patients' health and well-being, and patients' satisfaction with care
Search strategy	We searched the Cochrane Effective Practice and Organisation of Care and Consumers and Communication specialised registers (to August 2001); CENTRAL (to August 2001); MEDLINE (1966 to August 2001); EMBASE (1966 to August 2001); Science Citations (to August 2001); CINAHL (1966 to June 2001); HealthSTAR (1975–2000); AMED (1966 to August 2001); the Leeds Health Education Effectiveness Database, and the reference lists of articles
Selection criteria	RCTs of any intervention delivered by LHWs (paid or voluntary) in primary or community health care which are intended to promote health, manage illness or provide support to patients. An LHW was defined as any health worker carrying out functions related to health-care delivery, trained in some way in the context of the intervention, and having no formal RCTs of any intervention delivered by LHWs (paid or voluntary) in primary or community health care and intended to promote health, manage illness or provide support to patients. An LHW was defined as any health worker carrying out functions related to health-care delivery, trained in some way in the context of the intervention, and having no formal professional or paraprofessional certificated or degreed tertiary education. There were no restrictions on the types of consumers, professional or paraprofessional, certificated or degreed tertiary education. There were no restrictions on the types of consumers
Character of peer	Any LHW (paid or voluntary) including community health workers, village health workers, cancer supporters, birth attendants, etc. For the purposes of this review, a 'LHW' was defined as any health worker: • carrying out functions related to health-care delivery • trained in some way in the context of the intervention • having no formal professional or paraprofessional certificated or degreed tertiary education
Assessment of risk of bias	Two reviewers independently assessed the quality of all eligible trials using the methodological quality criteria for RCTs listed in the Cochrane EPOC Review Group module. Studies were assessed as high quality if they reported allocation concealment, higher than 80% patient follow-up and intention-to-treat analysis. Studies were assessed as low quality if they did not meet these criteria or if they did not report the information necessary for assessment
Data collection and analysis	Two reviewers independently extracted data on to a standard form and assessed study quality. Studies that compared broadly similar types of interventions were grouped together. Where feasible, the results of included studies were combined and an estimate of effect obtained
Results	Forty-three studies met the inclusion criteria, involving more than 210,110 consumers. These showed considerable diversity in the targeted health issue and the aims, content and outcomes of interventions. Most were conducted in high-income countries ($n=35$), but nearly half of these focused on low-income and minority populations ($n=15$). Study diversity limited meta-analysis to outcomes for five subgroups ($n=15$ studies) {LHW interventions to promote the uptake of breast cancer screening, immunisation and breastfeeding promotion [(before 2 weeks and between 2 weeks and 6 months post partum) and to improve diagnosis and treatment for selected infectious diseases]}. Promising benefits in comparison with usual care were shown for LHW interventions to promote immunisation uptake in children and adults (RR = 1.30, 95% CI 1.14 to 1.48, $p=0.0001$) and LHW interventions to improve outcomes for selected infectious diseases (RR = 0.74, 95% CI 0.58 to 0.93, $p=0.01$). LHWs also appear promising for breastfeeding promotion. They appear to have a small effect in promoting breast cancer screening uptake when compared with usual care. For the remaining subgroups ($n=29$ studies), the outcomes were too diverse to allow statistical pooling. We can therefore draw no general conclusions on the effectiveness of these subgroups of interventions
Conclusions	LHWs show promising benefits in promoting immunisation uptake and improving outcomes for acute respiratory infections and malaria, when compared with usual care. For other health issues, evidence is insufficient to justify recommendations for policy and practice. There is also insufficient evidence to assess which LHW training or intervention strategies are likely to be most effective. Further research is needed in these areas

AMED, Allied and Complementary Medicine Database; CENTRAL, the Cochrane Register of Controlled Trials; EPOC, Effective Practice and Organisation of Care Group; LHW, lay health worker; RR, rate ratio.

Swider 2002[330]

Study	Swider SM. Outcome effectiveness of community health workers: an integrative literature review. *Public Health Nurs* 2002;**19**:11–20.[330]
Aim	Are CHWs effective in community health promotion and disease prevention efforts?
Search strategy	MEDLINE 1981–99; HealthSTAR 1975–99; CINAHL 1982–99; EBM Review Best Evidence 1991–9 (September/October); PsycINFO 1984–99; NCBI PubMed 1980–99
Selection criteria	(1) CHWs. (2) Location: only studies conducted in the USA were included in this review. (3) Types of studies: only studies that were listed in a database and that focused on outcomes or effectiveness of CHW work were included. All studies purporting to measure outcomes were included, because the literature on types of outcomes defined them broadly. (4) Health promotion and disease prevention: CHWs are described as functioning across a wide range of populations, diseases and conditions. Thus, any study with a health focus for the activities of the CHWs was included in this review. (5) Time period: from 1980 to present
Character of peer	Definition of CHW: For the studies reviewed here, the terms CHW, community health advocate, *promotora de salud*, community health promoter, lay health worker and community outreach worker were used interchangeably. Often in these articles the definitions are not given explicitly, and thus, the definition used by each researcher was allowed to stand, and each study was coded by the functions of the worker
Assessment of risk of bias	None described
Data collection and analysis	The studies identified from these databases were entered into a search chart by relevant characteristics. An initial reading of the studies, in conjunction with the research question, culminated in the development of a codebook to document all relevant variables. This codebook was used to review three studies; it was then revised based on these three reviews and used to review the remaining studies (Broome 1993[343]). Analysis: The author coded all data as described previously here, with results displayed in tabular form and examined for frequencies, common themes, weaknesses, gaps, and the need for future studies
Results	Overall, CHWs were found to result in some positive outcomes in 79% ($n=15$) of the reviewed studies. Eleven of the 15 studies (73%) documented at least partial effectiveness of the CHWs in changing access to health-care services in the target population. There is limited evidence from two studies of the CHW effectiveness with knowledge improvement outcomes. However, several other studies documented behaviour change and health-outcome changes from CHW health education interventions. Three of the four studies documented a positive change in health status indicators. Five of the six studies documented positive results in behaviour change on the part of the target population. Two studies measured the costs of care but found they did not differ between the groups
Conclusions	This article reviews the data-based literature on CHW effectiveness, which indicates preliminary support for CHWs in increasing access to care, particularly in underserved populations. There are a smaller number of studies documenting outcomes in the areas of increased health knowledge, improved health status outcomes, and behavioural changes, with inconclusive results. Although CHWs show some promise as an intervention, the role can be doomed by overly high expectations, lack of a clear focus and lack of documentation. Further research is required with an emphasis on stronger study design, documentation of CHW activities, and carefully defined target populations

EBM, evidence-based medicine; NCBI, National Center for Biotechnology Information.

Andrews 2004[331]

Study	Andrews JO, Feiton G, Wewers ME, Heath J. Use of community health workers in research with ethnic minority women. *J Nurs Scholarsh* 2004;**36**:358–65.[331]
Aim	To explore roles and effectiveness of CHWs in research with ethnic minority women in the USA
Search strategy	MEDLINE (1966–2002) and CINAHL (1982–2002) databases were used to locate published research studies on the use of CHWs with ethnic minority women in the USA. Key words for searches were CHWs, community health aides, health promoters and community workers
Selection criteria	Selection criteria were that the studies be data based, with ethnic minority women as the targeted population, use CHWs and be conducted in the USA. Reasons for exclusion were programme description only and lack of data-based results; international focus; or ethnic minority women not included in at least 75% of the sample
Character of peer	All of the CHWs in these studies were women and were matched according to the ethnicity of the target population
Assessment of risk of bias	Methodological limitations were coded but not reported
Data collection and analysis	A codebook to document all relevant variables was designed for review of these studies, in consideration with the research questions. The variables used in this analysis included the role of CHWs, targeted health outcomes (i.e. access, behaviour, knowledge), design, sample size, theoretical framework, preparation and training of CHWs, perceived benefits of CHWs, and methodological limitations
Results	The CHW role varied according to the purpose, design and intervention protocols of each study. The roles were coded to one of the following four areas: educator, 'outreacher', case manager and data collector. CHWs' training, payment, recruitment and supervision also varied in the included studies. Outcomes related to access to health services were evaluated in 16 studies; all 16 found improvements in access, specifically for ethnic minority women, to prenatal care, mammography screening, Pap testing, sick child visits, pre- and postnatal care, STD testing, smoking cessation programme, and maternal–child health visits. Five of the seven studies showed positive outcomes in knowledge of participants. Positive outcomes in behaviour change were reported in five of the six studies. CHWs promoted social support, cultural competence and other intangible resources among community members. These outcomes were not quantitatively measured in these studies, but they were described in process evaluation and qualitative data. Conceptually, the use of CHWs in research is often considered cost-effective. Two of the studies in this review showed improved outcomes and reduced costs related to the use of CHWs. In comparison with other health-care providers, CHWs are relatively inexpensive to train, hire and supervise
Conclusions	An integrative analysis of 24 studies showed that despite varying roles and functions, evidence indicates that CHWs are effective in increasing access to health services, increasing knowledge, and promoting behaviour change among ethnic minority women. Other advantages of using CHWs are to provide social support and culturally competent, cost-effective care. Recommendations for future directions of research with CHWs and ethnic minority women include improved conceptualisation of the CHW role, theoretical frameworks for research designs, enhanced methods for evaluating effectiveness and increased community involvement

Fischer 2007[332]

Study	Fisher TL, Burnet DL, Huang ES, Chin MH, Cagney KA. Cultural leverage: interventions using culture to narrow racial disparities in health care. *Med Care Res Rev* 2007;**64**:S243–82.[332]
Aim	This particular review examined a broad range of interventions that used cultural aspects of race to: (1) modify the health behaviours of individuals within communities; (2) increase access from communities to the existing health-care system; and (3) amend or transform the health-care system to better serve patients of colour and their communities
Search strategy	The reviewers searched MEDLINE, CENTRAL, and a cross-referenced engine, Web of Knowledge. In addition, we searched the grey literature using The New York Academy of Medicine Grey Literature Report. To augment this search strategy, we reviewed the reference lists of key reviews, websites, reference articles, systematic reviews and books
Selection criteria	We reviewed all non-white racial and ethnic categories, including African-American, Hispanic, American Indian/ Alaska Native, and Asian/Pacific Islander. We included interventions that encompassed cultural constructs related to race, such as language, religion, diet, sexuality, family structure, neighbourhood, class and gender. We excluded articles published before 1985. We also excluded articles that did not describe interventions arising from health-care organisations or connecting communities or patients of colour to health-care organisations, those that did not include evaluations of interventions, those that did not focus on populations of at least 50% people of colour, and those describing interventions that took place outside the USA. Beyond these exclusion criteria, we chose to include a wide range of study designs. There are very few RCTs comparing interventions with and without cultural leverage, and to limit this review to those studies would have left out many innovative studies in the field. Similarly, there are very few intervention studies designed to examine an outcome such as the level of health disparities between white patients and coloured people. As such, we chose to also include studies that focused on the health of racial and ethnic minorities
Character of peer	Not specified
Assessment of risk of bias	Articles included in the final analysis were reviewed for quality using multiple criteria, because of the difficulty in comparing and contrasting heterogeneous study approaches. To capture the value of studies that ranged from descriptive to controlled trials, we started with a descriptive discussion of their strengths and weaknesses. We then applied Downs and Black's[344] criteria for assessing methodological quality, using the first 26 items in the scoring system, which had a possible total score of 27
Data collection and analysis	The first author identified relevant abstracts through review of citations obtained from this search strategy. Each abstract was assigned to a team member for independent review to confirm relevance to the research question. We developed a standardised form to facilitate the review of abstracts and articles to determine relevance to the study question, document study characteristics, extract data, and assess the quality of evidence. Full articles were obtained for those abstracts appearing eligible and in cases in which determinations could not be made from the abstracts alone. Three team members (TLF, DLB and KAC) reviewed articles independently and then compared findings; each article was reviewed by at least two reviewers, and differences were adjudicated by team consensus
Results	Thirty-eight interventions of three types were identified: interventions that modified the health behaviours of individual patients of colour, that increased the access of communities of colour to the existing health-care system, and that modified the health-care system to better serve patients of colour and their communities. Individual-level interventions typically tapped community members' expertise to shape programmes. Access interventions largely involved screening programmes, incorporating patient navigators and lay educators. Health-care interventions focused on the roles of nurses, counsellors, and CHWs to deliver culturally tailored health information. These interventions increased patients' knowledge for self-care, decreased barriers to access, and improved providers' cultural competence
Conclusions	The delivery of processes of care or intermediate health outcomes was significantly improved in 23 interventions. Interventions using cultural leverage show tremendous promise in reducing health disparities, but more research is needed to understand their health effects in combination with other interventions

CENTRAL, the Cochrane Central Register of Controlled Trials.

Rhodes 2007[333]

Study	Rhodes SD, Foley KL, Zometa CS, Bloom FR. Lay health advisor interventions among hispanics/latinos: a qualitative systematic review. *Am J Prevent Med* 2007;**33**:418–27.[333]
Aim	The primary goal of this systematic review was to explore how LHA approaches have been used and evaluated within Hispanic/Latino communities in the USA
Search strategy	Ten literature databases were used: AgeLine, CINAHL, EBSCO Academic Search Elite and Premier, Education Resources Information Center (ERIC), Health Source Consumer and Nursing and Nursing/Academic Editions, pre-CINAHL, PsycINFO and PubMed. Each database was searched from its inception through to July 2006 Terms for the search included keywords as defined by the Medical Subject Headings (MeSH). Keywords used in a Boolean search included: Hispanic or Latino and village health worker, natural helper, promoter, *promotora*, *partera*, volunteer health worker, allied health personnel, LHA, lay health, community outreach worker, community health service volunteer, public health aide, peer health promoter, community health representative, community health advocate, or health advisor. In addition, citations from the bibliographies of identified papers were analysed and relevant citations were selected for review
Selection criteria	This review consisted of human studies (which included adult Hispanics or Latinos of either gender), conducted in the USA, that were published in English-language peer-reviewed journals, and contained enough abstractable information. Often, editorials, letters, book chapters, and commentaries have been excluded in systematic reviews;[15] however, when appropriate, such articles were included to supplement data about studies that had been identified. These inclusion and exclusion criteria were selected to ensure that findings could best inform future LHA intervention research among Hispanic/Latino communities within the USA. Because some studies included non-Hispanics and non-Latinos, these studies were included if at least half of the LHAs were Hispanic/Latino. Furthermore, because studies may have had multiple articles published, this analysis explored LHA approaches by study
Character of peer	All studies indicated that the LHAs matched the target population in their communities in terms of countries of origin and current geographic location
Assessment of risk of bias	Not described
Data collection and analysis	Data abstraction was completed independently by three data abstractors using a standardised abstraction form that collected intervention characteristics and study results
Results	A total of 172 studies were identified and 37 met the selection criteria. Of these, 28 included female LHAs exclusively and five included a small number of male as well as female LHAs. Training for LHAs ranged from 6 to 160 hours. Primary roles of LHAs included: supporting participant recruitment and data collection, serving as health advisors and referral sources, distributing materials, being role models, and advocating on behalf of community members. Fourteen studies found evidence of effectiveness
Conclusions	Given the long history of using LHAs as an approach to health promotion and disease prevention, and the current emphasis of LHA approaches as a potential solution to health disparities in general, and among Hispanics/Latinos in particular, few rigorous studies have been published that document the effectiveness of LHAs on a variety of public health concerns. A stronger empirical evidence base is clearly needed

Pérez-Escamilla 2008[334]

Study	Pérez-Escamilla R, Hromi-Fiedler A, Vega-López S, Bermúdez-Millán A, Segura-Pérez S. Impact of peer nutrition education on dietary behaviors and health outcomes among latinos: a systematic literature review. *J Nutri Educ Behav* 2008;**40**:208–25.[334]
Aim	This systematic review assesses the impact of peer education/counseling on nutrition and health outcomes among Latinos and identifies future research needs
Search strategy	A systematic literature search was conducted by: (1) searching internet databases (PubMed); (2) conducting backward searches from reference lists of articles of interest; (3) manually reviewing the archives of the Center for Eliminating Health Disparities among Latinos; (4) searching the *J Nutri Educ Behav*; and (5) directly contacting researchers in the field. The PubMed search was conducted using the following keywords and combinations: Latino(s), Hispanic(s), CHW(s), peer(s), educator(s), peer education, *promotora(s)*, promoter(s), diabetes, nutrition, la cocina saludable, salud para su corazón, su corazón su vida, your health your life, partner(s) in health, compañeros en salud, EFNEP, FSNE and breastfeeding
Selection criteria	Nutrition education is defined as 'any set of learning experiences designed to facilitate the voluntary adoption of eating and other nutrition-related behaviours conducive to health and well being'. Thirteen nutrition education impact studies were included if they met the following criteria: (1) experimental or quasiexperimental design; (2) include Latino-specific results or a predominantly Latino study population (>60%); (3) use of reliable and valid scales; (4) nutrition education intervention(s) clearly described; (5) published since 1994; and (6) conducted in the USA
Character of peer	Community members who work almost exclusively in community settings and serve as connectors between health-care consumers and providers to promote health among groups that have traditionally lacked access to adequate care
Assessment of risk of bias	The only bias assessed was those associated with the use of reliable and valid scales: a Cronbach α of at least 0.85 was established a priori as a criterion for assessing internal validity of scales. Reliability was assessed based on intracorrelation coefficients of repeated scale applications using preset criteria of an *r*-value of at least 0.35 and a *p*-value <0.05
Data collection and analysis	All abstracts of articles generated from the database searches were reviewed by community nutrition academic and agency experts (i.e. the authors of this paper) to identify those that met the selection criteria. Each article was assessed for the internal and external validity of the study as well as for the behavioural theory base (or lack thereof) of the intervention. Internal and external validity were assessed following the guidelines recommended by Jekel *et al.*[345] The collective interpretation of study findings was the product of a consensus process involving all authors
Results	Peer nutrition education has a positive influence on diabetes self-management and breastfeeding outcomes, as well as on general nutrition knowledge and dietary intake behaviours among Latinos
Conclusions	There is a need for longitudinal randomised trials testing the impact of peer nutrition education interventions grounded on goal-setting and culturally appropriate behavioural change theories. Inclusion of reliable scales and the construct of acculturation are needed to further advance knowledge in this promising field. Operational research is also needed to identify the optimal peer educator characteristics, the type of training that they should receive, the client loads and dosage (i.e. frequency and amount of contact needed between peer educator and client), and the best educational approaches and delivery settings

EFNEP, Expanded Food and Nutrition Program; FSNE, Food Stamp Nutrition Education Program.

Sibley 2004[335]

Study	Sibley LM, Sipe TA, Koblinsky M. Does traditional birth attendant training increase use of antenatal care? A review of the evidence. *J Midwifery Womens Health* 2004;**49**:298–305.[335]
Aim	A combined narrative review and meta-analytic review was conducted to summarise published and unpublished studies completed between 1970 and 2002 on the relationship between TBA training and increased use of professional ANC
Search strategy	A search for potentially eligible studies was conducted for the period 1970 to 1999. Sources included 17 electronic bibliographic databases available through Emory University POPLine database, including the TBA Annotated Bibliography derived from POPLine and compiled Family Health International; WHO bibliographic database; USAID electronic network; contracting and donor agencies; the invisible college; cross-referencing (i.e. ancestry); and hand searching table of contents from selected published journals having the greatest yield. Secondary source documents were considered if the primary source document was unavailable. Several secondary source documents containing English translations of primary documents were accepted. The search was conducted in stages. First, a set of key words was developed for alternative expressions of the concept 'traditional birth attendant'. Second, an extensive set of key words was developed for alternative expressions of the concepts 'training', 'evaluation', 'comparison', 'effect, impact, outcome', 'performance', 'knowledge, practice, or attitude', 'maternal mortality', and 'perinatal and neonatal mortality'. Copies of potentially eligible documents were obtained, and their bibliographies were searched In January 2003, we conducted an update search of the literature for the period July 1999 through December 2002. However, the one study identified from this search as being suitable for inclusion in the review was a more recent report of a study already included in the meta-analysis, so it was not included in the present study
Selection criteria	(1) Treatment was TBA training; (2) treatment group data were derived from trained TBAs or mothers and neonates, whose care was provided by trained TBAs or who were living in areas where more than 50% of births were attended by trained TBAs; (3) comparison group data were available; (4) dependent measures were related to knowledge, attitude, behaviour, or maternal and perineonatal health outcomes; (5) documents were in English and completed or published between January 1970 and June 1999; (6) research design was either experimental or quasiexperimental; and (7) data were sufficient to calculate an effect size
Character of peer	TBA
Assessment of risk of bias	Loevinsohn describes features of study quality that are considered 'desirable'.[346] The overall quality of the studies included in this review was variable, making it impossible to attribute causality to the observed outcomes in relation to TBA training. Rather, we describe the magnitude and direction of the *association* between TBA training and the observed outcomes
Data collection and analysis	Narrative review: specific ANC-related outcomes, measured as percentages, were independently sorted into three categories: (1) TBA knowledge, (2) TBA behaviour, and (3) maternal behaviour. We describe the narrative review results as follows: a positive result indicates that all percentages reported for specific outcomes in a category were higher for the trained TBA group than for the untrained TBA group, an equivocal result indicates that the percentages were similar for the trained and untrained TBA groups, a mixed result indicates that percentages reported were higher in the trained TBA group for some outcomes but the same or lower for other outcomes, and a negative result indicates that all percentages reported for specific outcomes in a category were lower for the trained TBA group than for the untrained TBA group Meta-analytic review: the per cent difference associated with each outcome was converted to the effect size index. The effect size index represents the standardised difference between the treatment or trained TBA group and comparison or untrained TBA group on the particular outcome of interest. The variance-weighted mean effect size for each subgroup of outcomes was then calculated, and homogeneity tests were performed on the distributions of the weighted mean effect sizes. With few exceptions, homogeneity of variance was rejected, and the weighted mean effect size and 95% CI were calculated by using formulas based on a random effects model. The strategy used to combine effect sizes and sample sizes within and across studies resulted in independent data sets for analysis. Sensitivity analyses, conducted to detect the presence of publication bias, revealed no evidence of bias. Stratified analyses of the outcomes, by study design and sampling procedure, were also performed to examine the influence of these potential moderating variables on the weighted mean effect sizes. To assist interpretation, we converted the weighted mean effect sizes into per cent increase over baseline. Per cent increase over baseline represents the trained TBA and untrained TBA group success rate difference divided by the untrained TBA group success rate, using the grand median of the groups' distributions as the point of reference. The narrative review and meta-analytic review results were compared
Results	Fifteen studies ($n=15$) from eight countries and two world regions were analysed. There are, to varying degrees, positive associations between TBA training and TBA knowledge of the value and timing of ANC services, TBA behaviour in offering advice or assistance to obtain ANC, and compliance and use of ANC services by women cared for by TBAs or living in areas served by TBAs. There is a serious lack of information about TBA training programme characteristics
Conclusions	Although the findings cannot be causally attributed to TBA training, the results suggest that training may increase ANC attendance rates by about 38%. This magnitude of improvement could contribute to a reduction in maternal and perinatal mortality in areas where women have access to quality antenatal and emergency obstetric care. There is an urgent need to improve capacity for evaluation and research of the effect of TBA training programmes and other factors that influence women's use of ANC services

ANC, antenatal care; TBA, trained birth attendant.

Hodnett 2003[336]

Study	Hodnett ED, Fredericks S. Support during pregnancy for women at increased risk of low birth weight babies. *Cochrane Database Syst Rev* 2003; Issue 3, Art. No. CD000198.[336]
Aim	The objective of this review was to assess the effects of programmes offering additional social support for pregnant women who are believed to be at risk for giving birth to preterm or low-birthweight babies
Search strategy	We searched the Cochrane Pregnancy and Childbirth Group's Trials Register (March 2009)
Selection criteria	Randomised trials of additional support during at-risk pregnancy by either a professional (social worker, midwife or nurse) or specially trained layperson, compared with routine care. Additional support was defined as some form of emotional support (e.g. counseling, reassurance, sympathetic listening) and information or advice or both, either in home visits or during clinic appointments, and could include tangible assistance (e.g. transportation to clinic appointments, assistance with the care of other children at home)
Character of peer	Laywomen
Assessment of risk of bias	Both review authors independently assessed risk of bias for each study using the criteria outlined in the *Cochrane Handbook for Systematic Reviews of Interventions*.[347] Any disagreements were resolved by discussion or by involving a third assessor
Data collection and analysis	We independently assessed trial quality and extracted data. Double data entry was performed. We contacted study authors to request additional information
Results	Eighteen trials, involving 12,658 women, were included. The trials were generally of good to excellent quality, although three used an allocation method likely to introduce bias. Programmes offering additional social support for at-risk pregnant women were not associated with improvements in any perinatal outcomes, but there was a reduction in the likelihood of caesarean birth and an increased likelihood of elective termination of pregnancy. Some improvements in immediate maternal psychosocial outcomes were found in individual trials Because there was only one trial in which the support was provided by laywomen,[348] and in another trial the support was provided by a multidisciplinary team that included laywomen,[349] the planned subgroup analysis was not performed. However, the results of these two trials were remarkably consistent with those of the other trials
Conclusions	Pregnant women need the support of caring family members, friends and health professionals. While programmes that offer additional support during pregnancy are unlikely to prevent the pregnancy from resulting in a low-birthweight or preterm baby, they may be helpful in reducing the likelihood of caesarean birth

Doggett 2005[337]

Study	Doggett C, Burrett SL, Osborn DA. Home visits during pregnancy and after birth for women with an alcohol or drug problem. *Cochrane Database Syst Rev* 2005; Issue 4, Art. No. CD004456.[337]
Aim	To determine the effects of home visits during pregnancy and/or after birth for pregnant women with a drug or alcohol problem
Search strategy	We searched the Cochrane Pregnancy and Childbirth Trials Register (30 April 2004), CENTRAL (*The Cochrane Library*, Issue 2, 2004), MEDLINE (1966 to April 2004), EMBASE (1980 to week 16, 2004), CINAHL (1982 to April 2004), PsycINFO (1974 to April 2004), citations from previous reviews and trials, and contacted expert informants
Selection criteria	Studies using random or quasirandom allocation of pregnant or post partum women with a drug or alcohol problem to home visits. Trials enrolling high-risk women of whom more than 50% were reported to use drugs or alcohol were also eligible
Character of peer	Trained laypeople (not the sole focus of the review)
Assessment of risk of bias	We assessed the methodological quality of included trials according to the criteria in the *Cochrane Reviewers' Handbook*,[350] with a grade allocated to each trial on the basis of allocation concealment: A (adequate), B (unclear), and C (clearly inadequate). Details regarding randomisation method, completeness of follow-up, and blinding of outcome measurement were documented for all trials. Cluster randomised and quasirandomised designs, such as alternate allocation and use of record numbers, were included if found. Differences of opinion regarding trials for inclusion were resolved by consensus
Data collection and analysis	Assessments of trials were performed independently by all review authors. Statistical analyses were performed using fixed and random effects models where appropriate
Results	Six studies (709 women) compared home visits after birth with no home visits. None provided a significant antenatal component of home visits. The visitors included community health nurses, paediatric nurses, trained counsellors, paraprofessional advocates, midwives and lay African-American women. Most studies had methodological limitations, particularly large losses to follow-up. There were no significant differences in continued illicit drug use (two studies, 248 women: RR 0.95, 95% CI 0.75 to 1.20), continued alcohol use (RR 1.08, 95% CI 0.83 to 1.41), failure to enrol in a drug treatment programme (two studies, 211 women: RR 0.45, 95% CI 0.10 to 1.94). There was no significant difference in the Bayley MDI (three studies, 199 infants: WMD 2.89, 95% CI –1.17 to 6.95) or PDI (WMD 3.14, 95% CI –0.03 to 6.32). Other outcomes reported by one study only included breastfeeding at 6 months (RR 1.00, 95% CI 0.81 to 1.23), incomplete 6-month infant vaccination schedule (RR 1.07, 95% CI 0.58 to 1.96), non-accidental injury and non-voluntary foster care (RR 0.16, 95% CI 0.02 to 1.23), failure to use post partum contraception (RR 0.41, 95% CI 0.20 to 0.82), child behavioural problems (RR 0.46, 95% CI 0.21 to 1.01) and involvement with child protective services (RR 0.38, 95% CI 0.20 to 0.74) Two studies reported home visits by trained layworkers.[351,352] Schuler 2000[352] reported no significant difference for continued illicit drug use (RR 1.20, 95% CI 0.79 to 1.85), continued alcohol use (RR 1.01, 95% CI 0.75 to 1.35) or failure to enrol in a drug treatment programme (RR 0.84, 95% CI 0.63 to 1.12). Grant 1996[351] reported, at 3 years, no significant difference in incidence of cognitive delay using the Bayley MDI (RR 1.36, 95% CI 0.41 to 4.45) and an increase in incidence of psychomotor delay using the Bayley PDI of borderline statistical significance (RR 3.26, 95% CI 1.00 to 10.59; RR 0.27, 95% CI 0.03 to 0.51). Meta-analysis of two studies[351,352] found no significant differences in cognitive development (Bayley MDI: FE WMD 3.92, 95% CI –0.56 to 8.41) or psychomotor development (Bayley PDI: FE WMD 3.22, 95% CI –0.01 to 6.44). Schuler 2000[352] reported a significant reduction in child protection services (RR 0.38, 95% CI 0.20 to 0.74)
Conclusions	There is insufficient evidence to recommend the routine use of home visits for women with a drug or alcohol problem. Further large, high-quality trials are needed, and women's views on home visiting need to be assessed

CENTRAL, the Cochrane Central Database of Controlled Trials; FE, fixed effect; MDI, Mental Development Index; PDI, Psychomotor Development Index; RR, rate ratio; WMD, weighted mean difference.

Britton 2007[338]

Study	Britton C, McCormick FM, Renfrew MJ, Wade A, King SE. Support for breastfeeding mothers. *Cochrane Database Syst Rev* 2007; Issue 1, Art. No. CD001141.[338]
Aim	To assess the effectiveness of support for breastfeeding mothers
Search strategy	We searched the Cochrane Pregnancy and Childbirth Group's Trials Register (January 2006), MEDLINE (1966 to November 2005), EMBASE (1974 to November 2005) and MIDIRS (1991 to September 2005)
Selection criteria	*Types of studies* – All RCTs or quasi-RCTs, with or without blinding, and with a minimum of 75% follow-up *Types of participants* – Participants were pregnant women intending to breastfeed, post partum women intending to breastfeed and women breastfeeding their babies *Types of interventions* – Contact with an individual or individuals (either professional or volunteer) offering support which is supplementary to standard care (in the form of, for example, appropriate guidance and encouragement), with the purpose of facilitating continued breastfeeding. Studies were included if the intervention occurred in the postnatal period alone or also included an antenatal component. Interventions taking place in the antenatal period alone were excluded from this review, as were interventions described as solely educational in nature
Character of peer	Nine studies used laypeople for support
Assessment of risk of bias	We assessed the method of allocation concealment used in each study using criteria outlined in the *Cochrane Handbook for Systematic Reviews of Interventions*.[353] We categorised studies according to whether the method of allocation concealment reported was judged to have been adequate (A), unclear (B) or inadequate (C) or if allocation was not concealed (D). We also checked study reports for clear descriptions of inclusion and exclusion criteria; randomisation methods; withdrawals and dropouts; statistical analysis used; blinding of outcome assessment; and intention-to-treat analysis. Included trials had a minimum of 75% initial follow-up. When included, trials reported data at more than one time point and follow-up rates fell, we included only data from time points at which follow-up rates were at least 75% in the analysis
Data collection and analysis	Two authors independently assessed trial quality and extracted data
Results	We have included 34 trials (29,385 mother–infant pairs) from 14 countries. All forms of extra support analysed together showed an increase in duration of 'any breastfeeding' (includes partial and exclusive breastfeeding) (RR for stopping any breastfeeding before 6 months 0.91, 95% CI 0.86 to 0.96). All forms of extra support together had a larger effect on duration of exclusive breastfeeding than on any breastfeeding (RR 0.81, 95% CI 0.74 to 0.89). Lay and professional support together extended duration of any breastfeeding significantly (RR before 4–6 weeks 0.65, 95% 0.51 to 0.82; RR before 2 months 0.74, 95% CI 0.66 to 0.83). Exclusive breastfeeding was significantly prolonged with use of WHO/UNICEF training (RR 0.69, 95% CI 0.52 to 0.91). Maternal satisfaction was poorly reported Nine studies included used laypeople for support. Trials that used laypeople to deliver the intervention demonstrated a significant reduction in breastfeeding cessation at the time of the last study assessment (RR 0.86, 95% CI 0.76 to 0.98).[88,114,354–360] Significant heterogeneity was present among these studies ($I^2 = 75.6\%$). Further subgroup analysis did not reveal a statistically significant effect at any time point up to 4 months. However, in the studies of lay support that reported exclusive breastfeeding, there was a marked reduction in the cessation of exclusive breastfeeding before the last study assessment (RR 0.72, 95% CI 0.57 to 0.90).[114,355,356,358–360] There was heterogeneity among these studies ($I^2 = 96.3\%$). Further subgroup analysis indicated that this effect was significant within the first 3 months (RR before 4–6 six weeks 0.66, 95% 0.46 to 0.96; RR before 2 months 0.44, 95% CI 0.26 to 0.73; RR before 3 months 0.42, 95% CI 0.31 to 0.57)
Conclusions	Additional professional support was effective in prolonging any breastfeeding, but its effects on exclusive breastfeeding were less clear. WHO/UNICEF training courses appeared to be effective for professional training. Additional lay support was effective in prolonging exclusive breastfeeding, while its effects on duration of any breastfeeding were uncertain. Effective support offered by professionals and laypeople together was specific to breastfeeding, and was offered to women who had decided to breastfeed. Further trials are required to assess the effectiveness (including cost-effectiveness) of both lay and professional support in different settings, particularly those with low rates of breastfeeding initiation, and for women who wish to breastfeed for longer than 3 months. Trials should consider timing and delivery of support interventions and relative effectiveness of intervention components, and should report women's views. Research into appropriate training for supporters (whether lay or professional) of breastfeeding mothers is also needed

MIDIRS, Midwives Information and Resource Service; RR, rate ratio; UNICEF, United Nations Children's Fund.

Dyson 2005[361]

Study	Dyson L, McCormick FM, Renfrew MJ. Interventions for promoting the initiation of breastfeeding. *Cochrane Database Syst Rev* 2005; Issue 2, Art. No. CD001688.[361]
Aim	To evaluate the effectiveness of interventions which aim to encourage women to breastfeed in terms of changes in the number of women who start to breastfeed
Search strategy	We searched the Cochrane Pregnancy and Childbirth Group's Trials Register (July 2007), handsearched the *Journal of Human Lactation*, *Health Promotion International* and *Health Education Quarterly* from inception to 15 August 2007, and scanned reference lists of all articles obtained
Selection criteria	RCTs, with or without blinding, of any breastfeeding promotion intervention in any population group except women and infants with a specific health problem
Character of peer	Not specified
Assessment of risk of bias	We assessed the validity of each included study according to the criteria outlined in the *Cochrane Handbook*.[362] We assessed selection bias on the basis of concealment of allocation: adequate or unclear or inadequate. We rated performance bias, attrition bias and detection bias as: adequate or unclear or partially adequate or inadequate
Data collection and analysis	One review author independently extracted data and assessed trial quality, checked by a second author. We contacted investigators to obtain missing information
Results	Eleven trials were included. Statistical analyses were conducted on data from eight trials (1553 women). Five studies (582 women) on low incomes in the USA, whose participants had typically low breastfeeding rates, showed that breastfeeding education had a significant effect on increasing initiation rates compared with standard care (RR 1.57, 95% CI 1.15 to 2.15, $p=0.005$). Subgroup analyses showed that one-to-one, needs-based, informal repeat education sessions and generic, formal antenatal education sessions are effective in terms of an increase in breastfeeding rates among women on low incomes, regardless of ethnicity and feeding intention. Needs-based, informal peer support in the antenatal and postnatal periods was also shown to be effective in one study conducted among Latina women who were considering breastfeeding in the USA (RR 4.02, 95% CI 2.63 to 6.14, $p<0.00001$) A single study evaluating the effect of prenatal, perinatal and postnatal peer support services among a total of 165 participants[354] was shown to be effective at increasing initiation rates among predominantly Latina women who were considering breastfeeding in the USA (RR 4.02, 95% CI 2.63 to 6.14, $p<0.00001$). Authors describe many of the study population as feeling socially uncomfortable with breastfeeding in the USA. The personalised, problem-solving approach of the intervention had been developed for 10 years in collaboration with the study hospital. Peer counsellors were community women who have completed high school, breastfed for 6 months and received 30 hours of internationally recognised classroom training in breastfeeding management. Counsellors served as observers for 3–6 months with experienced peer counsellors, received a payment (US$12) and the potential for health benefits if working at least 20 hours per week. Counselling services included at least one prenatal home visit, daily postpartum visits during hospitalisation and at least three home visits following return from hospital. Routine care was patient led, comprising breastfeeding information in response to participants' questions and written materials available at the prenatal clinic. Perinatal care included hands-on assistance and education from maternity ward nurses. Written breastfeeding materials and access to a lactation consultant for breastfeeding problems were also available if requested, as was a 'warm line', where nurses answered postpartum breastfeeding questions. A significant increase in duration rates of breastfeeding was not demonstrated at 1 or 3 months post partum. Failure to adhere to protocol, particularly the delivery of half of postnatal home visits in the first month, was a study limitation due to staffing problems
Conclusions	This review showed that health education and peer support interventions can result in some improvements in the number of women beginning to breastfeed. Findings from these studies suggest that larger increases are likely to result from needs-based, informal repeat education sessions than more generic, formal antenatal sessions. These findings are based only on studies conducted in the USA, among women on low incomes with varied ethnicity and feeding intention, and this raises some questions regarding generalisability to other settings

RR, rate ratio.

May 2000[160]

Study	May S, West R. Do social support interventions ('buddy systems') aid smoking cessation? A review. *Tob Control* 2000;**9**;415–22.[160]
Aim	To provide an overview of the role of social support in smoking cessation and to critically review evidence regarding the use of 'buddy systems' (where smokers are specifically provided with someone to support them) to aid smoking cessation
Search strategy	Studies were located by searching MEDLINE and PsycLIT using the keywords 'smoking', 'smoking cessation', 'social support' and 'buddy'. Additional studies were identified through reference lists. Only studies reported in English and published since 1980 were included
Selection criteria	Studies were selected on four criteria: publication in a peer-reviewed journal; RCT using smokers who wanted to stop; the use of a social support intervention, including a 'buddy'; and dependent variable of smoking abstinence. Most research in this area does not use a randomised design so only a small proportion of the originally identified studies were included
Character of peer	Buddy support
Assessment of risk of bias	Not described
Data collection and analysis	Not described
Results	In view of the diverse nature of the studies, a meta-analysis was not attempted. Ten studies were identified: nine were clinic-based smoking trials, eight used a group format, and nine used buddies from among smokers' existing relationships. Support training varied from role play and rehearsal to a simple instruction to call each other regularly. Intervention and follow-up periods varied between studies. Two studies showed a significant benefit of the intervention in the short term
Conclusions	Research methodology in many cases was poor. The evidence would suggest that in the context of a smokers' clinic the use of buddies may be of some benefit. There is a lack of evidence regarding the efficacy of the use of buddies in community interventions. This is an important area for future research

Park 2004[161]

Study	Park EW, Schultz JK, Tudiver FG, Campbell T, Becker LA. Enhancing partner support to improve smoking cessation. *Cochrane Database Syst Rev* 2004; Issue 3, Art. No. CD002928.[161]
Aim	The purpose of this review was to determine if an intervention to enhance partner support helps smoking cessation when added as an adjunct to a smoking cessation programme
Search strategy	The search was performed in: Cochrane Tobacco Addiction Group specialised register (October 2007), Cochrane Controlled Trials Register (October 2007), (1966 to October 2007), MEDLINE (1966 to October 2007), EMBASE (1974 to October 2007), PsycINFO (1861 to Oct 2007). The search terms used were 'smoking' (prevention, control, therapy), 'smoking cessation' and 'support' (family, marriage, spouse, partner, sexual partner, buddy, friend, cohabitees and coworker)
Selection criteria	RCTs of smoking cessation interventions that compared an intervention which included a partner support component with an otherwise identical intervention and reported follow-up of 6 months or longer
Character of peer	Partners were defined as spouses, friends, coworkers, 'buddies' or other significant others who supported the smokers as a part of the cessation programme to which they were assigned
Assessment of risk of bias	Not described
Data collection and analysis	Two authors independently identified the included studies and extracted data using a structured form. A third author was consulted to aid in the resolution of discrepancies. Abstinence, biochemically validated if possible, was the primary outcome measure and was extracted at two post-treatment intervals: 6–9 months and > 12 months. The scores of PIQ were also analysed to assess partner support. A fixed-effect model was used to pool RRs from each study and estimate a summary effect
Results	A total of 49 articles were identified for this review. Only 10 articles (11 studies, > 2000 participants) met the inclusion criteria. The definition of partner varied between studies. All studies gave self-reported smoking cessation rates, but there was limited biochemical validation of abstinence. The RR for self-reported abstinence at 6–9 months was 1.01 (95% CI, 0.86 to 1.18); at 12 months the RR post treatment was 1.04 (95% CI, 0.87 to 1.24). Of the six studies that measured partner support at follow-up, only two studies reported significant increase in partner support in the intervention groups
Conclusions	In this review of RCTs of interventions designed to enhance partner support for smokers in cessation programmes, we failed to detect an increase in quit rates. Limited data from several of the trials suggest that these interventions did not increase partner support either. No conclusions can be made about the impact of partner support on smoking cessation. More systematic intervention to affect partnership significantly should be delivered if partner support were part of an existing cessation programme

PIQ, partner interaction questionnaire; RR, rate ratio.

Riemsma 2002[205]

Study	Riemsma RP, Pattenden J, Bridle C, Sowden AJ, Mather J, Watt IS, *et al.* A systematic review of the effectiveness of interventions based on a stages-of-change approach to promote individual behaviour change. *Health Technol Assess* 2002;**6**(24).[205]
Aim	To systematically assess the effectiveness of interventions using a stage-based approach in bringing about positive changes in health-related behaviour
Search strategy	A wide range of electronic databases were searched from inception to May 2000: AMED; ASSIA; BIOSIS; British Education Index; British Library Catalogue; British Nursing Index; CAB-Health; CINAHL; Cochrane Library CD-ROM; Conference Papers Index; DARE; DH-Data; Dissertation Abstracts; EconLIT; EMBASE; EPPI-Centre Register of Reviews of Effectiveness; ERIC; HEBS; HealthPromis/Health Education Authority; Unicorn Database; HEED; HELMIS; HTA database; Index to Scientific and Technical Proceedings; International Bibliography of the Social Sciences; King's Fund Database; MANTIS; MEDLINE; Mental Health Abstracts; NHS EED; NRR; PsycLIT; SCI; SIGLE; SSCI; and Sociological Abstracts. In addition, searches of the internet were carried out using a range of search engines The bibliographies of retrieved references were scanned for further relevant publications. The authors of abstracts appearing in conferences proceedings identified by the literature search were contacted for further information about their research
Selection criteria	RCTs evaluating interventions which aimed to influence individual health behaviour, used within a stages-of-change approach, were eligible for inclusion. Only studies that reported health-related behaviour change, such as smoking cessation, reduced alcohol consumption or dietary intake and stage movement, were included. The target population included individuals whose behaviour could be modified, primarily in order to prevent the onset, or progression, of disease. There was no limitation of study by country of origin, language or date
Character of peer	Not relevant
Assessment of risk of bias	Each included trial was assessed against a comprehensive checklist for methodological quality and quality of the implementation of the intervention. Quality assessment was performed by one reviewer and checked by a second, with disagreements resolved by discussion
Data collection and analysis	Assessment of titles and abstracts was performed independently by two reviewers. If either reviewer considered a reference to be relevant, the full paper was retrieved. Full papers were assessed against the review selection criteria by two independent reviewers, and disagreements were resolved through discussion. Data were extracted by one reviewer into structured summary tables and checked by a second reviewer. Health behaviour change was the primary outcome of interest. Secondary outcomes included assessment of stage movement, health-related outcomes, intermediate outcomes, any adverse effects resulting from the intervention, as well as cost-effectiveness data. Information about the implementation of each intervention and how the relevant professionals were trained was also recorded where given. Any disagreements about data extraction were resolved by discussion
Results	Thirty-seven RCTs were included in the review. Three studies evaluated interventions aimed at prevention (two for alcohol consumption and one for cigarette smoking). In 13 trials the interventions were aimed at smoking cessation, seven studies evaluated interventions aimed at the promotion of physical activity, and five studies evaluated interventions aimed at dietary change. Six trials evaluated interventions aimed at multiple lifestyle changes. Two studies evaluated interventions aimed at the promotion of screening mammography, and one study evaluated an intervention aimed at the promotion of treatment adherence. Four of these studies also included an economic evaluation The methodological quality of the trials was mixed, and ranged from 2 to 11 out of 13 quality items present. The main problems were lack of detail on the methods used to produce true randomisation (methods of randomisation and concealment of allocation); lack of blinding of participants (where appropriate), outcome assessors and care providers, and failure to use intention-to-treat analysis. The main issue with the quality of the implementation was lack of information on the validity of the instrument used to assess an individual's stage of change

	In 1 of the 13 trials aimed at *smoking cessation* the results could not be compared to a non-stage-based intervention because only stage-based interventions were included. In 4 of the remaining 12 smoking cessation trials, significant differences favouring the intervention group for scores on quit rates were found; in three of these the comparator was a usual-care control group and in one a non-stage-based intervention. One study showed mixed outcomes. In the remaining seven smoking cessation trials no significant differences between groups in behavioural change outcomes were found. One of the seven trials aimed at the promotion of *physical activity* did not report any data on behaviour change. Three trials found no significant differences between groups in behavioural change outcomes. Two trials showed mixed effects, and one trial mainly showed significant effects in favour of the stage-based intervention. Two of the five trials aimed at *dietary change* reported significant effects in favour of the stage-based intervention; in one trial this was in comparison to a non-stage-based intervention and in the other to a usual-care control group. Two trials showed mixed effects, and in one trial no significant differences between groups in behavioural change outcomes were found. Three of the six studies aimed at *multiple lifestyle changes* showed no differences between groups for any outcomes included. Two studies showed mixed effects, and one study showed positive effects for all outcomes included: smoking cessation, fat intake and physical activity. One of the two trials aimed at the promotion of *screening mammography* found no significant differences between groups for nearly all outcomes. The other trial showed a significant difference in favour of the stage-based intervention. The trial aimed at the promotion of *treatment adherence* showed significant results in favour of the stage-based intervention. Two out of three trials aimed at *prevention* showed no significant differences between groups for any measure of behaviour change. The other trial showed mixed outcomes. Studies with low-income participants tended not to report effects favouring the stage-based intervention. Other study characteristics, such as number of respondents, age and gender of respondents, year of publication, setting and verification of outcome measures, seemed to have little relationship with the effectiveness of the stage-based intervention
Conclusions	Overall, there appears to be little evidence to suggest that stage-based interventions are more effective than non-stage-based interventions. Similarly, there is little evidence that stage-based interventions are more effective than no intervention or usual care. Out of 37 trials, 17 showed no significant differences between groups, eight trials showed mixed effects, and 10 trials showed effects in favour of the stage-based intervention(s). One trial presented no data on behavioural outcomes, and another included stage-based interventions only. Twenty trials compared a stage-based intervention with a non-stage-based intervention, 10 trials reported no significant differences between groups, five reported mixed effects and five reported significant effects in favour of the stage-based intervention. There does not seem to be any relationship between the methodological quality of the study, the targeted behaviour or quality of the implementation (both in terms of exposure and in terms of full use of the model) and effectiveness of the stage-based intervention The methodological quality of studies was mixed, and few studies mentioned validation of the stages of change instrument. In addition, there was little consistency in the types of interventions used once participants were classified into stages, and little knowledge about the types of interventions needed once people were classified. It was unclear in a number of trials whether the intervention was properly stage based. Given the limited evidence for the effectiveness of interventions tailored to the stages-of-change approach practitioners and policy-makers need to recognise that this approach has a status that appears to be unwarranted when it is evaluated in a systematic way. There is a need for well-designed and appropriately implemented RCTs that are characterised by tailored interventions derived from accurate stage measurement, and which involve frequent reassessment of readiness to change in order to permit evolving, stage-specific interventions

AMED, Allied and Complementary Database; ASSIA, Applied Social Sciences Index and Abstracts; DARE, Database of Abstracts and Reviews of Effects; ERIC, Educational Resources Information Center; HEBS, Health Education Board for Scotland; HEED, Health Economic Evaluations Database; HELMIS, Health Management Information Service; MANTIS, Manual, Alternative and Natural Therapy Index System; NHS EED, NHS Economic Evaluation Database; NRR, National Research Register; SCI, Science Citation Index; SIGLE, System for Information on Grey Literature in Europe; SSCI, Social Sciences Citation Index.

TABLE 31 Characteristics of included reviews

Study	Date of last search of databases	No. of studies included	Study method	Type of health advisor	Type of participant	Type/mode of intervention	Area of health
Dale 2008[329]	December 2007	Seven RCTs	RCTs	Peer with similar or relevant health experience	People living with acute or long-term illness, carers of people with acute or long-term illness, parents, people with psychological symptoms, and people requiring screening or who had any other health and well-being-related concerns	Telephone support	Any health concern
Lewin 2005[13]	June–August 2001	43 studies	RCTs	Lay health workers (paid or voluntary) in primary or community health care	Any	Any	To promote health, manage illness or provide support to patients
Swider 2002[330]	1999	19 studies	Focused on outcomes or effectiveness of CHW work	CHWs in USA	Any in USA	Any	Health promotion and disease prevention
Andrews 2004[331]	2002	24 studies	Any studies on the use of CHWs in social sciences research	CHW	Ethnic minority women in USA	Any	Any; cervical cancer, maternal health, breast cancer, diabetes management, STD prevention, HIV infection risk reduction, weight loss, and physical activity
Rhodes 2007[333]	July 2006	37 studies	Any	LHAs	Adult Hispanic/ Latinos living in the USA	Any interventions to promote health and prevent disease	Any
Fischer 2007[332]	1985 to June 2006	38 studies	Any	Evaluation of strategies or interventions using cultural leverage to see if they are effective at decreasing health disparities for communities of colour	Populations of at least 50% people of colour in the USA	Any	Any; also process outcomes

Study	Date of last search of databases	No. of studies included	Study method	Type of health advisor	Type of participant	Type/mode of intervention	Area of health
Pérez-Escamilla 2008[334]	1994 to not stated	22 studies	Any	CHWs	Latino-specific results or a predominantly Latino study population (>60%)	Nutrition education intervention	Diet
Sibley 2004[335]	January 1970 to June 1999	15 studies	Experimental or quasi-experimental designs	Traditional birth attendant	Pregnant women	Any	Maternal health and baby health
Hodnett 2003[336]	March 2009	18 studies (two with lay advisors)	Randomised trials	Specially trained layperson	Pregnant women who are believed to be at risk for giving birth to preterm or low-birthweight babies	Additional support was defined as some form of emotional support (e.g. counselling, reassurance, sympathetic listening) and information or advice or both, either in home visits or during clinic appointments, and could include tangible assistance (e.g. transportation to clinic appointments, assistance with the care of other children at home)	Maternal health and baby health
Doggett 2005[337]	April 2004	Six studies (two with lay advisors)	Studies using random or quasi-random allocation	Trained lay advisors	Pregnant or post partum women with a drug or alcohol problem	Any	Any, reduction of drug and alcohol use
Britton 2007[338]	September/ November 2005 or January 2006	34 studies (nine with lay advisors)	RCTs or quasi-RCTs	LHAs	Any pregnant women intending to breastfeed, post partum women intending to breastfeed and women breastfeeding their babies	Any	Breastfeeding support
Dyson 2005[362]	July to August 2007 (search updated no change in review)	11 studies (one with peer support)	RCTs	Peers	Any breastfeeding promotion intervention in any population group except women and infants with a specific health problem	Any breastfeeding promotion intervention	Breastfeeding support

continued

TABLE 31 Characteristics of included reviews *(continued)*

Study	Date of last search of databases	No. of studies included	Study method	Type of health advisor	Type of participant	Type/mode of intervention	Area of health
May 2006[113]	1980 to date not stated	10 studies	RCTs	Smoking buddies	Smokers	Interventions aimed at supporting smoking cessation	Smoking cessation support
Park 2004[343]	October 2007	10 studies	RCTs	Smoking buddies	Smokers	Interventions aimed at supporting smoking cessation	Smoking cessation support
Riemsma 2002[205]	May 2000	37 studies	RCTs	Not relevant	Any	Any interventions based on a stages-of-change approach to promote individual behaviour change	Any

TABLE 32 Table of excluded reviews

Study	Reason for exclusion	Area reviewed
Boer 2005[324]	Did not search multiple databases	Training of paraprofessionals as behaviour modifiers
Battersby 2004[363]	Did not search multiple databases	Breastfeeding peer support cost-effectiveness
Devilly 2005[23]	Did not search multiple databases	Prison-based peer education
Durlak 1979[364]	Did not search multiple databases	Forty-two studies comparing the effectiveness of professional and paraprofessional
		Helpers – mental health therapy
Fogelholm 2002[365]	Did not search multiple databases	Community interventions for prevention of CVD
Forster 2007[366]	Primarily addressing self management of chronic disease – not lifestyle advice	Self-management of chronic conditions
Hill 1995[367]	Did not search multiple databases	Nurses and health workers CVD
Hattie 1984[368]	Search strategy not described	Professional and paraprofessional counsellors – meta-analysis
Logsdon 2004[326]	Review only included studies with statistically significant results	Paraprofessional support for pregnant and parenting women
Nash 1978[369]	Did not search multiple databases	Paraprofessionals and community mental health
Parkin 2000[370]	Did not search multiple databases	History of peer education techniques and outlines some of the definitional diversity in attempts at characterising peer education projects
Persily 2003[327]	The search for and identification of studies was not systematic	Pregnancy, breastfeeding
	The reviewers used a variety of search terms (*not specified*), an exhaustive search of the literature was conducted using several large electronic databases (*not specified*). Twenty-five citations that directly related to lay home visiting in pregnancy were found. Additional citations were located by reviewing the reference lists of relevant lists of relevant articles. Particular attention was paid to those manuscripts referred to by more than one author. Studies carried out within the last 15 years were desired; however, those considered to be foundational or classic work were also included (*criteria for foundational or classic were not specified*)	
Ross 2002[371]	Did not search multiple databases	Community HIV/STD prevention programmes
Rossman 2007[372]	Search strategy not described	Breastfeeding peer counsellors in the USA
Scott 1999[373]	Did not search multiple databases	Continuous support from doula in childbirth
Torres 2002–3[374]	Did not search multiple databases	Nineteen articles on sex education in Latino populations
Valente 2007[328]	Although 191 studies were identified they were not cited so the association between the studies and the review's conclusions could not be corroborated	Ten techniques used to identify opinion leaders to promote behaviour change
Walt 1988[32]	Did not search multiple databases	Are national CHWs programmes in crisis
Wilson 2008[375]	Did not search multiple databases	Expert Patients Programme
Wilson 2006[376]	Did not search multiple databases	Expert Patients Programme

TABLE 33 Review studies included and excluded from this review

Study	Studies included in review and in our review	Studies included in review and excluded in our review by title	Unobtainable in the timescale	Not in developed countries similar to the UK context	Descriptive material/ insufficient reporting	Not solely health-related LAs	Not adult health-related lifestyle focused	Poor methodological quality
Dale 2008[329]	Dennis 2002[87]		Calle 1994; Carroll 2006; Dale 2007		Heller 1995			Dennis 2003b; Duan 2000
Lewin 2005[13]	Andersen 2000;[41,80,81] Dennis 2002;[87] Ireys 2001;[102] Morrow 1999[113,114]	Black 1995; Leigh 1999; Morrell 2000; Schuler 2000		Chongsuvivat' 1996; Haider 2000; Kidane 2000; Lin 1997; Mtango 1986; Ramadas 2003; Zwarenstein 2000	Heller 1995; Lapham 1995; McNeil 1995; Tudiver 1992; Von Korff 1998; Wan 1980; Weinberger 1989; Wertz 1986	Silver 1997; Voorhees 1996; Williams 1992	Barnes 1999; Barth 1991; Bullock 1995; Carpenter 1990; Graham 1992; Johnson 1993; Komaroff 1974; Krieger 2000; Olds 2002; Siegel 1980	Caulfield 1998; Duan 2000; Hoare 1994; Ireys 1996; Krieger 1999; Nielsen 1972; Sung 1997
Swider 2002[330]	Bird 1998[83–86]	Black 1995; Bone 1989; Butz 1994; Moore 1981; St James 1999; Sung 1992	Bradley 1994		Brooks-Gunn 1989; Cunningham-Williams 1999	Corkery 1997	Wolff 1997	Birkel 1993; CDC 1999; Krieger 1999; Lacey 1991; Margolis 1998; McCormick 1989; Navarro 1998; Sung 1997
Andrews 2004[331]	Bird 1998;[83–86] Earp 2002;[16,62,92,93] Flax 1999; Keyserling 2002[107–108]	Arlotti 1998; Barnes-Boyd 2001; Batts 2001; Bray 1994; Burhansstipanov 2000; Thomas 2000; Watkins 1994			Sox 1999	Corkery 1997		Caufield 1998; Dignan 1996; Dignan 1998; Lacey 1991; McCormick 1989; Moore 1974; Navarro 1998; Nyamathi 2001; Quinn 2001; Sung 1997; Zhu 2002
Fisher 2007[332]	Bird 1998;[83–86] Gary 2003[97–99]	Doswell 2004; Philis-Tsimikas 2004	Fitzgibbon 2004		Giarratano 2005; Washington 2003	Avila 1994; Brant 1993; Brown 2002; Davies 2005; Jenkins 1999; Klerman 2001; Nguyen 2000; Schneider 2001; Sterling 2001	Anderson 2004; Ard 2000; Bonner 2002; D'Eramo 2004; Freeman 1995; Harris 1998; Velsor-Friedrich 2005; Wyatt 2004	Braun 2005; Briscoe 1999; Fedder 2003; Foley 2005; Hill 1999; Hill 2003; Jandorf 2005; Kim 2004; Lam 2003, Lipkus 1999; Mishra 1998; Nebelkopf 2005; Norr 2003; Taylor 2002

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Study	Studies included in review and in our review	Studies included in review and excluded in our review by title	Unobtainable in the timescale	Not in developed countries similar to the UK context	Descriptive material/ insufficient reporting	Not solely health-related LAs	Not adult health-related lifestyle focused	Poor methodological quality
Rhodes 2007[333]	Bird 1996;[83–86] Woodruff 2002[119]	Balcazar 2006; Balcazar 2005; Bray 1994; Conway 2004; Forst 2004; Kim 2005; May 1995 ; McElmurry 2003; McQuiston 2001b; Meister 1992; Sherrill 2005; Suarez 1993a; Tuefel-Shone 2005; Watkins 1994			Artinian 2004; Carrillo 1986; Flaskerund 2000; Giarratano 2005; Kiger 2003; Koval 2006; May 2003; McQuiston 2001a; McQuiston 2003; Ramos 2001; Rodrigez 2003; Watkins 1990	Corkery 1997; Navarro 2000	Hunter 2004; Larkey 2002; McAllister 1995; Ramirez 1995	Baker 1997; Castro 1995; Davis 1994; Elder 2005; Fernandez-Esquer 2003; Flaskerund 1997; Hansen 2005; Hanson 1998; Kim 2004; Martin 2005; Mayo 2004; McFarlane 1994; Navarro 1995; Navarro 1998; Nies 2004; Nyamathi 2001; Suarez 1993b; Warrick 1992; Whitehorse 1999
Pérez-Escamilla 2008[334]	Elder 2006;[94,95] Lujan 2007[111]	Anderson 2005; Balcazar 2005; Chapman 2004; Philis-Tsimikas 2004; Taylor 2000; Tuefel-Shone 2005	Block Joy 2006; Culica 2007; Dollahite 2003; Gill 2007; Townsend 2006			Corkery 1997; Garvin 2004	Joshu 2007	Ingram 2007; Thompson 2007
Sibley 2004[335]		Akhter 1995; Alisjahbana 1995; Benara 1990; Bhatia 1985; Ghana MoH 1990; Greenwood 1990; Larston 1987; Malawi MoH 1987; Mathur 1979; Mathur 1983; Okubagzhi 1988; Post 1991; Smith 1997; Sujpluem 1979; Swaminathan 1986						

continued

TABLE 33 Review studies included and excluded from this review *(continued)*

Study	Studies included in review and in our review	Studies included in review and excluded in our review by title	Unobtainable in the timescale	Not in developed countries similar to the UK context	Descriptive material/ insufficient reporting	Not solely health-related LAs	Not adult health-related lifestyle focused	Poor methodological quality
Hodnett 2003[336]		Spencer 1989				Blondel 1990; Brooten 2001; Bryce 1991; Dawson 1989; Dawson 1999; Heins 1990; Iedema-Kuiper 1996; Klerman 2001; McLaughlin 1992; Moore 1998; Norbeck 1996; Oakley 1990; Olds 1986; Rothberg 1991a; Rothberg 1991b; Spira 1986; Villar 1993		
Doggett 2005[337]		Schuler 2000				Black 1994; Butz 1998; Dakof 2003; Quinlivan 2000		Grant 1996;
Britton 2007[338]	Dennis 2002;[87] Morrow 1999;[113,114]	Chapman 2004a Chapman 2004b; Mongeon 1995; Morrell 2000		Haider 2000; Leite 1998	Jenner 1988	Albernaz 2003; Davies-Adetugbo 1997; Barros 1994; Bhandari 2003; Brent 1995; DiNapoli 2004; Frank 1987; Froozani 1999; Gagnon 2002; Grossman 1990; Haider 1996; Jones 1985; Kools 2005; Kramer 2001; Lynch 1986; McDonald 2003; Moore 1985; Pinelli 2001; Porteous 2000; Pugh 2002; Quinlivan 2003; Santiago 2003; Sjolin 1979; Winterburn 2003; Wrenn 1997		Graffy 2004
Dyson 2005[362]		Chapman 2004a Chapman 2004b				Brent 1995; Coombs 1998; Forster 2004; Hill 1987; Howard 2000; Lindenberg 1990; Ryser 2004; Serwint 1996		Caulfield 1998

Study	Studies included in review and in our review	Studies included in review and excluded in our review by title	Unobtainable in the timescale	Not in developed countries similar to the UK context	Descriptive material/ insufficient reporting	Not solely health-related LAs	Not adult health-related lifestyle focused	Poor methodological quality
May 2006[112]	West 1998[30]	Albrecht 1998; Ginsberg 1992; Glasgow 1986; Gruder 1993; Malott 1984; McIntyre-Kingsolver 1986; Mermelstein 1986; Nyborg 1986				Orleans 1991		
Park 2004[343]	May 2006[113]	Ginsberg 1992; Glasgow 1986; Gruder 1993; Malott 1984; McIntyre-Kingsolver 1986; Nyborg 1986	McBride 2004			Orleans 1991; Powell 1981		
Foster 2007[349]	Barlow 2000;[83] Griffiths 2005;[101,102] Kennedy 2007;[104–107] Lorig 2003;[111] Lorig 1999[110]		Lorig 1986; Lorig 1999a	Fu 2003	Cohen 1986; de Weerdt 1991; Gifford 1998; Summers Holtrop 2002; Von Korff 1998	Buszewicz 2006	Riegel 2004	Haas 2005; Swerissen 2006
Riemsma 2002[205]		Steptoe 1999; Werch 1999; Werch 1996	Baker 1999; Cash 1997; Lutz 1996; Scales 1998		DiClemente 1991; Wang 1994	Berman 1995; Braatz 1999; Brug 1998; Butler 1999; Crane 1998; Dijkstra, 1999; Graham-Clarke 1994; Gritz 1993; Gritz 1998; Harland 1999; Kristal 2000; Lennox 1998; Morgan 1996; Oliansky 1997; Pallonen 1994; Peterson 1999; Rakowski 1998; Resnicow 1997; Swanson 1999; Velicer, 1999; Woollard 1995	Aveyard 1999; Cardinal 1996; Goldstein 1999; Pallonen 1998; Sinclair 1999	Glasgow 1995; Havas 1998

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Appendix 2

Original protocol

Project title

An evidence synthesis of qualitative and quantitative research on the component intervention techniques, effectiveness, cost-effectiveness, equity and acceptability of different versions of the health-related LA role in improving health and well-being in the UK.

Background – policy context and existing literature

Policy context

Behaviour is recognised as a key determinant of health; for example, in the USA, more than a third of all deaths are estimated to be due to modifiable behaviours such as smoking, physical inactivity, unhealthy eating and excessive alcohol use.[1,2] These major health risks tend to be more prevalent among lower socioeconomic groups and, consequently, large sociodemographic differences exist in both experiences and expectations of health.[3,4] The Public Health White Paper *Choosing health: making healthy choices easier* sought to address this issue by taking action to encourage and enable individuals to make healthier choices, with a particular focus on those living in disadvantaged communities.[5] It recognises the central importance of changing behaviour to improve population health and also builds on the vision of a 'fully engaged scenario', in which people take control of their own health and the wider determinants of ill health are addressed.[6] Many Western health-care systems are currently undergoing a shift from paternalistic to partnership models of care, with policy-makers, clinicians and consumers all seeking ways to promote increased involvement of patients and the wider public.[7] These shifts in policy require an expanded portfolio of public health interventions, including an expanded workforce continuum, in order to effective address the health needs of both the general population and the most vulnerable groups in society.

The introduction of new roles or the expansion of existing roles to deliver health-related lifestyle advice (HRLA) or training represents one response to these developments. Peer support in particular represents a strategy that has been widely used to promote behaviour change and self-care across diverse conditions and population groups, and is becoming increasingly important in health-care environments that are challenged by limited financial and human resources. Peer- or lay-led interventions have the potential to address key issues such as the need to care cost-effectively for expanding populations with chronic illness, increase engagement with 'hard-to-reach' groups, enhance equity of service provision and ensure compliance with interventions.[8,9] Preliminary work conducted in relation to the implementation of health trainers in the NHS (see below) identified a range of models varying by degree of targeting and mode of delivery.[10,11] However, it is not currently known what the effects of these various models are on health outcomes. Given the increasing interest in this area, the funding that is now being committed to it by the Department of Health (DoH) and the opportunity it offers to address health inequalities, it is timely to bring together the available data on the impacts of HRLA or training to determine how effective the various approaches are. Using systematic methods, we will therefore seek to (1) describe and classify the range of HRLA models; (2) identify key dimensions that appear to characterise these models; and (3) investigate associations between these dimensions and measures of effectiveness, cost-effectiveness, equity and acceptability. *Table 1* provides a summary of the dimensions identified through our preliminary work on this subject.

Existing literature

Much of the formal literature describing peer-based models comes from North America, where health promotion and disease prevention programmes that rely on lay health advisors (LHAs) have proliferated since the 1970s.[12] Research has shown that people are more likely to hear and personalise messages, and thus to change their attitudes and behaviours, if they believe the messenger is similar to them.[13] In addition, peer-based interventions can often be implemented economically, allow for direct involvement of clients and can result in long-term benefits for the peer educators themselves.[14] A recent Cochrane Review, involving studies mainly from North America and the UK, found promising benefits in the use of LHWs to promote immunisation, breastfeeding and breast cancer screening uptake and to improve outcomes for selected infectious diseases, in comparison with usual care, i.e. care delivered by qualified health professionals.[15] However, there was insufficient evidence to assess which lay health worker strategies were likely to be most effective. An earlier meta-analysis from the USA found a consistent, but modest, positive effect of peer-based health education programmes, but could not answer the question of whether these effect sizes justified the investment of the extra time and resources needed to recruit, train and support peer educators.[16] Additional reviews have found that lay or CHWs are most effective in the area of increasing access to care, particularly in underserved populations, but that further work is needed to determine whether or not this strategy can be cost-effective.[17,18]

In the UK, NHS health trainers were introduced in the *Choosing health* White Paper, offering a range of approaches to helping people change their behaviour in relation to their health.[5] A review of the existing literature to support the implementation of health trainers found little evidence of the effectiveness of similar roles (e.g. community parents, Healthlink workers, community health educators), particularly from the UK.[10] Research and evaluation studies plus descriptive accounts of programmes were identified via systematic searches of electronic databases [e.g. ASSIA, Bath Information and Data Service (BIDS), MEDLINE, Science Direct] and the internet. As most of the evidence did not exist in the formal literature, it was also necessary to use a 'snowball approach' to build up a network of contacts with access to this information, identified through professional networks, internet searches and conference proceedings. The main reason cited for the lack of published literature in this area is that many projects are relatively small in scale and do not have the resources or expertise for rigorous, scientific evaluation. Quantitative evaluations have, therefore, rarely been randomised or controlled and generally take a before-and-after approach to study design. The review also revealed that many evaluations are qualitative or contain a qualitative element in addition to a quantitative element. These frequently obtain information on the experience of the intervention from the perspectives of clients, the advisors or trainers, and from others in the health care or community team involved in referral to or from the service. Furthermore, although the majority of programmes identified tended to conduct at least some process evaluation, few have sought to rigorously evaluate the impact of the intervention in terms of improvements in health behaviours and health and well-being.

There are, therefore, large gaps in terms of the published evidence in this area from the UK and a predominance of formal literature from North America, where interventions delivered by lay or peer advisors tend to focus on specific health issues, such as cancer screening, cardiovascular health or sex education. The full range of existing HRLA formats is difficult to clearly capture and categorise, but previous attempts to model the health trainer intervention will be expanded upon further in the research proposed here.[10,11] The search strategies we propose to use recognise that, although randomised controlled trials (RCTs) are widely accepted as the 'gold standard' of research evidence, a range of different study designs are considered appropriate for the evaluation of health promotion interventions.[19] Although RCTs are questions of safety and effectiveness (*does it work?*), qualitative studies and surveys are best for questions of appropriateness, satisfaction and salience (*does it matter?*), and questions concerning acceptability and process

may be addressed by qualitative studies or quantitative studies using mediation analyses (*how does it work?*). [20] Hence, the research we propose here will attempt to incorporate studies that have utilised various qualitative and quantitative methodologies. By reviewing the current diverse range of evidence, a set of criteria will be developed detailing the conditions and contexts in which different versions of the HRLA or trainer format are more or less effective and cost-effective than others. The importance of looking at the existing models broadly across different dimensions, including different health topic areas and communities, is to understand under which conditions, in which settings and in what ways different types of support are more effective, efficient, equitable and acceptable.

Research aim and objectives

This research aims to identify, describe, classify and analyse the range of models, developed to date for delivering HRLA or training, for effectiveness, mechanism of effect, cost-effectiveness, equity and acceptability in improving the health and well-being of individuals and communities, with particular reference to the reduction of inequalities in the UK. This aim will be achieved by meeting the following objectives:

Phase I Intervention modelling and problem definition:

1. Define and model the range of HRLA interventions currently in use, via secondary analysis of national survey data and telephone interviews with key stakeholders.
2. Elicit stakeholders' [the Project Advisory Group (PAG) and a recruited sample] perceptions of key issues surrounding the role of HRLAs to be taken into account when shaping, planning and executing the systematic review.

Phase II Evidence synthesis:

3. Identify, critically appraise and, if appropriate, meta-analyse effectiveness and model cost-effectiveness data from studies addressing interventions for delivering HRLA or training in the UK or similar settings. Integral to this will be a theoretical analysis of the component intervention techniques identified in the studies. The review will be limited to 'developed' countries in which there is similarity of the main behaviours associated with ill health and similar types of health inequalities, i.e. Western Europe, North America, Australia and New Zealand. There will be no limitation by study population but the review will seek a particular focus on interventions targeting those living in areas of multiple social and economic deprivation.
4. Seek data from published evaluations on differential outcomes of interventions by factors such as age, gender, ethnicity and socioeconomic position.

Phase III Development of proposals for definitive research and dissemination of findings:

5. Present a summary of the existing evidence base and present practice, in order to identify the most appropriate future research questions and research designs that will provide the NHS with best evidence for the effectiveness and cost-effectiveness of HRLAs or trainers in the future.

Research methods

The difficulty of conducting systematic reviews of public health interventions directly reflects the complexity of the interventions reviewed and the subsequent determination of effectiveness. Some of the key challenges in this field include: the focus on populations rather than individuals, multicomponent interventions, the use of qualitative as well as quantitative approaches, an emphasis on processes of implementation, and the complexity and long-term nature of the

interventions and outcomes. [20] The concept of HRLAs is multifaceted and as such represents a complex public health intervention. Hence, any assessment of the effectiveness and cost-effectiveness of the models identified needs to take into consideration the nature of this type of intervention and will require multiple methods of enquiry. This has implications for the research proposed here, which will be divided into the following three elements:

1. problem definition and intervention modelling, leading to classification of the various intervention dimensions
2. evidence synthesis, including a systematic review, economic modelling and meta-analysis of the results
3. development of a proposal for definitive research studies to provide evidence for the effectiveness, cost-effectiveness, and mechanisms of change equity and acceptability of the HRLA role.

These three phases are framed by a staged approach to intervention development, evaluation and implementation, as exemplified by Nutbeam's[20,23] outcome model for health promotion and the Medical Research Council (MRC) framework for the evaluation of complex interventions. The process will very much be an iterative one, incorporating a number of overlapping phases and activities, and leading to specific outcomes and deliverables.

Phase I: problem definition and intervention modelling

The PAG will be consulted on their views and perceptions of key issues surrounding the role of HRLAs to be taken into account when planning and executing the research. An initial scoping exercise will be undertaken in order to identify, describe and categorise the various intervention dimensions that currently exist, and to set the parameters for the systematic review (Phase II). This phase will build directly on a national survey of health trainer activity, funded by the Department of Health and currently being undertaken by Professor Michie and colleagues at the Centre for Outcomes Research and Effectiveness, University College London (UCL). The survey will be completed and reported in September 2007. A secondary analysis of the survey data will be undertaken and, along with the outcomes of the Advisory Group consultation, will be used to produce a primary classification of the intervention dimensions with respect to the following:

- referral system (*who initiates*)
- timing or stage of intervention, in relation to access to target groups and stage of life (*when?*)
- aims, including whether primary or secondary prevention or positive health promotion (*why?*)
- theoretical basis (*how does it work?*)
- level of delivery (population, group, individual, national, regional, local, etc.) and target audience (*for whom?*)
- actors (*who delivers it?*)
- setting of delivery (*where?*)
- method of intervention, i.e. component techniques (*what?*)
- intensity, i.e. frequency, duration, amount of specific components (*how much?*)
- mode of delivery, for example one-to-one, face-to-face versus telephone contact (*how delivered?*)
- cost (*what price?*).

Our primary classification of intervention dimensions will aim to identify the smallest number of discrete intervention types that are distinctive, can be identified from searches in the subsequent systematic review and could be expected to be differentiated in terms of outcomes. Our experience is that the number will not exceed 30. We will then undertake semistructured telephone interviews with local project leads/coordinators (largely those with some involvement

in local health trainer projects) in order to refine the classification. We will analyse the interviews in batches of 10 and cease interviewing when the analysis is saturated and no new categories are identified (we estimate that this will be 30–40 interviews). We will identify categories that are well populated by instances of interventions, develop specific questions regarding differences expected and interview several from each category. Our expectation is that the number will not exceed 30. We will develop an interview schedule, informed by Phase I of the MRC framework for evaluation of complex interventions, and the Advisory Group will be consulted on this via email.[19] Interviews will be audio-recorded, with participants' consent, and later transcribed verbatim. Analysis of transcripts will be undertaken using the framework analysis method to verify the classification and modify it according to the findings.[24] The resulting classification will be mailed out to all health trainer leads and hub leads for them to provide instances where interventions do not fit on to the classification. The final classification will be will be emailed to the PAG for comment via email and teleconference.

At conclusion of Phase I, search terms will have been defined and we will have developed the analytical framework for Phase II. The framework will both inform and be informed by each of the subsequent phases.

Phase II: evidence synthesis

We will conduct a systematic review to determine the effectiveness, mechanisms of change (to understand why changes happen and therefore enable more effective intervention), cost-effectiveness, equity and acceptability of different versions of the HRLA in improving health behaviours and health and well-being. The methods detailed below for identifying and selecting relevant material, assessing its quality and synthesising the results have been developed from the guidelines issued by the NHS Centre for Reviews and Dissemination (CRD).[25] For the integration of qualitative research with quantitative studies in systematic reviews, we will draw on the framework set out by Thomas *et al.* (2004).[26]

Planned inclusion/exclusion criteria

Explicit inclusion and exclusion criteria will be set following completion of Phase I. Studies will be considered relevant and included in the review if they report an evaluation of HRLA or training delivered to patients or the public in the UK or a sufficiently similar setting, in terms of the outcomes listed below. As the impacts of HRLA in all adult groups are of interest, no exclusions will be made on the basis of the population studied. Furthermore, as much of the available evidence has not been formally published in peer-reviewed journals, no exclusions will be made on the basis of lack of peer review in the first instance. In order to provide an assessment of the best available evidence on lifestyle advice, we will not restrict inclusion in the review on the basis of study design, date or language (subject to translation into English). However, study quality will be rigorously appraised (see below).

We will adopt a broad and inclusive approach to interventions that involve paid or voluntary work with an individual or group of peers acting in an advisory role, offering training, support or counselling (in person, over the telephone or online) focused on delivering HRLA or training in terms of health improvement. We will include advice delivered by post or electronically only if this involves an iterative process of interaction between the individual and the advisor (i.e. excluding simple web-based information sources or online peer support groups).

This review will exclude interventions delivered without the explicit aim of health improvement. For example, community-based secondary prevention for chronic disease will be included, but lifestyle advice or training delivered as part of treatment or care for acute illness will be excluded. Other exclusion criteria will include: interventions focusing solely on the delivery of training or advice to children or adolescents as intervention methods and factors determining effectiveness

are likely to be very different from those in adults; and studies or reports detailing descriptive accounts of programmes, without any evaluation. Although this descriptive information will not be included in the review per se, it may be included in the intervention modelling phase (Phase I) as part of the process of problem definition.

Proposed outcome measures

The outcomes to be assessed in the review will be refined after Phase I is complete. For now, we propose that studies reporting at least one of the following outcomes will be included:

- health status [including self-rated health, health-related quality of life (HRQoL) or individual quality of life (QoL), psychological well-being, pain, fatigue, disability]; physiological measures (such as blood pressure, lung function or glycaemic control)
- health behaviour (including physical activity, consumption of tobacco, alcohol and food, symptom management)
- health-care use (including doctor visits, hospital admissions, length of stay)
- costs of delivering a programme or intervention; cost-effectiveness [life-years and quality-adjusted life-years (QALYs) gained per unit cost].

Secondary outcomes or mediators are likely to include: self-efficacy (confidence) to improve health; knowledge acquisition; changes in attitudes or beliefs; social role or activities; self-reported competence; uptake; communication with a health-care professional; effects on relatives or carers; and adverse outcomes, such as complaints or other adverse effects of interventions. We will also record the differential effects of the interventions in terms of primary and secondary outcomes and mediators by measures of socioeconomic position, ethnicity, age and gender, where these are available and reported.

Search strategies

Searches will be made by two reviewers for existing relevant systematic reviews using Cochrane, Campbell, CRD/DARE and EPPI-Centre databases, in addition to searches for primary studies. Our initial scoping review suggests that the formal literature base (i.e. from peer-reviewed journals) on HRLAs is relatively small. However, there does appear to be a substantial amount of 'grey' literature on this subject and therefore we will access as much of this as possible using a variety of search strategies, including:

1. *Searches of electronic databases* Searches will be made of relevant electronic databases using various combinations of search terms (*Boxes 1* and *2*). These initial search strategies have been developed from the scoping review but will be refined and expanded based on the results of Phase I.
2. *Searches of the internet* Searches will be made of the internet using the Google search engine (www.google.com) using the search strategies listed in *Box 2*. The first 100 results returned by each search strategy will be scanned for relevance and those judged to be potentially relevant followed up. If this strategy identifies HRLA or training programmes but no information on evaluation is available on the internet, attempts will be made to contact programme organisers directly by telephone or email in order to access the results of any evaluation that has been performed.
3. *Suggestions from experts and those working in the field* Requests for help with accessing relevant literature will be posted on the NHS Health Trainers' Network discussion forum (www.networks.nhs.uk/forums/showthread.php?*p*=11#post11) and sent to relevant mailbases (listed in *Box 3*). 'Experts' – identified as such either by responses to postings, frequent publication in the area or through personal contacts of the research team – will also be contacted directly and asked for help with identifying relevant literature or providing further contacts.

4. *Searches of specific websites* A number of specific websites of organisations that sponsor and/or conduct relevant research will be searched to identify publications of interest (listed in *Box 4*). Searches will also be made of various trial and research registers for completed and ongoing research of relevance.
5. *Reference lists of relevant studies* The reference lists of all studies assessed to be relevant will be hand searched to identify additional studies that may be of relevance. Reference lists of previous reviews will also be searched to ensure thoroughness.
6. *Searches of the Science Citation Index (SCI) and Social Sciences Citation Index (SSCI)* Citation searches of the SCI and SSCI will be made in order to identify all citations of studies identified as relevant, and therefore identify any further possible relevant studies.
7. *Hand searches of relevant journals* The contents pages of journals considered to be highly relevant (i.e. found to contain a significant number of relevant articles using the above methods) will be scanned to identify additional relevant publications.

Additional information from authors

Our solution to the anticipated problem of only brief description of intervention and evaluation protocols being presented in published evaluation will be to contact all authors of included studies to gather the full details required for the purpose this review. Excellent response rates, for example 80%, to such requests has been achieved in other reviews we have conducted.

Selection of studies

Titles of studies identified using the above search strategies will be scanned by two reviewers to make an initial assessment of relevance. In cases where there is any doubt concerning relevance at this stage, abstracts will be retrieved in order to make a further judgement. If doubt concerning relevance remains at this stage or no abstract is available, full reports will be retrieved for review. Abstracts and relevant articles will be reviewed independently by two reviewers based on the inclusion criteria and specified outcomes of interest. Studies excluded after reviewing abstracts or full reports will be detailed in a 'table of excluded studies'.

As we will make substantial efforts to access the grey literature, it is likely that there will be cases where we retrieve both an internal report and peer-reviewed paper on the same study. In these cases, both documents will be scrutinised. If there are any discrepancies in results, those reported in peer-reviewed journals will be favoured. However, results described in internal reports but not peer-reviewed journals will also be abstracted and included in the review.

Data abstraction

We will abstract data on all outcomes reported with the aid of a data abstraction form developed by Professor White and colleagues,[27] which has been modified to fit this review (*Table 2*). As we are interested in all possible health behaviour and health and well-being impacts of lifestyle advice, no explicit outcomes are stated in the data collection sheets and data on all and any measurements instruments used will be abstracted.

Data abstraction from each study retrieved will be performed independently by two reviewers, with information entered either directly on to a Microsoft ACCESS database or recorded on paper data abstraction sheets and then entered into the Microsoft ACCESS database. In any cases where reviewers are found to disagree in the data abstracted, a third reviewer will be asked to independently review the study and a majority decision taken. If substantive disagreement remains then the whole review team will meet and agree the data that will be included in the review.

Assessment of study quality (quantitative)

We will use the *Quality assessment tool for quantitative studies* developed by the Effective Public Health Practice Project, Canada.[28] The tool assesses the following quality criteria: selection bias, study design, confounders, blinding, data collection methods, withdrawals and dropouts, intervention integrity, and statistical analyses. It is suitable to be used in systematic reviews of effectiveness, and can be used for RCTs, quasi-experimental studies and uncontrolled studies.[29] Content and construct validity have also been established. As few studies in this area are likely to be RCTs, we may not be able to use a formal scoring framework to determine the quality of each study. In such cases, we will collect information on various aspects of methodology – as shown in the data abstraction sheet – and report this in a descriptive analysis. In addition, we will report our results in categories based on the strength of the study designs used to obtain data (e.g. RCTs, non-RCTs, uncontrolled before and after studies, etc.) in order to make clear the methodological strength of the evidence available.

Statistical procedures

Where baseline data are available from quantitative studies, pre- and post-interventions, means will be reported for both intervention and control groups, and the absolute change from baseline will be calculated, together with 95% CIs. When baseline data are not available, results will be expressed as the relative percentage change. For dichotomous outcomes, we will present the RR of the outcome compared with the control group. We will also calculate the risk difference, which is the absolute difference in the proportions of each treatment group. The number needed to treat will also be calculated.

As the scoping review identified few occasions where the effect of lifestyle advice on health behaviour and health or well-being outcomes was investigated using quantitative methods, it is unlikely that we will collect much data that will be susceptible to combination and formal meta-analysis. Nevertheless, we will perform meta-analyses where possible, using a random effects model where there is statistical heterogeneity and a fixed effects model where there is no significant statistical heterogeneity. We will use funnel plots to examine publication bias, and use sensitivity studies to examine the effects of heterogeneity and study quality on the results. Sensitivity analyses will address: effectiveness of specific programmes, study quality, differential dropout and intention-to-treat. If a sufficient number of studies is identified, we will perform subgroup analyses for the following: gender, age groups, intervention type, socioeconomic status, ethnicity, and the various dimensions described in *Table 1*.

Treatment of qualitative data

Quality appraisal is a much-discussed issue in relation to the role of qualitative research in systematic reviews.[33] We will utilise the Critical Appraisal Skills Programme (CASP) checklist for qualitative research, which is a tool for reviewers recommended by the Cochrane Qualitative Research Methods Group.[34] The checklist comprises 10 questions designed to help the reviewer to appraise the report of qualitative research by thinking systematically about the key issues of rigour, credibility and relevance. As with the quantitative evaluative work, few qualitative studies or components of studies, identified in the scoping review for this proposal appeared to meet some of the standards for high-quality qualitative research that have been proposed.[35,36] Whilst we will include all qualitative research identified as relevant in a narrative analysis, we may not be able to apply any formal framework for determining quality. In these cases, information on various aspects of methodology will be recorded and reported descriptively.

Expected output of the review

We will prepare tables of included and excluded studies. Within each of these sets of tables, interventions will be further grouped according to type of study, type of intervention, HRLA

and participant characteristics. Interventions will be classified as: effective, potentially effective, ineffective or uncertain in improving behaviours related to health and well-being.

Economic modelling

We will attempt to combine data on the economic impacts of HRLA or training in order to determine the cost-effectiveness of the various advisor formats. The economic models constructed will be based on care pathways and on a detailed analysis of previously conducted economic evaluations retrieved in the systematic review. Given the challenges in evaluating such complex interventions, in particular the likely lack of RCTs, lack of direct evidence of the effect on long-term outcomes such as QoL and uncertainty in appropriate measures of benefit, the initial phase of structuring the model will therefore draw on Phase I data relating to relevant measures of benefit.

When assessing efficiency, by whatever economic evaluation method, data are required on the costs and outcomes of different interventions and procedures. By deriving and linking estimates of relative costs and effectiveness for the alternative advisor formats under consideration, it should be possible to determine whether one format is:

- less costly and at least as effective as its comparator, in which case it would be judged, unequivocally, to be a better use of health-care resources; or
- more costly, and more effective, than its comparator, in which case a judgement would have to be made about whether the extra cost is worth the gains in health achieved.

The basic approach we will use to classify interventions in this way comprises three main stages:

Structuring of the model The decision models constructed will have the following main features:

- They will be used to estimate final outcomes, for example probability (for a given time horizon) of developing a given disease condition, given participation in a HRLA/training intervention, by estimating the intermediate relationships of probability of intermediate outcome given intervention and probability of final given intermediate.
- The choice of outcomes will be determined by consultation with key stakeholders.
- Expected cost will be the sum of the costs associated with each outcome, weighted by their probabilities, and including the cost of the intervention itself. If QALYs were deemed an appropriate measure, and health–state utility data are available for each of the relevant states, then QALYs will be similarly estimated.
- Subgroup analysis will be used if relevant and in order to provide evidence of any inequalities, for example by socioeconomic status (where the data can be extracted in the review).
- We will seek to include the full range of intervention dimensions as considered in the systematic review of effectiveness.
- A time horizon will be chosen in consultation with the key stakeholders.

Populating the model The models will be populated by the following data:

- Estimates of effects (probabilities) derived from the systematic review of effectiveness.
- Utility values (if deemed appropriate and available). Here, we will use literature-based values for corresponding outcomes. Some adjustment will have to be made to estimate the utility given multiple outcomes, for example stroke plus diabetes, if no literature estimates were available.
- Estimated unit costs and resource quantities derived from the systematic review, and nationally or locally available data, modified by an appropriate discount rate.

For the above three bullets, consideration will be given to using all sources regardless of quality, weighting the estimates according to quality using the shape of the second-order probability distribution (on the parameter estimates). We will use the most cost-effective method of locating estimates, such as from routinely collected data, industry or expert opinion. If only expert opinion is available we will use appropriate methods (e.g. consensus development), but which permit the estimation of uncertainty.

Estimating uncertainty Inevitably, there will be considerable uncertainty in estimates of cost and effectiveness, and our strategy for dealing with this will be to:

- estimate appropriate probability distributions [surrounding the parameter (e.g. probability, cost and any utility) estimates] based on plausibility and the sampling distribution, using sample statistics
- estimate the expected cost and benefit, given the prior distributions
- summarise by subgroup in terms of:
  - incremental net benefit for plausible levels of a threshold (incremental cost per QALY) to inform the recommending of interventions (i.e. which are cost-effective).
  - cost-effectiveness acceptability curve (CEAC) for illustrative purposes.
- conduct non-probabilistic sensitivity analysis (e.g. one-way) as considered appropriate, such as to take into variation in unit costs.

All the new modelling processes in this research will follow guidelines on economic evaluation, such as those by Drummond *et al.* (1997),[30] guidelines on technology appraisal, such as by the National Institute of Clinical Excellence (2004); and guidelines on decision modelling, such as by Phillips *et al.* (2004).[30–32]

Phase III: development of proposals for definitive research and dissemination of findings

The findings of the previous two phases will be used to identify the main evaluation question(s) to be considered by the HTA for future research in examining the effectiveness, cost-effectiveness, equity and acceptability of the health-related LA role. Assessing the applicability of the findings and the feasibility of replicating the interventions included in the review to other settings will form a key part of the process of summarising evidence. The Cochrane Review guidelines contain a detailed framework that will be used by the reviewers in determining applicability. [38] This framework is based on the RE-AIM model for conceptualising the public health impact of an intervention. [39]

Dissemination

Papers will be produced for publication in journals indexed in major databases such as MEDLINE, as well as for presentation at relevant local, national and international conferences. Summary articles will be produced for publication in both professional and academic journals, such as the *Health Service Journal*, *Nursing Times* and *Quality in Health Care*. Specialist health publications and relevant consumer magazines will also be targeted. A summary of the research will be published electronically and be made available to download freely through Northumbria University's web pages, and we will also ask for it to be assessed for inclusion in DARE, an electronic database of published reviews. Key contacts identified through the research and the PAG will be asked to distribute the review to all interested parties. Dissemination will also take place via workshops targeted at the DoH, Strategic Health Authorities, Primary Care Trusts and health trainer leads. We will offer to run workshops for other organisations, such as professional and public bodies, if funded by these organisations.

Research governance

The review of published and publicly available literature will not require ethical approval. However, any stakeholder events and telephone interviews conducted as part of Phase I will require submission of all project documentation to the relevant NHS Research Ethics Committee and Trust Research & Governance Department. Northumbria University, as the employing organisation of the Principal Investigator, will act as sponsor for the research.

Expertise

We have convened a collaborative, multidisciplinary team of highly skilled individuals who will make a significant contribution to the research by offering their expertise in public health, social sciences, health psychology, epidemiology, health economics, medicine and nursing. Particular skills in the team include experience of conducting quantitative and qualitative systematic reviews and economic modelling. The systematic review will be undertaken by two researchers at Northumbria University. They will draw on the expertise of Dr Katherine Deane, a Research Fellow at Northumbria University, who has undertaken numerous Cochrane reviews, and who will provide guidance with respect to quantitative systematic reviewing and with any meta-analyses required. Economic modelling expertise will be provided by the Health Economics team within the Institute of Health and Society at Newcastle University.

Dr Susan Carr, Reader in Public Health in the Health Improvement Research Programme (HIRP), at Northumbria University, is the Principal Investigator. Experience of concurrent management of multiple projects will provide a template for leadership, management and probity of the overlapping phases of this project. She will draw on HIRP research foci of enhancement of understanding of population need, service innovation and evaluation and output and outcome evaluation to contribute to this project. Professor Cam Donaldson, Director of the Institute of Health and Society at Newcastle University, has expertise in measuring and valuing the benefits of health care and the economic evaluation of health-care interventions. Professor Susan Michie of the Centre for Outcomes Research and Effectiveness (CORE) at UCL will take responsibility for an analysis of the possible mechanisms of change underlying any effects found. This will include appropriate coding of the interventions and linking this with theoretical principles of behaviour change. Professor Martin White, Director of the Public Health Research Programme at Newcastle University, will offer his expertise in conducting systematic reviews and the development and evaluation of complex public health interventions. He will contribute to all phases of the research, in particular providing advice on analysis of differential intervention effects within the systematic review and on development of future research questions, intervention strategies and evaluation designs.

An Advisory Group (n=8) representing a range of key stakeholders and expertise has been recruited from different geographical locations, service, user and academic backgrounds and disciplines. The group will provide guidance to the review team to ensure appropriate inclusion and exclusion criteria; discuss and define the range of intervention dimensions following the survey analysis; contribute to decisions about the scope of the review; assisting the reviewers in prioritising outcomes and interpreting the findings of the review; and disseminating the review to relevant groups, ensuring that it is readable and understandable from a range of perspectives. This group will meet a minimum of four times over the duration of the project, at approximately the following times:

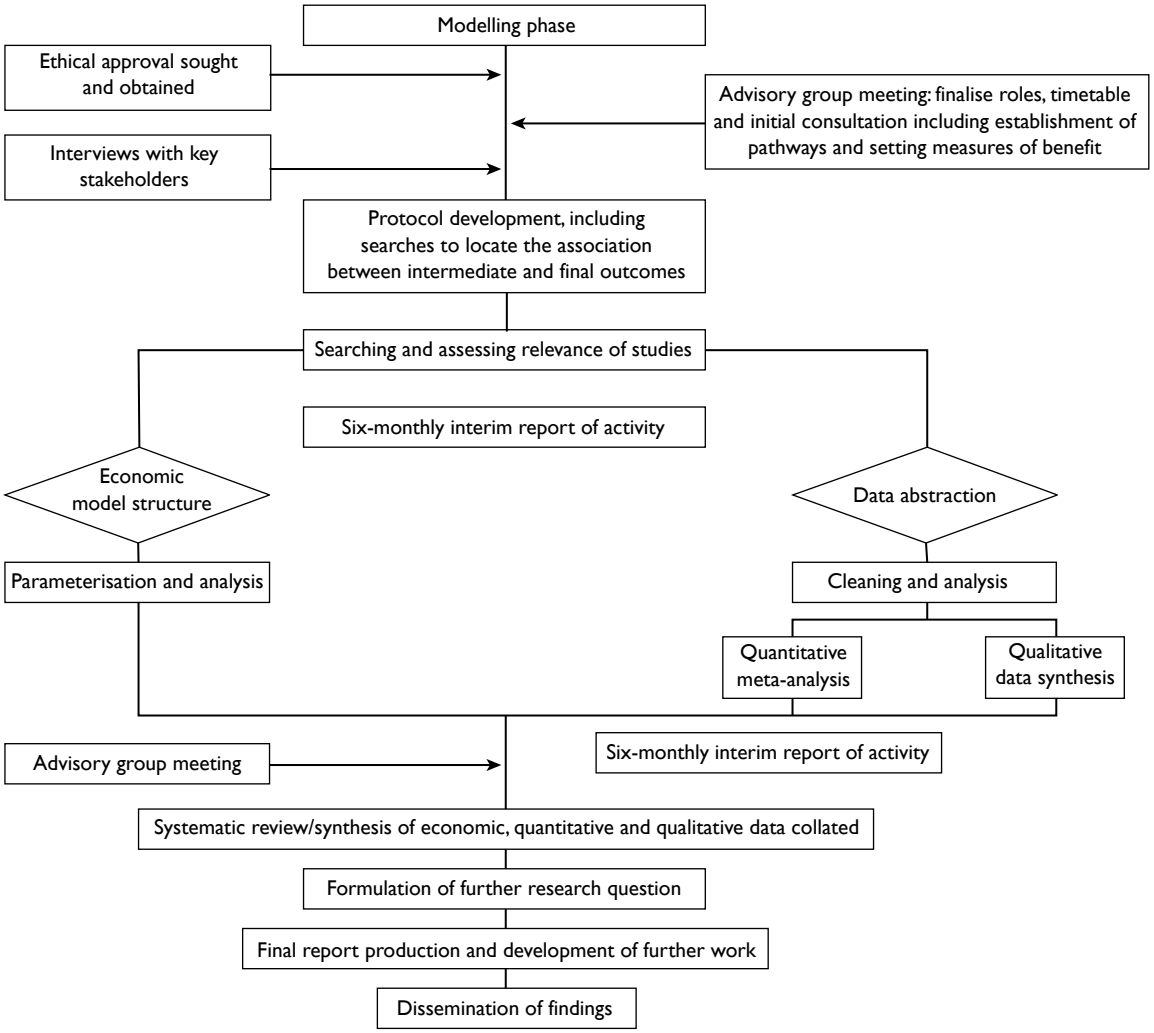
- October 2007 commence project, finalise roles and timetable, undertake initial consultation
- April 2008 completion of Phase I, preparation for Phase II and production of interim report
- October 2008 review of economic modelling and data abstraction, interim report preparation

- February 2009 research question formulation, preparation of final report and framework paper for publication.

Justification of support required

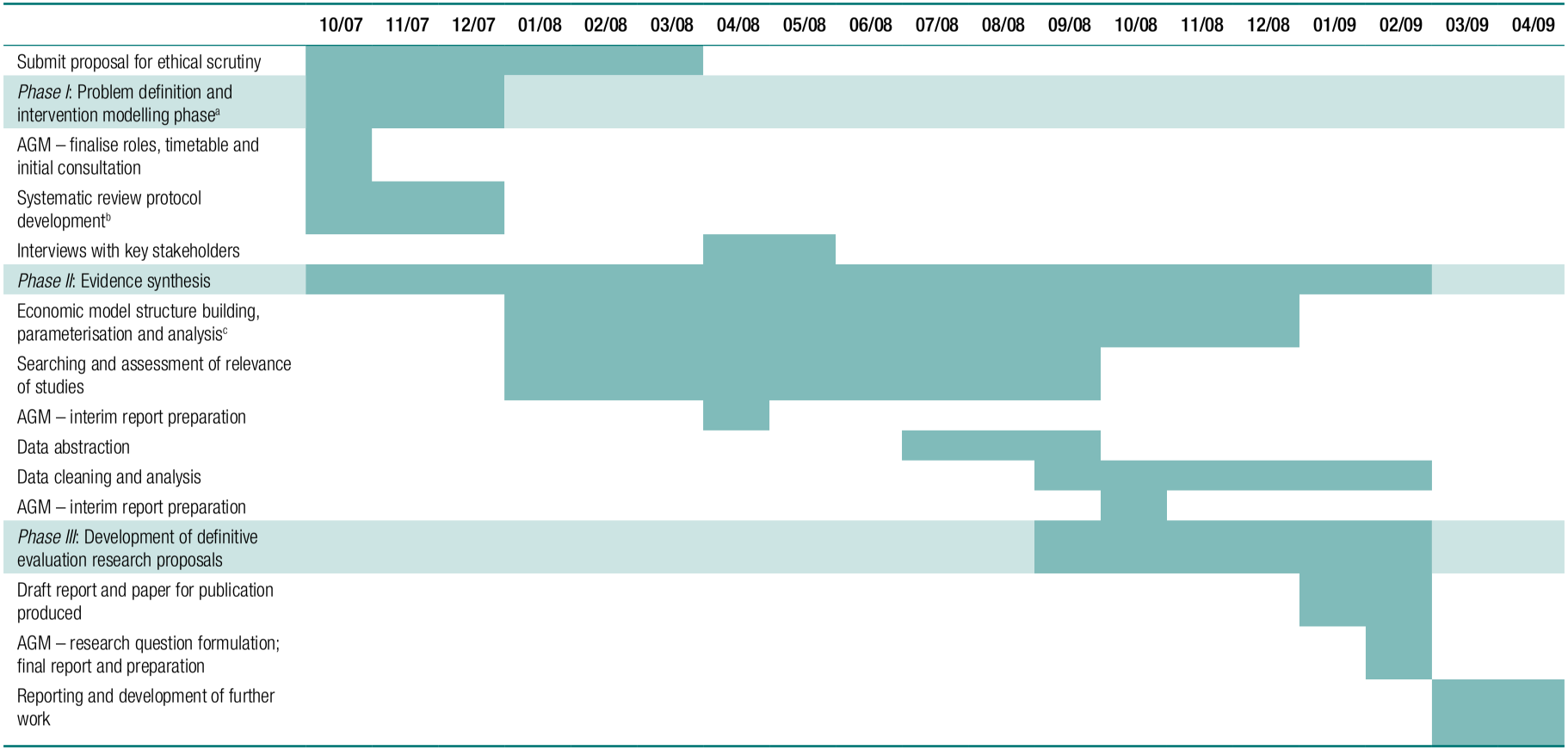
In accordance with standard practice to ensure rigour, two reviewers will be used to avoid bias. This means that the equivalent of one part-time Research Associate (RA) and one part-time Senior Research Assistant (SRA) at Northumbria University will be required for 18 months, with input from Dr Deane for the equivalent of 10 days, and one part-time RA/economic modeller at Newcastle University for 18 months. Overall supervision and leadership will be provided by Dr Carr at Northumbria University, with Professors Donaldson, Michie and White providing expertise and specific leadership at appropriate points during the project. Progress review meetings will be conducted with Dr Carr and the research team on a monthly basis, and the core team will convene every 3 months, with regular email and telephone communication as and when required. The PAG will attend four steering group meetings over the course of the 18 months, with reimbursement of travel and subsistence costs.

Flow diagram



Project timetable

We estimate that the project will take approximately 18 months to complete, starting in November 2007 and completing in May 2009. The relevant milestones will be as follows:



AGM, Advisory Group Meeting.

a Including establishment of pathways and setting measures of benefit.

b Including searches to locate the association between intermediate and final outcomes.

c Including locating cost and utility estimates as required.

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Progress reports will be submitted at 6-monthly intervals during the project, detailing progress towards or against the above milestones. A final report will be produced and submitted to *Health Technology Assessment* (HTA) by May 2009, along with at least one paper for publication in a relevant peer-reviewed journal.

Should we become aware of any further studies performed after the review has been completed, we will append these to the review as necessary. If a number of studies that challenge the conclusions of the review become available, and the original conclusions become untenable, we will repeat the review if we have the resources available to do so.

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TABLE 1 The multi-dimensional nature of the HRLA format[a]

	Dimension	
Bottom up, emergent	*Origins*	Top down, mandated
Informal	*Level of formality*	Formal
Generic, focus on overall health and well-being	*Topic focus*	Targeted, focus on specific health topics or behaviours
Whole population within a specified locality	*Population focus*	Particular target groups or local communities
Community outreach	*Referral*	Biomedical referral model
One-off contact	*Frequency*	Iterative, ongoing intervention
Peer or lay led	*Practitioner type*	Professionally driven
Unqualified, low/no skill	*Skill level*	Qualified, highly skilled
Unpaid volunteers	*Nature of role*	Paid employees
Part-time/sessional workers	*Hours*	Full-time advisors/trainers
Group or community work	*Mode of delivery*	One-to-one intervention
Community development and engagement	*Main activities*	Evidence-based lifestyle advice, goal setting
Community setting	*Context*	Health-care setting
Nurturing and supporting	*Approach*	Information giving and signposting
Enhanced capacity and social capital within communities	*Key outcomes*	Health behaviour change within individual clients

a Interventions and programmes for the delivery of HRLA can be loosely classified along the dimensions detailed above. However, none of these is mutually exclusive and there is inevitably a high degree of overlap and blurring of the boundaries between the categories. For example, initiatives described as taking a one-to-one approach may occasionally involve some group work, and those that focus on a particular issue often deal with wider health concerns by signposting clients to other services.

BOX 1 Electronic databases that will be searched

ASSIA
Article 1st
British Humanities Index
CINAHL
EMBASE
FRANCIS
NHS Economic Evaluation Database (NHS EED)
IBSS
MDX Health
MEDLINE
PAIS
PsycINFO
Science Citation Index (SCI)
SIRS Researcher
Social Sciences Citation Index (SSCI)
Social Services Abstracts
Sociological Abstracts
Web of Knowledge
WorldCat
Zetoc

BOX 2 Strategy for searching electronic databases

(Health trainer OR lifestyle advi$/ train$ OR lay health worker/adviser OR peer educ$/counsel$/support$ OR health activator/activist OR health aide OR health advocate OR link worker OR community champion OR community health educator OR outreach worker) AND (evaluation OR effectiveness OR cost-effectiveness OR equity OR acceptability OR behaviour change OR health promotion/improvement OR disease prevention)

AND/OR searches for specific health-related behaviours: (smoking OR physical activity OR diet OR overweight/obesity OR alcohol OR breastfeeding OR sexual health)

BOX 3 Mailbases and ListServs that requests for information will be posted on

HEALTH-EQUITY-NETWORK@JISCMAIL.AC.UK
COMMUNITY-HEALTH@JISCMAIL.AC.UK
GP-UK@JISCMAIL.AC.UK
GPRD-RESEARCH@JISCMAIL.AC.UK
HEALTH-FOR-ALL@JISCMAIL.AC.UK
HEALTH-PROMOTION@JISCMAIL.AC.UK
HEALTH-SERVICES-RESEARCH@JISCMAIL.AC.UK
PUBLIC-HEALTH@JISCMAIL.AC.UK
PUBLIC-HEALTH-IN-TRUSTS@JISCMAIL.AC.UK
SOCIALWORK-HEALTHINEQUALITIES@JISCMAIL.AC.UK
EVIDENCE-BASED-HEALTH@JISCMAIL.AC.UK
HEALTH-SECTOR-DEVELOPMENT@JISCMAIL.AC.UK
HEALTHFUTURESUK@JISCMAIL.AC.UK
APIG@JISCMAIL.AC.UK
LEEDSPEERSUPERVISION@JISCMAIL.AC.UK
primarycarenursingresearchnetwork@yahoogroups.com
evidencenetwork.com
click4HP@yorku.ca
address_healthcare_disparities@list.ahrq.gov
health-disparities@lis.ahrq.gov
public-health@latrobe.edu.au
SDOH@yorku.ca

BOX 4 Websites to be hand searched for relevant publications

The National Audit Office: www.nao.org.uk
The Home Office: www.homeoffice.gov.uk
The Joseph Rowntree Foundation: www.jrf.org.uk
The Office of the Deputy Prime Minister: www.odpm.gov.uk
ISRCTN Register: www.controlled-trials.com/isrctn
The Department of Health: www.dh.gov.uk
The American Institutes for Research: www.air.org
The Office of Policy: www.ssa.gov/policy
The Medical Research Council: www.mrc.ac.uk
The Urban Institute: www.urban.org
Wellcome Trust: www.wellcome.ac.uk
National Institute of Health: www.nice.org.uk/
The Society of Behavioural Medicine: www.sbm.org/

TABLE 2 Data abstraction sheet

Authors		
Title		
Year		
Journal and reference		
Institution (if report)		
Reviewer		Review date
Entered on EndNote		EndNote ref.
Entered on Access		Access ref.
Screening		
Does this study describe an intervention involving some form of HRLA or trainer?		
If not, this study should not be included in the review – may need to discuss with team		
Description of intervention		
What was the referral system?		
When was the intervention delivered – timing or stage?		
What were the aims of the intervention?		
Who was eligible for the intervention?		
Who delivered the intervention?		
Where was the intervention delivered?		
What was the content of the intervention (specific technique/s)?[23]		
Theoretical basis of the intervention?		
What was the intensity of the intervention?		
How as the intervention delivered?		
What was the cost of the intervention?		
Evaluation		
Type of evaluation performed	Quantitative	
	Qualitative	
	Economic	

TABLE 2 Data abstraction sheet *(continued)*

Quantitative evaluation			
Type of quantitative evaluation		Uncontrolled before and after Controlled/comparison group	
Uncontrolled before-and-after studies			
Size, e.g. number seen by advisor(s)			
Timescale that those included in evaluation seen			
Health outcomes	Measurement instrument 1		
	Data collection method		
	Baseline mean & SD		Baseline *N*
	FU mean & SD		Follow-up *N*
	Stats performed?		Result of stats
	Measurement instrument 2		
	Data collection method		
	Baseline mean & SD		Baseline *N*
	FU mean & SD		Follow-up *N*
	Stats performed?		Result of stats
Other outcomes	Measurement instrument 1		
	Data collection method		
	Baseline mean & SD		Baseline *N*
	FU mean & SD		Follow-up *N*
	Stats performed?		Result of stats
	Measurement instrument 2		
	Data collection method		
	Baseline mean & SD		Baseline *N*
	FU mean & SD		Follow-up *N*
	Stats performed?		Result of stats
Controlled studies/studies with comparison groups			
Size	No. in intervention/effect group at baseline		
	No. in intervention/effect group at follow-up		
	No. in control/comparison group at baseline		
	No. in control/comparison group at follow-up		
Timescale/follow-up			
Random assignment to control/intervention group?			
Researchers blind to control/intervention group status?			
Health outcomes	*Measurement instrument 1*		
	effect grp score at baseline		
	comp grp score at baseline		
	effect grp score at FU		
	comp grp score at FU		
	stats performed?		
	results of stats		
	Measurement instrument 2		
	effect grp score at baseline		
	comp grp score at baseline		
	effect grp score at FU		
	comp grp score at FU		
	stats performed?		
	results of stats		

continued

TABLE 2 Data abstraction sheet *(continued)*

Other outcomes	*Measurement instrument 1*
	control grp score at baseline
	int grp score at baseline
	control grp score at FU
	int grp score at FU
	stats performed?
	results of stats
	Measurement instrument 2
	control group score at baseline
	int group score at baseline
	control group score at FU
	int group score at FU
	stats performed?
	result of stats
Qualitative evaluation	
Sample	Size
	Composition
	How chosen
Data collection method	
Analytical method	
Main themes identified	
Economic evaluation	
Size	
Timescale that those included in evaluation seen	
Economic outcomes	Measurement instrument 1
	Measurement instrument 2

Appendix 3

Multidimensional nature of the HRLA format

TABLE 34 The multidimensional nature of the HRLA format

	Dimension	
Bottom up, emergent	*Origins*	Top down, mandated
Informal	*Level of formality*	Formal
Generic, focus on overall health and well-being	*Topic focus*	Targeted, focus on specific health topics or behaviours
Whole population within a specified locality	*Population focus*	Particular target groups or local communities
Community outreach	*Referral*	Biomedical referral model
One-off contact	*Frequency*	Iterative, ongoing intervention
Peer or lay led	*Practitioner type*	Professionally driven
Unqualified, low/no skill	*Skill level*	Qualified, highly skilled
Unpaid volunteers	*Nature of role*	Paid employees
Part-time/sessional workers	*Hours*	Full-time advisors/trainers
Group or community work	*Mode of delivery*	One-to-one intervention
Community development and engagement	*Main activities*	Evidence-based lifestyle advice, goal setting
Community setting	*Context*	Health-care setting
Nurturing and supporting	*Approach*	Information giving and signposting
Enhanced capacity and social capital within communities	*Key outcomes*	Health behaviour change within individual clients

Interventions and programmes for the delivery of HRLA can be loosely classified along the dimensions detailed above. However, none of these are mutually exclusive and there is inevitably a high degree of overlap and blurring of the boundaries between the categories. For example, initiatives described as taking a one-to-one approach may occasionally involve some group work, and those that focus on a particular issue often deal with wider health concerns by signposting clients to other services.

Appendix 4

Project Advisory Group

Rachel Baker, Lecturer, Newcastle University

Sharon Bartram, Health Trainer Manager, Hartlepool Primay Care Trust

Dr Susan Carr, Reader in Public Health & Primary Care, Northumbria University

Professor Cam Donaldson, Director of the Institute of Health and Society, Newcastle University

Dr Katherine Deane, Senior Lecturer, Newcastle University (2008–9), University of East Anglia (2009)

Professor Chris Drinkwater, Emeritus Chair of Primary Care Development, Northumbria University

Gwen Ellison, Health Trainer Lead, North East Hub, Newcastle Primary Care Trust

Natalie Forster, Research Assistant, Northumbria University

Lesley Geddes, Principal Lecturer, Northumbria University

Philip Hodgson, Research Assistant/Administrator, Northumbria University

Diane Jones, Research Associate, Northumbria University (August–November 2009)

Farzana Latif, Public Health Practitioner, East Berkshire Primary Care Trust

Dr Monique Lhussier, Senior Lecturer, Northumbria University

Dr Marianne Morris, Principal Lecturer, University of West England

Professor Susan Michie, Professor of Health Psychology, University College London

Mark Pennington, Research Associate, Newcastle University

Jane South, Reader in Health Promotion, CoDirector of the Centre for Health Promotion Research, Leeds Metropolitan University

Professor Martin White, Professor of Public Health, Director of the Centre for Translational Research in Public Health, Newcastle University

Appendix 5

Interview schedule

Stakeholders' perceptions of key issues surrounding the role of health-related LAs

1. Role definitions/descriptions
   i. What services/interventions do you provide that are delivered by a health-related LA?
   ii. Do you have one or multiple models/versions of the health-related LA role? What is their role title?
   iii. What is the skill level of those delivering the intervention?
   iv. Number of hours worked, for example full-time/part-time/sessional, etc.
   v. What are the origins/history of the service/intervention, i.e. was it previously undertaken by another post holder, is it delegated from another post holder ?
2. Referral process
   i. Is a referral required for the service to be offered/delivered?
   ii. What type of referral, e.g. community outreach/biomedical referral?
3. Aims and objectives of the intervention delivered by the health-related LA
   i. What is the intervention intending to achieve, i.e. is it about primary or secondary prevention or positive health promotion?
   ii. Does it have a specific disease or health topic focus?
   iii. Does it focus on one particular health improvement issue (e.g. smoking cessation), more than one issue (e.g. smoking cessation, obesity and exercise) or general health and well-being (i.e. a generic focus)?
   iv. What are the key outcomes for the intervention?
   v. How do you define and measure success of the health-related LA role?
4. Eligibility for service
   i. Who are the target audience for the intervention?
   ii. What is the level of delivery, i.e. individual, group, community, local/regional/national population, etc.?
   iii. Is there any specific targeting of particular populations?
5. Setting
   i. Where is the intervention delivered?
   ii. What is the context in which the intervention is delivered?
6. Mode of delivery
   i. What are the main activities undertaken?
   ii. What is the approach of the intervention? Nurturing and supporting or signposting and giving information
   iii. How is the intervention delivered, e.g. face-to-face contact with individuals/groups versus telephone contact?
   iv. What is the method of the intervention, i.e. what are its component techniques?
7. Intensity
   i. What is the intensity of the intervention, i.e. frequency, duration, amount of specific components?
   ii. Theoretical basis
   iii. How does the intervention work?
   iv. Were any theories used to develop the intervention, e.g. stages of change?

8. Price
    i. Has any cost analysis of the intervention been carried out?
    ii. How much does the intervention cost? Overall cost/cost per contact?
9. Grey literature
    i. Any supporting documentation that could be used within the review?

Appendix 6

Search strategies for electronic databases

Database: Applied Social Sciences Index and Abstracts

Name of host: CSA Illumina

Years covered: 1960–present

Search strategy

List one:

1. kw= (health train*)
2. kw= (lifestyle within 1 (advi* or train* or coach*))
3. kw= (lay health within 1 (worker or advis?r or support*))
4. kw= (lay within 1 (practitioner or leader or midwi*))
5. kw= (peer within 1 (leader or educ* or counsel* or support* or mentor* or network* or assist*))
6. kw= (health within 1 (activ* or aide or advoc* or coach or promot?r))
7. kw= ((patient or peer) within 1 navig*)
8. kw= ((community or health) within 1 champion)
9. kw= (community health within 1 (educ* or work* or advis* or activ* or representative))
10. kw= (community wellness advocate)
11. kw= (community within 1 (parent or mother))
12. kw= (outreach within 1 (worker or specialist))
13. kw= (expert patient) or kw= (natural help*)
14. kw= ((neighborhood or neighbourhood) within 1 (help* or leader or assistant))
15. kw= (family health advis*)
16. kw= (breastfeeding supporter)
17. kw= (lactation consultant)
18. kw= ((village or indigenous) within 1 health worker)
19. kw= (promotor*)
20. kw= (paraprofessional)
21. kw= (workplace health advi*)
22. kw= ((professional* or nurs* or physician* or clinician*) within 2 (delegat* or substitut*))
23. kw= (staff* within 1 model*)
24. kw= (nurs* within 2 (led or managed or directed or run))
25. kw= ((lay or voluntary or volunteer* or untrained or unlicensed or nonprofessional* or non professional* or paraprofessional* or paramedical) within 1 (worker* or staff))
26. kw= (community within 3 (volunteer* or aid* or support))
27. kw= ((birth or childbirth or child birth or labor or labour) within 1 (attendant* or assistant*))
28. kw= (doula* or douladural* or monitrice* or linkworker* or link worker* or barefoot doctor*)
29. kw= (home within 1 (aid or aides or health or nursing or support or intervention* or treatment* or visit*))

List two:

30. kw= (public health)
31. kw= ((behaviour or behavior or lifestyle or lifestyle) within 1 change)
32. kw= (health within 1 (promotion or education or improvement))
33. kw= ((disease or illness) within 1 prevention)
34. kw= (smoking)
35. kw= (tobacco use)
36. kw= (exercise)
37. kw= (diet)
38. kw= (nutrition)
39. kw= (overweight)
40. kw= (obesity)
41. kw= (alcohol)
42. kw= (substance misuse)
43. kw= (breastfeeding)
44. kw= (sexual health)
45. kw= (condom use)
46. kw= (HIV)
47. kw= (AIDS)
48. kw= (mental health)
49. kw= (wellbeing)

List three

50. kw= (evaluation)
51. kw= (randomi?ed controlled trial)
52. kw= (RCT)
53. kw= (controlled clinical trial)
54. kw= ((questionnaire or survey or interview or focus group) within 5 method)
55. kw= (program evaluation)
56. kw= (multicenter study)
57. kw= (experiment*)
58. kw= (time within 1 series)
59. kw= (interrupted time series)
60. kw=(pre test or pretest or (post test or posttest))
61. kw= (impact)
62. kw= (intervention*)
63. kw= (chang*)
64. kw= (compar*)
65. kw= (random allocation)
66. kw= (double blind method)
67. kw= (single blind method)
68. kw= (clinical trial)
69. kw= (clin* within 5 trial*)
70. kw= ((singl* or doubl* or trebl* or tripl*) within 5 (blind* or mask*))
71. kw= (placebo*)
72. kw= (random*)
73. kw= (comparative study)
74. kw= (follow up studies)
75. kw= (prospective studies)
76. kw= (control* or prospective* or volunteer*)

77. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3 treatment within 1 (program* or strateg* or test* or questionnaire* or process* or procedure* or method*))
78. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 1 care within 1 (program* or strateg* or test* or questionnaire* or process* or procedure* or method*))
79. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3 screening within 1 (program* or strateg* or test* or questionnaire* or process* or procedure* or method*))
80. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3 intervention* within 1 (program* or strateg* or test* or questionnaire* or process* or procedure* or method*))
81. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3 prevention* within 1 (program* or strateg* or test* or questionnaire* or process* or procedure* or method*))
82. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3 (protocol* or guideline* or strateg* or audit* or method*))
83. kw= ((critical* within 3 apprais*) or evaluat*)

List four

84. kw= (econom*) or kw= (cost*) or kw= (pric*) or kw= (pharmacoecon*)
85. kw= (cost within 1 (effectiveness or utili* or benefit or minimi* or energy or oxygen or metabolic)) or kw= (expenditure not energy)
86. kw= (value within 2 money) or kw= (budget*) or kw= (preference) or kw= (QALY) or kw= (quality within 1 adjusted)
87. kw= (utility*)
88. kw= (financ* within 1 (management or support or organized)) or kw= (econom* or cost or costs or costly or costing or price or prices or pricing or pharmacoeconomic*)
89. kw= (expenditure* not energy)
90. kw= (value within 1 money) or kw= (budget*)
91. List five
92. kw= (editorial)
93. kw= (letter)
94. kw= (comment)
95. kw= (animal)

Database: Articles 1st

Name of host: OCLC FirstSEARCH

Years covered: earliest to latest

Search strategy

((kw: Health w train*) or (kw: Lifestyle w advi*) or (kw: Lifestyle w train*) or (kw: Lifestyle w coach*) or (kw: Lay w health w worker) or (kw: Lay w health w advis#r) or (kw: Lay w health w support) or (kw: Lay w practitioner) or (kw: Lay w leader) or (kw: Lay w midwi*) or (kw: Peer w leader) or (kw: Peer w edu*) or (kw: Peer w counsel*) or (kw: Peer w support*) or (kw: Peer w mentor*) or (kw: Peer w network*) or (kw: Peer w assist*) or (kw: Health w activ*) or (kw: Health w aide) or (kw: Health w advoc*) or (kw: Health w coach) or (kw: Health w promot#r) or (kw: Patient w navig*) or (kw: Peer w navig*) or (kw: Community w champion) or (kw: Health w champion) or (kw: Community w health w educ*) or (kw: Community w health w work*) or (kw: Community w health w advis*) or (kw: Community w health w activ*) or (kw: Community

w health w representative) or (kw: Community w wellness w advocate) or (kw: Community w parent) or (kw: Community w mother) or (kw: Outreach w worker) or (kw: Outreach w specialist) or (kw: Expert w patient) or (kw: Natural w help*) or (kw: Neighborhood w help*) or (kw: Neighborhood w leader) or (kw: Neighborhood w assistant) or (kw: Neighbourhood w help*) or (kw: Neighbourhood w leader) or (kw: Neighbourhood w assistant) or (kw: Family w health w advis*) or (kw: Breastfeeding w supporter) or (kw: Lactation w consultant) or (kw: Village w health w worker) or (kw: Indigenous w health w worker) or (kw: Promotor*) or (kw: Paraprofessional) or (kw: Workplace w health w advi*))

AND

((kw: Public w health) Or (kw: Behaviour w change) Or (kw: Behavior w change) Or (kw: Lifestyle w change) Or (kw: Life w style w change) Or (kw: Health w promotion) Or (kw: Health w education) Or (kw: Health w improvement) Or (kw: Disease w prevention) Or (kw: Illness w prevention) Or (kw: Smoking) Or (kw: Tobacco w use) Or (kw: Physical w activity) Or (kw: Exercise) Or (kw: Diet) Or (kw: Nutrition) Or (kw: Overweight) Or (kw: Obesity) Or (kw: Alcohol) Or (kw: Substance w misuse) Or (kw: Breastfeeding) Or (kw: Sexual w health) Or (kw: Condom w Use) Or (kw: HIV) Or (kw: AIDS) Or (kw: Mental w health) Or (kw: Wellbeing))

AND

((kw: Evaluation) Or (kw: Randomi#ed w controlled w trial) Or (kw: RCT) Or (kw: Controlled w clinical w trail) Or (kw: controlled w before w after w 3 w study) Or (kw: cohort w 3 kw: study) Or (kw: case-control w 3 kw: study) Or (kw: longitudinal w 3 kw: study) Or (kw: observational w 3 kw: study) Or (kw: case w 3 kw: study) Or (kw: qualitative w 3 kw: study) Or (kw: quantitative w 3 kw: study) Or (kw: questionnaire w 25 kw: method) Or (kw: survey w 25 kw: method) Or (kw: interview w 25 kw: method) Or (kw: focus w group w 25 kw: method) OR (kw: econom*) Or (kw: cost*) Or (kw: pric*) Or (kw: pharmacoecon*) Or (kw: cost w effectiveness) Or (kw: cost w utili*) Or (kw: cost w benefit) Or (kw: cost w minimi*) Or (kw: cost w energy) Or (kw: cost w oxygen) Or (kw: cost w metabolic) Or (kw: expenditure NOT kw: energy) Or (kw: value w 2 kw: money) Or (kw: budget*) Or (kw: preference) Or (kw: QALY) Or (kw: quality w adjusted) Or (kw: utility*) Or (kw: financ* w management) Or (kw: financ* w support) Or (kw: financ* w organized))

NOT

((kw: editorial) or (kw: letter) or (kw: comment) or (kw: animal))

Database: British Humanities INDEX

Name of host: CSA

Years covered: earliest to latest

Search strategy

List one:

1. kw= (health train*)
2. kw= (lifestyle within 1 (advi* or train* or coach*))
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57. kw= (experiment*)
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59. kw= (interrupted time series)
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64. kw= (compar*)
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67. kw= (single blind method)
68. kw= (clinical trial)
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70. kw= ((singl* or doubl* or trebl* or tripl*) within 5 (blind* or mask*))
71. kw= (placebo*)
72. kw= (random*)
73. kw= (comparative study)
74. kw= (follow up studies)
75. kw= (prospective studies)
76. kw= (control* or prospective* or volunteer*)
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79. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3 screening within 1 (program* or strateg* or test* or questionnaire* or process* or procedure* or method*))
80. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3 intervention* within 1 (program* or strateg* or test* or questionnaire* or process* or procedure* or method*))
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83. kw= ((critical* within 3 apprais*) or evaluat*)

List four:

84. kw= (econom*) or kw= (cost*) or kw= (pric*) or kw= (pharmacoecon*)

85. kw= (cost within 1 (effectiveness or utili* or benefit or minimi* or energy or oxygen or metabolic)) or kw= (expenditure not energy)
86. kw= (value within 2 money) or kw= (budget*) or kw= (preference) or kw= (QALY) or kw= (quality within 1 adjusted)
87. kw= (utility*)
88. kw= (financ* within 1 (management or support or organized)) or kw= (econom* or cost or costs or costly or costing or price or prices or pricing or pharmacoeconomic*)
89. kw= (expenditure* not energy)
90. kw= (value within 1 money) or kw= (budget*)
91. List five
92. kw= (editorial)
93. kw= (letter)
94. kw= (comment)
95. kw= (animal)

Database: CINAHL

Name of host: Ovid

Years covered: 1982 to week 1 September, 2008

Search strategy

1. health train*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
2. (lifestyle adj (advi* or train* or coach*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
3. (lay health adj (worker or advis?r or support*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
4. (lay adj (practitioner or leader or midwi*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
5. (peer adj (leader or educ* or counsel* or support* or mentor* or network* or assist*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
6. (health adj (activ* or aide or advoc* or coach or promot?r)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
7. ((patient or peer) adj navig*).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
8. ((community or health) adj champion).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
9. (community health adj (educ* or work* or advis* or activ* or representative)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
10. community wellness advocate.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
11. (community adj (parent or mother)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
12. (outreach adj (worker or specialist)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
13. expert patient.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
14. natural help*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
15. ((neighborhood or neighbourhood) adj (help* or leader or assistant)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]

16. family health advis*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
17. breastfeeding supporter.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
18. lactation consultant.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
19. ((village or indigenous) adj health worker).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
20. promotor*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
21. paraprofessional.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
22. workplace health advi*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
23. "delegation of authority"/
24. exp *voluntary workers/
25. ((professional* or nurs* or physician* or clinician*) adj2 (delegat* or substitut*)).tw
26. (staff* adj model*).tw
27. (nurs* adj2 (led or managed or directed or run)).tw
28. ((lay or voluntary or volunteer* or untrained or unlicensed or nonprofessional* or non professional* or paraprofessional* or paramedical) adj (worker* or staff)).tw
29. (community adj3 (volunteer* or aid* or support)).tw
30. ((birth or childbirth or child birth or labor or labour) adj (attendant* or assistant*)).tw
31. (doula* or douladural* or monitrice* or linkworker* or link worker* or barefoot doctor*).tw
32. (home adj (aid or aides or health or nursing or support or intervention* or treatment* or visit*)).tw
33. health personnel, health educators.sh
34. or/1–33
35. public health.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
36. ((behaviour or behavior or lifestyle or life style) adj change).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
37. (health adj (promotion or education or improvement)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
38. ((disease or illness) adj prevention).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
39. smoking.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
40. "tobacco use".mp. [mp=title, original title, abstract, name of substance word, subject heading word]
41. physical activity.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
42. exercise.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
43. diet.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
44. nutrition.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
45. overweight.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
46. obesity.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
47. alcohol.mp. [mp=title, original title, abstract, name of substance word, subject heading word]

48. substance misuse.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
49. breastfeeding.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
50. sexual health.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
51. "condom use".mp. [mp=title, original title, abstract, name of substance word, subject heading word]
52. HIV.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
53. AIDS.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
54. mental health.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
55. wellbeing.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
56. exp *community health services/
57. exp *public health/
58. "Tobacco Use Cessation"/
59. smoking/
60. patient compliance/
61. risk reduction behavior/
62. food habits/
63. or/35–62
64. evaluation.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
65. randomi?ed controlled trial.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
66. RCT.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
67. controlled clinical trial.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
68. (((controlled before and after) or cohort or case-control or longitudinal or observational or case or qualitative or quantitative) adj3 stud*).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
69. ((questionnaire or survey or interview or focus group) adj25 method).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
70. *program evaluation/
71. program evaluation.tw
72. exp *research/
73. multicenter studies/
74. experimental studies/
75. experiment*.tw
76. (time adj series).tw
77. time series/
78. (pre test or pretest or (post test or posttest)).tw
79. impact.tw
80. intervention*.tw
81. chang*.tw
82. compar*.tw
83. (controlled before and after stud*).mp
84. random assignment.sh
85. double – blind studies.sh
86. single -blind studies.sh
87. clinical trials.pt

88. exp Clinical Trial/
89. (clin* adj25 trial*).ti,ab
90. ((singl* or doubl* or trebl* or tripl*) adj25 (blind* or mask*)).ti,ab
91. placebo*.ti,ab
92. random*.ti,ab
93. comparative studies.sh
94. exp evaluation research/
95. follow up studies.sh
96. prospective studies.sh
97. (control* or prospective* or volunteer*).ti,ab
98. ((effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 treatment adj (program* or strateg* or test* or questionnaire* or process* or procedure* or method*)).tw
99. ((effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 care adj (program* or strateg* or test* or questionnaire* or process* or procedure* or method*)).tw
100. ((effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 screening adj (program* or strateg* or test* or questionnaire* or process* or procedure* or method*)).tw
101. ((effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 intervention* adj (program* or strateg* or test* or questionnaire* or process* or procedure* or method*)).tw
102. ((effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 prevention* adj (program* or strateg* or test* or questionnaire* or process* or procedure* or method*)).tw
103. ((effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 (protocol* or guideline* or strateg* or audit* or method*)).tw
104. ((critical* adj3 apprais*) or evaluat*).tw
105. *utilization review/
106. or/64–105
107. econom*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
108. cost*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
109. pric*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
110. pharmacoecon*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
111. (cost adj (effectiveness or utili* or benefit or minimi* or energy or oxygen or metabolic)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
112. (expenditure not energy).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
113. value NEAR2 money.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
114. budget*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
115. preference.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
116. QALY.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
117. (quality adj adjusted).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
118. utility*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
119. (financ* adj (management or support or organized)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
120. economics/
121. exp *costs/ and cost analysis/
122. economic value of life.sh
123. economics, dental/

124. exp *health care costs/
125. economic aspects of illness/
126. nursing costs/
127. economics, pharmaceutical/
128. (econom* or cost or costs or costly or costing or price or prices or pricing or pharmacoeconomic*).tw
129. (expenditure* not energy).tw
130. (value adj1 money).tw
131. budget*.tw
132. or/107–131
133. editorial.pt
134. letter.pt
135. comment.pt
136. animals/
137. human/
138. or/133–135
139. 136 not 137
140. 138 or 139
141. 34 and 63
142. 106 or 132
143. 141 and 142
144. 143 not 140

Database: EMBASE

Name of host: Ovid

Years covered: 1980–2008 week 36

Search strategy

1. health train*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
2. (lifestyle adj (advi* or train* or coach*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
3. (lay health adj (worker or advis?r or support*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
4. (lay adj (practitioner or leader or midwi*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
5. (peer adj (leader or educ* or counsel* or support* or mentor* or network* or assist*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
6. (health adj (activ* or aide or advoc* or coach or promot?r)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
7. ((patient or peer) adj navig*).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
8. ((community or health) adj champion).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
9. (community health adj (educ* or work* or advis* or activ* or representative)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
10. community wellness advocate.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
11. (community adj (parent or mother)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]

12. (outreach adj (worker or specialist)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
13. expert patient.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
14. natural help*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
15. ((neighborhood or neighbourhood) adj (help* or leader or assistant)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
16. family health advis*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
17. breastfeeding supporter.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
18. lactation consultant.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
19. ((village or indigenous) adj health worker).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
20. promotor*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
21. paraprofessional.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
22. workplace health advi*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
23. professional delegation/
24. voluntary worker/
25. ((professional* or nurs* or physician* or clinician*) adj2 (delegat* or substitut*)).tw
26. (staff* adj model*).tw
27. (nurs* adj2 (led or managed or directed or run)).tw
28. ((lay or voluntary or volunteer* or untrained or unlicensed or nonprofessional* or non professional* or paraprofessional* or paramedical) adj (worker* or staff)).tw
29. (community adj3 (volunteer* or aid* or support)).tw
30. ((birth or childbirth or child birth or labor or labour) adj (attendant* or assistant*)).tw
31. (doula* or douladural* or monitrice* or linkworker* or link worker* or barefoot doctor*).tw
32. (home adj (aid or aides or health or nursing or support or intervention* or treatment* or visit*)).tw
33. health care personnel,health education, healthy care delivery, health promotion, health program, health center, rural area.sh
34. or/1–33
35. public health.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
36. ((behaviour or behavior or lifestyle or life style) adj change).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
37. (health adj (promotion or education or improvement)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
38. ((disease or illness) adj prevention).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
39. smoking.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
40. "tobacco use".mp. [mp=title, original title, abstract, name of substance word, subject heading word]
41. physical activity.mp. [mp=title, original title, abstract, name of substance word, subject heading word]

42. exercise.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
43. diet.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
44. nutrition.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
45. overweight.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
46. obesity.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
47. alcohol.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
48. substance misuse.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
49. breastfeeding.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
50. sexual health.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
51. "condom use".mp. [mp=title, original title, abstract, name of substance word, subject heading word]
52. HIV.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
53. AIDS.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
54. mental health.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
55. wellbeing.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
56. exp *community health services/
57. exp *public health/
58. "Tobacco Use Cessation"/
59. smoking/
60. patient compliance/
61. risk reduction behavior/
62. food habits/
63. or/35–62
64. evaluation.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
65. randomi?ed controlled trial.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
66. RCT.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
67. controlled clinical trial.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
68. (((controlled before and after) or cohort or case-control or longitudinal or observational or case or qualitative or quantitative) adj3 stud*).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
69. ((questionnaire or survey or interview or focus group) adj25 method).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
70. Health Care Quality/
71. program evaluation.tw
72. multicenter study.pt
73. intervention study/
74. experiment*.tw
75. (time adj series).tw
76. time series analysis.mp
77. (pre test or pretest or (post test or posttest)).tw
78. impact.tw

79. intervention*.tw
80. chang*.tw
81. compar*.tw
82. (controlled before and after stud*).mp
83. randomization.sh
84. double blind procedure/
85. single blind procedure/
86. clinical trial.pt
87. exp Clinical Trial/
88. (clin* adj25 trial*).ti,ab
89. ((singl* or doubl* or trebl* or tripl*) adj25 (blind* or mask*)).ti,ab
90. placebo*.ti,ab
91. random*.ti,ab
92. comparative study.sh
93. exp evaluation/
94. follow up.sh
95. prospective study.sh
96. (control* or prospective* or volunteer*).ti,ab
97. ((effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 treatment adj (program* or strateg* or test* or questionnaire* or process* or procedure* or method*)).tw
98. ((effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 care adj (program* or strateg* or test* or questionnaire* or process* or procedure* or method*)).tw
99. ((effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 screening adj (program* or strateg* or test* or questionnaire* or process* or procedure* or method*)).tw
100. ((effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 intervention* adj (program* or strateg* or test* or questionnaire* or process* or procedure* or method*)).tw
101. ((effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 prevention* adj (program* or strateg* or test* or questionnaire* or process* or procedure* or method*)).tw
102. ((effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 (protocol* or guideline* or strateg* or audit* or method*)).tw
103. ((critical* adj3 apprais*) or evaluat*).tw
104. *utilization review/
105. econom*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
106. cost*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
107. pric*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
108. pharmacoecon*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
109. (cost adj (effectiveness or utili* or benefit or minimi* or energy or oxygen or metabolic)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
110. (expenditure not energy).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
111. value NEAR2 money.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
112. budget*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
113. preference.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
114. QALY.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
115. (quality adj adjusted).mp. [mp=title, original title, abstract, name of substance word, subject heading word]

116. utility*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
117. (financ* adj (management or support or organized)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
118. economics,health economics,environmental economics/
119. exp *cost, cost benefit analysis/
120. socioeconomics.sh
121. pharmacoeconomics/
122. (econom* or cost or costs or costly or costing or price or prices or pricing or pharmacoeconomic*).tw
123. (expenditure* not energy).tw
124. (value adj1 money).tw
125. budget*.tw
126. or/64–125
127. Editorial/
128. Letter/
129. comment.pt
130. animal/
131. human/
132. or/127–129
133. 130 not 131
134. 132 or 133
135. 34 and 63
136. 135 and 126
137. 136 not 134

Database: FRANCIS

Name of host: OCLC FirstSEARCH

Years covered: earliest to latest

Search strategy

((kw: Health w train*) or (kw: Lifestyle w advi*) or (kw: Lifestyle w train*) or (kw: Lifestyle w coach*) or (kw: Lay w health w worker) or (kw: Lay w health w advis#r) or (kw: Lay w health w support) or (kw: Lay w practitioner) or (kw: Lay w leader) or (kw: Lay w midwi*) or (kw: Peer w leader) or (kw: Peer w edu*) or (kw: Peer w counsel*) or (kw: Peer w support*) or (kw: Peer w mentor*) or (kw: Peer w network*) or (kw: Peer w assist*) or (kw: Health w activ*) or (kw: Health w aide) or (kw: Health w advoc*) or (kw: Health w coach) or (kw: Health w promot#r) or (kw: Patient w navig*) or (kw: Peer w navig*) or (kw: Community w champion) or (kw: Health w champion) or (kw: Community w health w educ*) or (kw: Community w health w work*) or (kw: Community w health w advis*) or (kw: Community w health w activ*) or (kw: Community w health w representative) or (kw: Community w wellness w advocate) or (kw: Community w parent) or (kw: Community w mother) or (kw: Outreach w worker) or (kw: Outreach w specialist) or (kw: Expert w patient) or (kw: Natural w help*) or (kw: Neighborhood w help*) or (kw: Neighborhood w leader) or (kw: Neighborhood w assistant) or (kw: Neighbourhood w help*) or (kw: Neighbourhood w leader) or (kw: Neighbourhood w assistant) or (kw: Family w health w advis*) or (kw: Breastfeeding w supporter) or (kw: Lactation w consultant) or (kw: Village w health w worker) or (kw: Indigenous w health w worker) or (kw: Promotor*) or (kw: Paraprofessional) or (kw: Workplace w health w advi*))

AND

((kw: Public w health) Or (kw: Behaviour w change) Or (kw: Behavior w change) Or (kw: Lifestyle w change) Or (kw: Life w style w change) Or (kw: Health w promotion) Or (kw: Health w education) Or (kw: Health w improvement) Or (kw: Disease w prevention) Or (kw: Illness w prevention) Or (kw: Smoking) Or (kw: Tobacco w use) Or (kw: Physical w activity) Or (kw: Exercise) Or (kw: Diet) Or (kw: Nutrition) Or (kw: Overweight) Or (kw: Obesity) Or (kw: Alcohol) Or (kw: Substance w misuse) Or (kw: Breastfeeding) Or (kw: Sexual w health) Or (kw: Condom w Use) Or (kw: HIV) Or (kw: AIDS) Or (kw: Mental w health) Or (kw: Wellbeing))

AND

((kw: Evaluation) Or (kw: Randomi#ed w controlled w trial) Or (kw: RCT) Or (kw: Controlled w clinical w trail) Or (kw: controlled w before w after w 3 w stud*) Or (kw: cohort w 3 kw: stud*) Or (kw: case-control w 3 kw: stud*) Or (kw: longitudinal w 3 kw: stud*) Or (kw: observational w 3 kw: stud*) Or (kw: case w 3 kw: stud*) Or (kw: qualitative w 3 kw: stud*) Or (kw: quantitative w 3 kw: stud*) Or (kw: questionnaire w 25 kw: method) Or (kw: survey w 25 kw: method) Or (kw: interview w 25 kw: method) Or (kw: focus w group w 25 kw: method) OR (kw: econom*) Or (kw: cost*) Or (kw: pric*) Or (kw: pharmacoecon*) Or (kw: cost w effectiveness) Or (kw: cost w utili*) Or (kw: cost w benefit) Or (kw: cost w minimi*) Or (kw: cost w energy) Or (kw: cost w oxygen) Or (kw: cost w metabolic) Or (kw: expenditure NOT kw: energy) Or (kw: value w 2 kw: money) Or (kw: budget*) Or (kw: preference) Or (kw: QALY) Or (kw: quality w adjusted) Or (kw: utility*) Or (kw: financ* w management) Or (kw: financ* w support) Or (kw: financ* w organized))

NOT

((kw: editorial) or (kw: letter) or (kw: comment) or (kw: animal))

Database: NHS Economic Evaluation Database

Name of host: OCLC First SEARCH

Years covered: earliest to latest

Search strategy

"health train*"

"lifestyle advi*"

"lifestyle train*"

"lifestyle coach*"

"lay health worker"

"lay health advis?r"

"lay health support*"

"lay practitioner"

"lay leader"

"lay midwi*"

peer AND (leader OR educ* OR counsel* OR support* OR mentor* OR network* OR assist*)

"health activ*"

"health aide"

"health advoc*"

"health coach"

"health promot?r"

"(patient or peer) and navig*"

"community champion"

"health champion"

"community health" AND (educ* OR work* OR advis* OR activ* OR representative)

"community wellness advocate"

"community mother"

"community parent"

"outreach worker"

"outreach specialist"

"expert patient"

"natural help*"

"(neighborhood or neighbourhood) and (help or leader or assistant)*"

"family health advis*"

"breastfeeding supporter"

"lactation consultant"

"indigenous health worker"

"village health worker"

promotor*

paraprofessional

"workplace health advi*"

community AND (volunteer* OR aid* OR support)

(birth OR childbirth OR child OR birth OR labor OR labour) AND (attendant* OR assistant*)

"health educator*"

"rural health personnel"

"community health workers"

"lay midwifery"

"community role"

"peer counselling"

"public health"

(behaviour OR behavior OR lifestyle OR life OR style) AND change

"health and promotion"

"health and education"

"health and improvement"

"disease prevention"

"illness prevention"

smoking

"tobacco use"

"physical activity"

exercise

diet

nutrition

overweight

obesity

alcohol

"substance misuse"

breastfeeding

"sexual health"

"condom use"

HIV

AIDS

"mental health"

wellbeing

"community health services"

"tobacco use cessation"

"patient compliance"

"risk reduction behavior"

"food habits"

"preventive health care"

wellness

"life style changes"

evaluation

"randomi?ed controlled trial"

RCT

"controlled clinical trial"

"controlled before and after stud*"

"cohort stud*"

"case-control stud*"

"longitudinal stud*"

"observational stud*"

"case stud*"

"qualitative stud*"

“quantitative stud*”

(questionnaire OR survey OR interview OR focus OR group) AND method

“program evaluation”

“multicenter study”

“intervention studies”

time AND series

“interrupted time series”

“pre test or pretest or (post test or posttest)”

“random allocation”

“double blind method”

“single blind method”

“clinical trial”

“comparative study”

“comparative study”

“follow up studies”

“prospective studies”

(effect* OR impact OR evaluat* OR introduc* OR compar* OR implement*) AND treatment AND (program* OR strateg* OR test* OR questionnaire* OR process* OR procedure* OR method*)

(effect* OR impact OR evaluat* OR introduc* OR compar* OR implement*) AND care AND (program* OR strateg* OR test* OR questionnaire* OR process* OR procedure* OR method*)

(effect* OR impact OR evaluat* OR introduc* OR compar* OR implement*) AND screening AND (program* OR strateg* OR test* OR questionnaire* OR process* OR procedure* OR method*)

(effect* OR impact OR evaluat* OR introduc* OR compar* OR implement*) AND intervention* AND (program* OR strateg* OR test* OR questionnaire* OR process* OR procedure* OR method*)

(effect* OR impact OR evaluat* OR introduc* OR compar* OR implement*) AND prevention* AND (program* OR strateg* OR test* OR questionnaire* OR process* OR procedure* OR method*)

(effect* OR impact OR evaluat* OR introduc* OR compar* OR implement*) AND (protocol* OR guideline* OR strateg* OR audit* OR method*)

"utilization review"

pharmacoecon*

"cost effectiveness"

"cost utili*"

"cost benefit"

"cost minimi*"

expenditure NOT energy

budget*

preference

QALY

"quality adjusted"

utility*

"financ management*"

"financ support*"

"financ organized*"

#1 or #2 or #5 or #10 or #11 or #14 or #20 or #24 or #26 or #31 or #34 or #35 or #37 or #38 or #39 or #41 or #43 or #44 or #46 or #47 or #48 or #49 or #50 or #51 or #52 or #53 or #54 or #55 or #56 or #57 or #58 or #59 or #60 or #61 or #62 or #63 or #64 or #65 or #66 or #67 or #68 or #69 or #70 or #71 or #72 or #73 or #74 or #75 or #76

#125 or #45

#79 or #80 or #81 or #82 or #83 or #84 or #85 or #86 or #87 or #88 or #89 or #90 or #91 or #92 or #93 or #94 or #95 or #96 or #97 or #98 or #99 or #100 or #101 or #102 or #103 or #110 or #111 or #112 or #113 or #114 or #115 or #116 or #117 or #118 or #119 or #120 or #121 or #122 or #123

#125 and #127

#126 and #127

#1 or #2 or #4 or #5 or #10 or #11 or #14 or #20 or #24 or #26 or #31 or #34 or #35 or #38 or #39 or #41 or #43 or #44 or #46 or #47 or #49 or #50 or #51 or #52 or #53 or #54 or #58 or #61 or #62 or #63 or #64 or #68 or #69 or #70 or #71 or #72 or #73 or #74 or #75 or #76

#130 and #127

Database: International Bibliography of the Social Sciences

Name of host: EBSCO

Years covered: earliest to latest

Search strategy

S16	(S14 and S10 and S6) not S15
S15	TX editorial or TX letter or TX comment or TX animal
S14	S13 or S12 or S11
S13	TX cost oxygen or TX cost metabolic or TX (expenditure NOT energy) or TX value W 2 money or TX budget* or TX preference or TX QALY or TX quality adjusted or TX utility* or TX financ* management or TX financ* support or TX financ* organized
S12	TX survey W25 method or TX interview W25 method or TX focus group W25 method or TX econom* or TX cost* or TX pric* or TX pharmacoecon* or TX cost effectiveness or TX cost utili* or TX cost benefit or TX cost minimi* or TX cost energy
S11	TX evaluation or TX randomi?ed controlled trial or TX RCT or TX controlled clinical trial or TX cohort W3 stud* or TX case-control W3 stud* or TX longitudinal W3 stud* or TX observational W3 stud* or TX case W3 stud* or TX qualitative W3 stud* or TX quantitative W3 stud* or TX questionnaire W25 method
S10	S9 or S8 or S7
S9	TX AIDS or TX mental health or TX wellbeing
S8	TX physical activity or TX exercise or TX diet or TX nutrition or TX overweight or TX obesity or TX alcohol or TX substance misuse or TX breastfeeding or TX sexual health or TX condom use or TX HIV
S7	TX public health or TX behaviour change or TX behavior change or TX lifestyle change or TX life style change or TX health promotion or TX health education or TX health improvement or TX disease prevention or TX illness prevention or TX smoking or TX tobacco use
S6	S5 or S4 or S3 or S2 or S1
S5	TX indigenous health worker or TX promotor* or TX paraprofessional or TX workplace health advi*
S4	TX expert patient or TX natural help* or TX neighborhood help* or TX neighborhood leader or TX neighborhood assistant or TX neighbourhood help* or TX neighbourhood leader or TX neighbourhood assistant or TX family health advis* or TX breastfeeding supporter or TX lactation consultant or TX village health worker
S3	TX community champion or TX health champion or TX community health educ* or TX community health work* or TX community health advis* or TX community health activ* or TX community health representative or TX community wellness advocate or TX community parent or TX community mother or TX outreach worker or TX outreach specialist
S2	TX peer counsel* or TX peer support* or TX peer mentor* or TX peer network* or TX peer assist* or TX health activ* or TX health aide or TX health advoc* or TX health coach or TX health promot?r or TX patient navig* or TX peer navig*
S1	TX health train* or TX lifestyle advi* or TX lifestyle train* or TX lifestyle coach* or TX lay health worker or TX lay health advis?r or TX lay health support* or TX lay practitioner or TX lay leader or TX lay midwi* or TX peer leader or TX peer educ*

Database: MEDLINE

Name of host: Ovid

Years covered: 1950 to week 4 May, 2008

Search strategy

1. health train*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
2. (lifestyle adj (advi* or train* or coach*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
3. (lay health adj (worker or advis?r or support*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
4. (lay adj (practitioner or leader or midwi*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]

5. (peer adj (leader or educ* or counsel* or support* or mentor* or network* or assist*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
6. (health adj (activ* or aide or advoc* or coach or promot?r)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
7. ((patient or peer) adj navig*).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
8. ((community or health) adj champion).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
9. (community health adj (educ* or work* or advis* or activ* or representative)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
10. community wellness advocate.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
11. (community adj (parent or mother)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
12. (outreach adj (worker or specialist)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
13. expert patient.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
14. natural help*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
15. ((neighborhood or neighbourhood) adj (help* or leader or assistant)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
16. family health advis*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
17. breastfeeding supporter.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
18. lactation consultant.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
19. ((village or indigenous) adj health worker).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
20. promotor*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
21. paraprofessional.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
22. workplace health advi*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
23. *delegation, professional/
24. exp *voluntary workers/
25. ((professional* or nurs* or physician* or clinician*) adj2 (delegat* or substitut*)).tw
26. (staff* adj model*).tw
27. (nurs* adj2 (led or managed or directed or run)).tw
28. ((lay or voluntary or volunteer* or untrained or unlicensed or nonprofessional* or non professional* or paraprofessional* or paramedical) adj (worker* or staff)).tw
29. (community adj3 (volunteer* or aid* or support)).tw
30. ((birth or childbirth or child birth or labor or labour) adj (attendant* or assistant*)).tw
31. (doula* or douladural* or monitrice* or linkworker* or link worker* or barefoot doctor*).tw
32. (home adj (aid or aides or health or nursing or support or intervention* or treatment* or visit*)).tw
33. health personnel, health educators.sh
34. or/1–33
35. public health.mp. [mp=title, original title, abstract, name of substance word, subject heading word]

36. ((behaviour or behavior or lifestyle or life style) adj change).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
37. (health adj (promotion or education or improvement)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
38. ((disease or illness) adj prevention).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
39. smoking.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
40. "tobacco use".mp. [mp=title, original title, abstract, name of substance word, subject heading word]
41. physical activity.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
42. exercise.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
43. diet.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
44. nutrition.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
45. overweight.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
46. obesity.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
47. alcohol.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
48. substance misuse.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
49. breastfeeding.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
50. sexual health.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
51. "condom use".mp. [mp=title, original title, abstract, name of substance word, subject heading word]
52. HIV.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
53. AIDS.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
54. mental health.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
55. wellbeing.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
56. exp *community health services/
57. exp *public health/
58. "Tobacco Use Cessation"/
59. smoking/
60. patient compliance/
61. risk reduction behavior/
62. food habits/
63. or/35–62
64. evaluation.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
65. randomi?ed controlled trial.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
66. RCT.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
67. controlled clinical trial.mp. [mp=title, original title, abstract, name of substance word, subject heading word]

68. (((controlled before and after) or cohort or case-control or longitudinal or observational or case or qualitative or quantitative) adj3 stud*).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
69. ((questionnaire or survey or interview or focus group) adj25 method).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
70. *program evaluation/
71. program evaluation.tw
72. exp *health care evaluation mechanisms/
73. multicenter study.pt
74. intervention studies/
75. experiment*.tw
76. (time adj series).tw
77. interrupted time series.mp
78. (pre test or pretest or (post test or posttest)).tw
79. impact.tw
80. intervention*.tw
81. chang*.tw
82. compar*.tw
83. (controlled before and after stud*).mp
84. random allocation.sh
85. double blind method.sh
86. single blind method.sh
87. clinical trial.pt
88. exp Clinical Trial/
89. (clin* adj25 trial*).ti,ab
90. ((singl* or doubl* or trebl* or tripl*) adj25 (blind* or mask*)).ti,ab
91. placebo*.ti,ab
92. random*.ti,ab
93. comparative study.sh
94. exp evaluation studies/
95. follow up studies.sh
96. prospective studies.sh
97. (control* or prospective* or volunteer*).ti,ab
98. ((effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 treatment adj (program* or strateg* or test* or questionnaire* or process* or procedure* or method*)).tw
99. ((effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 care adj (program* or strateg* or test* or questionnaire* or process* or procedure* or method*)).tw
100. ((effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 screening adj (program* or strateg* or test* or questionnaire* or process* or procedure* or method*)).tw
101. ((effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 intervention* adj (program* or strateg* or test* or questionnaire* or process* or procedure* or method*)).tw
102. ((effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 prevention* adj (program* or strateg* or test* or questionnaire* or process* or procedure* or method*)).tw
103. ((effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 (protocol* or guideline* or strateg* or audit* or method*)).tw
104. ((critical* adj3 apprais*) or evaluat*).tw
105. *utilization review/
106. or/64–105
107. econom*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]

108. cost*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
109. pric*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
110. pharmacoecon*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
111. (cost adj (effectiveness or utili* or benefit or minimi* or energy or oxygen or metabolic)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
112. (expenditure not energy).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
113. value NEAR2 money.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
114. budget*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
115. preference.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
116. QALY.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
117. (quality adj adjusted).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
118. utility*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
119. (financ* adj (management or support or organized)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
120. economics/
121. exp *costs/ and cost analysis/
122. economic value of life.sh
123. economics, dental/
124. exp *economics, hospital/
125. economics, medical/
126. economics, nursing/
127. economics, pharmaceutical/
128. (econom* or cost or costs or costly or costing or price or prices or pricing or pharmacoeconomic*).tw
129. (expenditure* not energy).tw
130. (value adj1 money).tw
131. budget*.tw
132. or/107–131
133. editorial.pt
134. letter.pt
135. comment.pt
136. animal/
137. human/
138. or/133–135
139. 136 not 137
140. 138 or 139
141. 34 and 63
142. 106 or 132
143. 141 and 142
144. 143 not 140

Database: PsycINFO

Name of host: APA PsychNET

Years covered: earliest to latest

Search strategy

Subject:(evaluation) OR Subject:(randomi?ed controlled trial) OR Subject:(RCT) OR Subject:(controlled clinical trial) OR Subject:((controlled before AND after OR cohort OR case-control OR longitudinal OR observational OR case OR qualitative OR quantitative) adj3 stud*) OR Subject:((questionnaire OR survey OR interview OR focus group) adj25 method) OR Subject:(econom*) OR Subject:(cost*) OR Subject:(pric*) OR Subject:(pharmacoecon*) OR Subject:(cost adj (effectiveness OR utili* OR benefit OR minimi* OR energy OR oxygen OR metabolic)) OR Subject:(expenditure NOT energy) OR Subject:(value NEAR/2 money) OR Subject:(budget*) OR Subject:(preference) OR Subject:(QALY) OR Subject:(quality adj adjusted) OR Subject:(utility*) OR Subject:(financ* adj (management OR support OR organized)) NOT Subject:(editorial) OR Subject:(letter) OR Subject:(comment) OR Subject:(animal) AND Subject:(public health) OR Subject:((behaviour OR behavior OR lifestyle OR life style) change) OR Subject:(health adj (promotion OR education OR improvement)) OR Subject:((disease OR illness) adj prevention) OR Subject:(smoking) OR Subject:(tobacco use) OR Subject:(physical activity) OR Subject:(exercise) OR Subject:(diet) OR Subject:(nutrition) OR Subject:(overweight) OR Subject:(obesity) OR Subject:(alcohol) OR Subject:(substance misuse) OR Subject:(breastfeeding) OR Subject:(sexual health) OR Subject:(condom use) OR Subject:(HIV) OR Subject:(AIDS) OR Subject:(mental health) OR Subject:(wellbeing) AND Subject:(health train*) OR Subject:(lifestyle adj (advi* OR train* OR coach*)) OR Subject:(lay health adj (worker OR advis?r OR support*)) OR Subject:(lay adj (practitioner OR leader OR midwi*)) OR Subject:(peer adj (leader OR educ* OR counsel* OR support* OR mentor* OR network* OR assist*)) OR Subject:(health adj (activ* OR aide OR advoc* OR coach OR promot?r)) OR Subject:((patient OR peer) adj navig) OR Subject:((community OR health) adj champion) OR Subject:(community health adj (educ* OR work* OR advis* OR activ* OR representative)) OR Subject:(community wellness advocate) OR Subject:(community adj (parent OR mother)) OR Subject:(outreach adj (worker OR specialist)) OR Subject:(expert patient) OR Subject:(natural help*) OR Subject:((neighborhood OR neighbourhood) adj (help* OR leader OR assistant)) OR Subject:(family health advis*) OR Subject:(breastfeeding supporter) OR Subject:(lactation consultant) OR Subject:((village OR indigenous) adj health worker) OR Subject:(promotor*) OR Subject:(paraprofessional) OR Subject:(workplace health advi*)

Database: SCI (part of web of Science)

Name of host: APA PsychNET

Years covered: earliest to latest

Search strategy

#14	#13 AND #9
#13	#12 OR #11 OR #10
#12	TS=("preference") OR TS=("QALY") OR TS=("quality adjusted") OR TS=("utility*") OR TS=("financ* management") OR TS=("financ* support") OR TS=("financ* organized") NOT TS=("editorial") NOT TS=("letter") NOT TS=("comment") NOT TS=("animal")
#11	TS=("focus group method") OR TS=("econom*") OR TS=("cost*") OR TS=("pric*") OR TS=("pharmacoecon*") OR TS=("cost effectiveness") OR TS=("cost utili*") OR TS=("cost benefit") OR TS=("cost minimi*") OR TS=("cost energy") OR TS=("cost oxygen") OR TS=("cost metabolic") OR TS=("expenditure NOT energy") OR TS=("value NEAR/2 money") OR TS=("budget*")
#10	TS=("evaluation") OR TS=("randomi?ed controlled trial") OR TS=("RCT") OR TS=("controlled clinical trial") OR TS=("controlled before and after stud*") OR TS=("cohort stud*") OR TS=("case-control stud*") OR TS=("longitudinal stud*") OR TS=("observational stud*") OR TS=("case stud*") OR TS=("qualitative stud*") OR TS=("quantitative stud*") OR TS=("questionnaire method") OR TS=("survey method") OR TS=("interview method")
#9	#8 AND #5
#8	#7 OR #6
#7	TS=("nutrition") OR TS=("overweight") OR TS=("obesity") OR TS=("alcohol") OR TS=("substance misuse") OR TS=("breastfeeding") OR TS=("sexual health") OR TS=("condom use") OR TS=("HIV") OR TS=("AIDS") OR TS=("mental health") OR TS=("wellbeing")

#6	TS=("public health") OR TS=("behaviour change") OR TS=("behavior change") OR TS=("lifestyle change") OR TS=("life style change") OR TS=("health promotion") OR TS=("health education") OR TS=("health improvement") OR TS=("disease prevention") OR TS=("illness prevention") OR TS=("smoking") OR TS=("tobacco use") OR TS=("physical activity") OR TS=("exercise") OR TS=("diet")
#5	#4 OR #3 OR #2 OR #1
#4	TS=("family health advis*") OR TS=("breastfeeding supporter") OR TS=("lactation consultant") OR TS=("village health worker") OR TS=("indigenous health worker") OR TS=("promotor*") OR TS=("paraprofessional") OR TS=("workplace health advi*")
#3	TS=("community health representative") OR TS=("community wellness advocate") OR TS=("community parent") OR TS=("community mother") OR TS=("outreach specialist") OR TS=("outreach worker") OR TS=("outreach specialist") OR TS=("expert patient") OR TS=("natural help*") OR TS=("neighborhood help*") OR TS=("neighborhood leader") OR TS=("neighborhood assistant") OR TS=("neighbourhood help*") OR TS=("neighbourhood leader") OR TS=("neighbourhood assistant")
#2	TS=("peer network*") OR TS=("peer assist*") OR TS=("health activ*") OR TS=("health aide") OR TS=("health advoc*") OR TS=("health coach") OR TS=("health promot?r") OR TS=("patient navig*") OR TS=("peer navig*") OR TS=("community champion") OR TS=("health champion") OR TS=("community health educ*") OR TS=("community health work*") OR TS=("community health advis*") OR TS=("community health activ*")
#1	TS=("health train*") OR TS=("lifestyle advi*") OR TS=("lifestyle train*") OR TS=(l"ifestyle coach*") OR TS=("lay health worker") OR TS=("lay health advis?r") OR TS=("lay health support*") OR TS=("lay practitioner") OR TS=("lay leader") OR TS=("lay midwi*") OR TS=("peer leader") OR TS=("peer educ*") OR TS=("peer counsel*") OR TS=("peer support*") OR TS=("peer mentor*")

Database: SIRS Researcher

Name of host: OCLC FirstSEARCH

Years covered: earliest to latest

Search strategy

((kw: Health w train*) or (kw: Lifestyle w advi*) or (kw: Lifestyle w train*) or (kw: Lifestyle w coach*) or (kw: Lay w health w worker) or (kw: Lay w health w advis#r) or (kw: Lay w health w support) or (kw: Lay w practitioner) or (kw: Lay w leader) or (kw: Lay w midwi*) or (kw: Peer w leader) or (kw: Peer w edu*) or (kw: Peer w counsel*) or (kw: Peer w support*) or (kw: Peer w mentor*) or (kw: Peer w network*) or (kw: Peer w assist*) or (kw: Health w activ*) or (kw: Health w aide) or (kw: Health w advoc*) or (kw: Health w coach) or (kw: Health w promot#r) or (kw: Patient w navig*) or (kw: Peer w navig*) or (kw: Community w champion) or (kw: Health w champion) or (kw: Community w health w educ*) or (kw: Community w health w work*) or (kw: Community w health w advis*) or (kw: Community w health w activ*) or (kw: Community w health w representative) or (kw: Community w wellness w advocate) or (kw: Community w parent) or (kw: Community w mother) or (kw: Outreach w worker) or (kw: Outreach w specialist) or (kw: Expert w patient) or (kw: Natural w help*) or (kw: Neighborhood w help*) or (kw: Neighborhood w leader) or (kw: Neighborhood w assistant) or (kw: Neighbourhood w help*) or (kw: Neighbourhood w leader) or (kw: Neighbourhood w assistant) or (kw: Family w health w advis*) or (kw: Breastfeeding w supporter) or (kw: Lactation w consultant) or (kw: Village w health w worker) or (kw: Indigenous w health w worker) or (kw: Promotor*) or (kw: Paraprofessional) or (kw: Workplace w health w advi*))

AND

((kw: Public w health) Or (kw: Behaviour w change) Or (kw: Behavior w change) Or (kw: Lifestyle w change) Or (kw: Life w style w change) Or (kw: Health w promotion) Or (kw: Health w education) Or (kw: Health w improvement) Or (kw: Disease w prevention) Or (kw: Illness w prevention) Or (kw: Smoking) Or (kw: Tobacco w use) Or (kw: Physical w activity) Or (kw: Exercise) Or (kw: Diet) Or (kw: Nutrition) Or (kw: Overweight) Or (kw: Obesity) Or (kw: Alcohol) Or (kw: Substance w misuse) Or (kw: Breastfeeding) Or (kw: Sexual w health) Or (kw: Condom w Use) Or (kw: HIV) Or (kw: AIDS) Or (kw: Mental w health) Or (kw: Wellbeing))

AND

((kw: Evaluation) Or (kw: Randomi#ed w controlled w trial) Or (kw: RCT) Or (kw: Controlled w clinical w trail) Or (kw: controlled w before w after w 3 w stud*) Or (kw: cohort w 3 kw: stud*) Or (kw: case-control w 3 kw: stud*) Or (kw: longitudinal w 3 kw: stud*) Or (kw: observational w 3 kw: stud*) Or (kw: case w 3 kw: stud*) Or (kw: qualitative w 3 kw: stud*) Or (kw: quantitative w 3 kw: stud*) Or (kw: questionnaire w 25 kw: method) Or (kw: survey w 25 kw: method) Or (kw: interview w 25 kw: method) Or (kw: focus w group w 25 kw: method) OR (kw: econom*) Or (kw: cost*) Or (kw: pric*) Or (kw: pharmacoecon*) Or (kw: cost w effectiveness) Or (kw: cost w utili*) Or (kw: cost w benefit) Or (kw: cost w minimi*) Or (kw: cost w energy) Or (kw: cost w oxygen) Or (kw: cost w metabolic) Or (kw: expenditure NOT kw: energy) Or (kw: value w 2 kw: money) Or (kw: budget*) Or (kw: preference) Or (kw: QALY) Or (kw: quality w adjusted) Or (kw: utility*) Or (kw: financ* w management) Or (kw: financ* w support) Or (kw: financ* w organized))

NOT

((kw: editorial) or (kw: letter) or (kw: comment) or (kw: animal))

Database: Social Sciences Citation Index (part of web of science)

Name of host: OCLC FirstSEARCH

Years covered: earliest to latest

Search strategy

#14	#13 AND #9
#13	#12 OR #11 OR #10
#12	TS=("preference") OR TS=("QALY") OR TS=("quality adjusted") OR TS=("utility*") OR TS=("financ* management") OR TS=("financ* support") OR TS=("financ* organized") NOT TS=("editorial") NOT TS=("letter") NOT TS=("comment") NOT TS=("animal")
#11	TS=("focus group method") OR TS=("econom*") OR TS=("cost*") OR TS=("pric*") OR TS=("pharmacoecon*") OR TS=("cost effectiveness") OR TS=("cost utili*") OR TS=("cost benefit") OR TS=("cost minimi*") OR TS=("cost energy") OR TS=("cost oxygen") OR TS=("cost metabolic") OR TS=("expenditure NOT energy") OR TS=("value NEAR/2 money") OR TS=("budget*")
#10	TS=("evaluation") OR TS=("randomi?ed controlled trial") OR TS=("RCT") OR TS=("controlled clinical trial") OR TS=("controlled before and after stud*") OR TS=("cohort stud*") OR TS=("case-control stud*") OR TS=("longitudinal stud*") OR TS=("observational stud*") OR TS=("case stud*") OR TS=("qualitative stud*") OR TS=("quantitative stud*") OR TS=("questionnaire method") OR TS=("survey method") OR TS=("interview method")
#9	#8 AND #5
#8	#7 OR #6
#7	TS=("nutrition") OR TS=("overweight") OR TS=("obesity") OR TS=("alcohol") OR TS=("substance misuse") OR TS=("breastfeeding") OR TS=("sexual health") OR TS=("condom use") OR TS=("HIV") OR TS=("AIDS") OR TS=("mental health") OR TS=("wellbeing")
#6	TS=("public health") OR TS=("behaviour change") OR TS=("behavior change") OR TS=("lifestyle change") OR TS=("life style change") OR TS=("health promotion") OR TS=("health education") OR TS=("health improvement") OR TS=("disease prevention") OR TS=("illness prevention") OR TS=("smoking") OR TS=("tobacco use") OR TS=("physical activity") OR TS=("exercise") OR TS=("diet")
#5	#4 OR #3 OR #2 OR #1
#4	TS=("family health advis*") OR TS=("breastfeeding supporter") OR TS=("lactation consultant") OR TS=("village health worker") OR TS=("indigenous health worker") OR TS=("promotor*") OR TS=("paraprofessional") OR TS=("workplace health advi*")
#3	TS=("community health representative") OR TS=("community wellness advocate") OR TS=("community parent") OR TS=("community mother") OR TS=("outreach specialist") OR TS=("outreach worker") OR TS=("outreach specialist") OR TS=("expert patient") OR TS=("natural help*") OR TS=("neighborhood help*") OR TS=("neighborhood leader") OR TS=("neighborhood assistant") OR TS=("neighbourhood help*") OR TS=("neighbourhood leader") OR TS=("neighbourhood assistant")
#2	TS=("peer network*") OR TS=("peer assist*") OR TS=("health activ*") OR TS=("health aide") OR TS=("health advoc*") OR TS=("health coach") OR TS=("health promot?r") OR TS=("patient navig*") OR TS=("peer navig*") OR TS=("community champion") OR TS=("health champion") OR TS=("community health educ*") OR TS=("community health work*") OR TS=("community health advis*") OR TS=("community health activ*")
#1	TS=("health train*") OR TS=("lifestyle advi*") OR TS=("lifestyle train*") OR TS=(l"ifestyle coach*") OR TS=("lay health worker") OR TS=("lay health advis?r") OR TS=("lay health support*") OR TS=("lay practitioner") OR TS=("lay leader") OR TS=("lay midwi*") OR TS=("peer leader") OR TS=("peer educ*") OR TS=("peer counsel*") OR TS=("peer support*") OR TS=("peer mentor*")

Database: Social Services Abstracts

Name of host: CSA

Years covered: earliest to latest

Search strategy

List one:

1. kw= (health train*)
2. kw= (lifestyle within 1 (advi* or train* or coach*))
3. kw= (lay health within 1 (worker or advis?r or support*))
4. kw= (lay within 1 (practitioner or leader or midwi*))
5. kw= (peer within 1 (leader or educ* or counsel* or support* or mentor* or network* or assist*))
6. kw= (health within 1 (activ* or aide or advoc* or coach or promot?r))
7. kw= ((patient or peer) within 1 navig*)
8. kw= ((community or health) within 1 champion)
9. kw= (community health within 1 (educ* or work* or advis* or activ* or representative))
10. kw= (community wellness advocate)
11. kw= (community within 1 (parent or mother))
12. kw= (outreach within 1 (worker or specialist))
13. kw= (expert patient) or kw= (natural help*)
14. kw= ((neighborhood or neighbourhood) within 1 (help* or leader or assistant))
15. kw= (family health advis*)
16. kw= (breastfeeding supporter)
17. kw= (lactation consultant)
18. kw= ((village or indigenous) within 1 health worker)
19. kw= (promotor*)
20. kw= (paraprofessional)
21. kw= (workplace health advi*)
22. kw= ((professional* or nurs* or physician* or clinician*) within 2 (delegat* or substitut*))
23. kw= (staff* within 1 model*)
24. kw= (nurs* within 2 (led or managed or directed or run))
25. kw= ((lay or voluntary or volunteer* or untrained or unlicensed or nonprofessional* or non professional* or paraprofessional* or paramedical) within 1 (worker* or staff))
26. kw= (community within 3 (volunteer* or aid* or support))
27. kw= ((birth or childbirth or child birth or labor or labour) within 1 (attendant* or assistant*))
28. kw= (doula* or douladural* or monitrice* or linkworker* or link worker* or barefoot doctor*)
29. kw= (home within 1 (aid or aides or health or nursing or support or intervention* or treatment* or visit*))

List two:

30. kw= (public health)
31. kw= ((behaviour or behavior or lifestyle or life style) within 1 change)
32. kw= (health within 1 (promotion or education or improvement))
33. kw= ((disease or illness) within 1 prevention)
34. kw= (smoking)
35. kw= (tobacco use)
36. kw= (exercise)

37. kw= (diet)
38. kw= (nutrition)
39. kw= (overweight)
40. kw= (obesity)
41. kw= (alcohol)
42. kw= (substance misuse)
43. kw= (breastfeeding)
44. kw= (sexual health)
45. kw= (condom use)
46. kw= (HIV)
47. kw= (AIDS)
48. kw= (mental health)
49. kw= (wellbeing)

List three:

50. kw= (evaluation)
51. kw= (randomi?ed controlled trial)
52. kw= (RCT)
53. kw= (controlled clinical trial)
54. kw= ((questionnaire or survey or interview or focus group) within 5 method)
55. kw= (program evaluation)
56. kw= (multicenter study)
57. kw= (experiment*)
58. kw= (time within 1 series)
59. kw= (interrupted time series)
60. kw=(pre test or pretest or (post test or posttest))
61. kw= (impact)
62. kw= (intervention*)
63. kw= (chang*)
64. kw= (compar*)
65. kw= (random allocation)
66. kw= (double blind method)
67. kw= (single blind method)
68. kw= (clinical trial)
69. kw= (clin* within 5 trial*)
70. kw= ((singl* or doubl* or trebl* or tripl*) within 5 (blind* or mask*))
71. kw= (placebo*)
72. kw= (random*)
73. kw= (comparative study)
74. kw= (follow up studies)
75. kw= (prospective studies)
76. kw= (control* or prospective* or volunteer*)
77. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3 treatment within 1 (program* or strateg* or test* or questionnaire* or process* or procedure* or method*))
78. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 1 care within 1 (program* or strateg* or test* or questionnaire* or process* or procedure* or method*))
79. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3 screening within 1 (program* or strateg* or test* or questionnaire* or process* or procedure* or method*))

80. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3 intervention* within 1 (program* or strateg* or test* or questionnaire* or process* or procedure* or method*))
81. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3 prevention* within 1 (program* or strateg* or test* or questionnaire* or process* or procedure* or method*))
82. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3 (protocol* or guideline* or strateg* or audit* or method*))
83. kw= ((critical* within 3 apprais*) or evaluat*)

List four:

84. kw= (econom*) or kw= (cost*) or kw= (pric*) or kw= (pharmacoecon*)
85. kw= (cost within 1 (effectiveness or utili* or benefit or minimi* or energy or oxygen or metabolic)) or kw= (expenditure not energy)
86. kw= (value within 2 money) or kw= (budget*) or kw= (preference) or kw= (QALY) or kw= (quality within 1 adjusted)
87. kw= (utility*)
88. kw= (financ* within 1 (management or support or organized)) or kw= (econom* or cost or costs or costly or costing or price or prices or pricing or pharmacoeconomic*)
89. kw= (expenditure* not energy)
90. kw= (value within 1 money) or kw= (budget*)
91. List five
92. kw= (editorial)
93. kw= (letter)
94. kw= (comment)
95. kw= (animal)

Database: Sociological Abstracts

Name of host: CSA

Years covered: all available

Search strategy

List one:

96. kw= (health train*)
97. kw= (lifestyle within 1 (advi* or train* or coach*))
98. kw= (lay health within 1 (worker or advis?r or support*))
99. kw= (lay within 1 (practitioner or leader or midwi*))
100. kw= (peer within 1 (leader or educ* or counsel* or support* or mentor* or network* or assist*))
101. kw= (health within 1 (activ* or aide or advoc* or coach or promot?r))
102. kw= ((patient or peer) within 1 navig*)
103. kw= ((community or health) within 1 champion)
104. kw= (community health within 1 (educ* or work* or advis* or activ* or representative))
105. kw= (community wellness advocate)
106. kw= (community within 1 (parent or mother))
107. kw= (outreach within 1 (worker or specialist))
108. kw= (expert patient) or kw= (natural help*)
109. kw= ((neighborhood or neighbourhood) within 1 (help* or leader or assistant))
110. kw= (family health advis*)

111. kw= (breastfeeding supporter)
112. kw= (lactation consultant)
113. kw= ((village or indigenous) within 1 health worker)
114. kw= (promotor*)
115. kw= (paraprofessional)
116. kw= (workplace health advi*)
117. kw= ((professional* or nurs* or physician* or clinician*) within 2 (delegat* or substitut*))
118. kw= (staff* within 1 model*)
119. kw= (nurs* within 2 (led or managed or directed or run))
120. kw= ((lay or voluntary or volunteer* or untrained or unlicensed or nonprofessional* or non professional* or paraprofessional* or paramedical) within 1 (worker* or staff))
121. kw= (community within 3 (volunteer* or aid* or support))
122. kw= ((birth or childbirth or child birth or labor or labour) within 1 (attendant* or assistant*))
123. kw= (doula* or douladural* or monitrice* or linkworker* or link worker* or barefoot doctor*)
124. kw= (home within 1 (aid or aides or health or nursing or support or intervention* or treatment* or visit*))

List two:

125. kw= (public health)
126. kw= ((behaviour or behavior or lifestyle or life style) within 1 change)
127. kw= (health within 1 (promotion or education or improvement))
128. kw= ((disease or illness) within 1 prevention)
129. kw= (smoking)
130. kw= (tobacco use)
131. kw= (exercise)
132. kw= (diet)
133. kw= (nutrition)
134. kw= (overweight)
135. kw= (obesity)
136. kw= (alcohol)
137. kw= (substance misuse)
138. kw= (breastfeeding)
139. kw= (sexual health)
140. kw= (condom use)
141. kw= (HIV)
142. kw= (AIDS)
143. kw= (mental health)
144. kw= (wellbeing)

List three:

145. kw= (evaluation)
146. kw= (randomi?ed controlled trial)
147. kw= (RCT)
148. kw= (controlled clinical trial)
149. kw= ((questionnaire or survey or interview or focus group) within 5 method)
150. kw= (program evaluation)
151. kw= (multicenter study)
152. kw= (experiment*)

153. kw= (time within 1 series)
154. kw= (interrupted time series)
155. kw=(pre test or pretest or (post test or posttest))
156. kw= (impact)
157. kw= (intervention*)
158. kw= (chang*)
159. kw= (compar*)
160. kw= (random allocation)
161. kw= (double blind method)
162. kw= (single blind method)
163. kw= (clinical trial)
164. kw= (clin* within 5 trial*)
165. kw= ((singl* or doubl* or trebl* or tripl*) within 5 (blind* or mask*))
166. kw= (placebo*)
167. kw= (random*)
168. kw= (comparative study)
169. kw= (follow up studies)
170. kw= (prospective studies)
171. kw= (control* or prospective* or volunteer*)
172. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3 treatment within 1 (program* or strateg* or test* or questionnaire* or process* or procedure* or method*))
173. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 1 care within 1 (program* or strateg* or test* or questionnaire* or process* or procedure* or method*))
174. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3 screening within 1 (program* or strateg* or test* or questionnaire* or process* or procedure* or method*))
175. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3 intervention* within 1 (program* or strateg* or test* or questionnaire* or process* or procedure* or method*))
176. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3 prevention* within 1 (program* or strateg* or test* or questionnaire* or process* or procedure* or method*))
177. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3 (protocol* or guideline* or strateg* or audit* or method*))
178. kw= ((critical* within 3 apprais*) or evaluat*)

List four:

179. kw= (econom*) or kw= (cost*) or kw= (pric*) or kw= (pharmacoecon*)
180. kw= (cost within 1 (effectiveness or utili* or benefit or minimi* or energy or oxygen or metabolic)) or kw= (expenditure not energy)
181. kw= (value within 2 money) or kw= (budget*) or kw= (preference) or kw= (QALY) or kw= (quality within 1 adjusted)
182. kw= (utility*)
183. kw= (financ* within 1 (management or support or organized)) or kw= (econom* or cost or costs or costly or costing or price or prices or pricing or pharmacoeconomic*)

184. kw= (expenditure* not energy)
185. kw= (value within 1 money) or kw= (budget*)
186. List five
187. kw= (editorial)
188. kw= (letter)
189. kw= (comment)
190. kw= (animal)

Database: Web of Knowledge

Name of host: ISI

Years covered: earliest to latest

Search strategy

#14	#13 AND #9
#13	#12 OR #11 OR #10
#12	Topic=("preference") OR Topic=("QALY") OR Topic=("quality adjusted") OR Topic=("utility*") OR Topic=("financ* management") OR Topic=("financ* support") OR Topic=("financ* organized") NOT Topic=("editorial") NOT Topic=("letter") NOT Topic=("comment") NOT Topic=("animal")
#11	Topic=("focus group method") OR Topic=("econom*") OR Topic=("cost*") OR Topic=("pric*") OR Topic=("pharmacoecon*") OR Topic=("cost effectiveness") OR Topic=("cost utili*") OR Topic=("cost benefit") OR Topic=("cost minimi*") OR Topic=("cost energy") OR Topic=("cost oxygen") OR Topic=("cost metabolic") OR Topic=("expenditure NOT energy") OR Topic=("value NEAR/2 money") OR Topic=("budget*")
#10	Topic=("evaluation") OR Topic=("randomi?ed controlled trial") OR Topic=("RCT") OR Topic=("controlled clinical trial") OR Topic=("controlled before and after stud*") OR Topic=("cohort stud*") OR Topic=("case-control stud*") OR Topic=("longitudinal stud*") OR Topic=("observational stud*") OR Topic=("case stud*") OR Topic=("qualitative stud*") OR Topic=("quantitative stud*") OR Topic=("questionnaire method") OR Topic=("survey method") OR Topic=("interview method")
#9	#8 AND #5
#8	#7 OR #6
#7	Topic=("nutrition") OR Topic=("overweight") OR Topic=("obesity") OR Topic=("alcohol") OR Topic=("substance misuse") OR Topic=("breastfeeding") OR Topic=("sexual health") OR Topic=("condom use") OR Topic=("HIV") OR Topic=("AIDS") OR Topic=("mental health") OR Topic=("wellbeing")
#6	Topic=("public health") OR Topic=("behaviour change") OR Topic=("behavior change") OR Topic=("lifestyle change") OR Topic=("life style change") OR Topic=("health promotion") OR Topic=("health education") OR Topic=("health improvement") OR Topic=("disease prevention") OR Topic=("illness prevention") OR Topic=("smoking") OR Topic=("tobacco use") OR Topic=("physical activity") OR Topic=("exercise") OR Topic=("diet")
#5	#4 OR #3 OR #2 OR #1
#4	Topic=("family health advis*") OR Topic=("breastfeeding supporter") OR Topic=("lactation consultant") OR Topic=("village health worker") OR Topic=("indigenous health worker") OR Topic=("promotor*") OR Topic=("paraprofessional") OR Topic=("workplace health advi*")
#3	Topic=("community health representative") OR Topic=("community wellness advocate") OR Topic=("community parent") OR Topic=("community mother") OR Topic=("outreach specialist") OR Topic=("outreach worker") OR Topic=("outreach specialist") OR Topic=("expert patient") OR Topic=("natural help*") OR Topic=("neighborhood help*") OR Topic=("neighborhood leader") OR Topic=("neighborhood assistant") OR Topic=("neighbourhood help*") OR Topic=("neighbourhood leader") OR Topic=("neighbourhood assistant")
#2	Topic=("peer network*") OR Topic=("peer assist*") OR Topic=("health activ*") OR Topic=("health aide") OR Topic=("health advoc*") OR Topic=("health coach") OR Topic=("health promot?r") OR Topic=("patient navig*") OR Topic=("peer navig*") OR Topic=("community champion") OR Topic=("health champion") OR Topic=("community health educ*") OR Topic=("community health work*") OR Topic=("community health advis*") OR Topic=("community health activ*")
#1	Topic=("health train*") OR Topic=("lifestyle advi*") OR Topic=("lifestyle train*") OR Topic=(l"ifestyle coach*") OR Topic=("lay health worker") OR Topic=("lay health advis?r") OR Topic=("lay health support*") OR Topic=("lay practitioner") OR Topic=("lay leader") OR Topic=("lay midwi*") OR Topic=("peer leader") OR Topic=("peer educ*") OR Topic=("peer counsel*") OR Topic=("peer support*") OR Topic=("peer mentor*")

Database: WorldCat

Name of host: OCLC FirstSEARCH

Years covered: earliest to latest

Search strategy

((kw: Health w train*) or (kw: Lifestyle w advi*) or (kw: Lifestyle w train*) or (kw: Lifestyle w coach*) or (kw: Lay w health w worker) or (kw: Lay w health w advis#r) or (kw: Lay w health w support) or (kw: Lay w practitioner) or (kw: Lay w leader) or (kw: Lay w midwi*) or (kw: Peer w leader) or (kw: Peer w edu*) or (kw: Peer w counsel*) or (kw: Peer w support*) or (kw: Peer w mentor*) or (kw: Peer w network*) or (kw: Peer w assist*) or (kw: Health w activ*) or (kw: Health w aide) or (kw: Health w advoc*) or (kw: Health w coach) or (kw: Health w promot#r) or (kw: Patient w navig*) or (kw: Peer w navig*) or (kw: Community w champion) or (kw: Health w champion) or (kw: Community w health w educ*) or (kw: Community w health w work*) or (kw: Community w health w advis*) or (kw: Community w health w activ*) or (kw: Community w health w representative) or (kw: Community w wellness w advocate) or (kw: Community w parent) or (kw: Community w mother) or (kw: Outreach w worker) or (kw: Outreach w specialist) or (kw: Expert w patient) or (kw: Natural w help*) or (kw: Neighborhood w help*) or (kw: Neighborhood w leader) or (kw: Neighborhood w assistant) or (kw: Neighbourhood w help*) or (kw: Neighbourhood w leader) or (kw: Neighbourhood w assistant) or (kw: Family w health w advis*) or (kw: Breastfeeding w supporter) or (kw: Lactation w consultant) or (kw: Village w health w worker) or (kw: Indigenous w health w worker) or (kw: Promotor*) or (kw: Paraprofessional) or (kw: Workplace w health w advi*))

AND

((kw: Public w health) Or (kw: Behaviour w change) Or (kw: Behavior w change) Or (kw: Lifestyle w change) Or (kw: Life w style w change) Or (kw: Health w promotion) Or (kw: Health w education) Or (kw: Health w improvement) Or (kw: Disease w prevention) Or (kw: Illness w prevention) Or (kw: Smoking) Or (kw: Tobacco w use) Or (kw: Physical w activity) Or (kw: Exercise) Or (kw: Diet) Or (kw: Nutrition) Or (kw: Overweight) Or (kw: Obesity) Or (kw: Alcohol) Or (kw: Substance w misuse) Or (kw: Breastfeeding) Or (kw: Sexual w health) Or (kw: Condom w Use) Or (kw: HIV) Or (kw: AIDS) Or (kw: Mental w health) Or (kw: Wellbeing))

AND

((kw: Evaluation) Or (kw: Randomi#ed w controlled w trial) Or (kw: RCT) Or (kw: Controlled w clinical w trail) Or (kw: controlled w before w after w 3 w stud*) Or (kw: cohort w 3 kw: stud*) Or (kw: case-control w 3 kw: stud*) Or (kw: longitudinal w 3 kw: stud*) Or (kw: observational w 3 kw: stud*) Or (kw: case w 3 kw: stud*) Or (kw: qualitative w 3 kw: stud*) Or (kw: quantitative w 3 kw: stud*) Or (kw: questionnaire w 25 kw: method) Or (kw: survey w 25 kw: method) Or (kw: interview w 25 kw: method) Or (kw: focus w group w 25 kw: method) OR (kw: econom*) Or (kw: cost*) Or (kw: pric*) Or (kw: pharmacoecon*) Or (kw: cost w effectiveness) Or (kw: cost w utili*) Or (kw: cost w benefit) Or (kw: cost w minimi*) Or (kw: cost w energy) Or (kw: cost w oxygen) Or (kw: cost w metabolic) Or (kw: expenditure NOT kw: energy) Or (kw: value w 2 kw: money) Or (kw: budget*) Or (kw: preference) Or (kw: QALY) Or (kw: quality w adjusted) Or (kw: utility*) Or (kw: financ* w management) Or (kw: financ* w support) Or (kw: financ* w organized))

NOT

((kw: editorial) or (kw: letter) or (kw: comment) or (kw: animal))

Database: Zetoc

Name of host: Mimas

Years covered: earliest to latest

Search strategy

Health train$ OR lifestyle advi$ OR lifestyle train$ OR lay health worker OR lay health advis*r OR peer educ$ OR peer counsel$ OR peer support$ OR health activ$ OR health aide OR health advoc$ OR link worker OR community champion OR community health educ$ OR outreach worker

AND

Evaluation OR effectiveness OR cost-effectiveness OR equity OR acceptability OR behaviour change OR health promotion OR health improvement OR disease prevention

Appendix 7

Search strategy for Google

List one (role)

1. "health trainer"
2. "lifestyle adviser" OR "lifestyle advisor" OR "lifestyle trainer" OR "lifestyle coach"
3. "lay health worker" OR "lay health adviser" OR "lay health advisor" OR "lay health supporter"
4. "lay practitioner" OR "lay leader" OR "lay midwife"
5. health ("peer leader" OR "peer educator" OR "peer counsellor" OR "peer supporter" OR "peer mentor" OR "peer networker" OR "peer assistant")
6. "health activist" OR "health aide" OR "health advocate" OR "health coach" OR "health promoter"
7. "patient navigator" OR "peer navigator"
8. "community champion" OR "health champion"
   i. a) "community health educator" OR "community health worker" OR "community health adviser" OR "community health advisor" OR "community health activist"
   ii. b) "community health representative"
9. "community wellness advocate"
10. "community parent" OR "community mother"
11. "outreach worker" OR "outreach specialist"
12. "expert patient"
13. "natural helper"
14. "neighborhood helper" OR "neighborhood leader" OR "neighborhood assistant" OR "neighbourhood helper" OR "neighbourhood leader" OR "neighbourhood assistant"
15. "family health adviser" OR "family health advisor"
16. "breastfeeding supporter"
17. "lactation consultant"
18. "village health worker" OR "indigenous health worker"
19. promotoras OR promotores
20. "workplace health adviser" OR "workplace health advisor"
21. "community volunteer" OR "community aide"
22. "birth attendant" OR "childbirth attendant" OR "child birth attendant" OR "labor attendant" OR "labour attendant"
23. "birth assistant" OR "childbirth assistant" OR "child birth assistant" OR "labor assistant" OR "labour assistant"
24. linkworker OR "link worker"
25. "lay staff" OR "untrained staff" OR "unlicensed staff" OR "nonprofessional staff" OR "non professional staff" OR "paraprofessional staff" OR "paramedical staff"
26. "barefoot doctor"
27. "lay worker" OR "untrained worker" OR "unlicensed worker" OR "nonprofessional worker" OR "non professional worker" OR "paraprofessional worker" OR "paramedical worker"
28. doula OR douladural OR monitrice

List two (method or general outcome)

(evaluation OR trial OR RCT OR study OR questionnaire OR survey OR interview OR focus group OR observation OR economic OR effectiveness OR cost effectiveness OR equity OR acceptability)

Appendix 8

Results returned for each Google search string

Search string	Number of results
"lifestyle adviser" OR "lifestyle advisor" OR "lifestyle trainer" OR "lifestyle coach"	744
"lay practitioner" OR "lay leader" OR "lay midwife"	15,200
"health activist" OR "health aide" OR "health advocate" OR "health coach" OR "health promoter"	191,000
"community champion" OR "health champion"	1210
"community wellness advocate"	19
"outreach worker" OR "outreach specialist"	83,900
health ("natural helper")	377
"family health adviser" OR "family health advisor"	23
promotoras OR promotores	104,000
Health ("community volunteer" OR "community aide")	11,200
"lay staff" OR "untrained staff" OR "unlicensed staff" OR "nonprofessional staff" OR "non professional staff" OR "paraprofessional staff" OR "paramedical staff"	112,000
"lay worker" OR "untrained worker" OR "unlicensed worker" OR "nonprofessional worker" OR "non professional worker" OR "paraprofessional worker" OR "paramedical worker"	728
"breastfeeding supporter"	26
"village health worker" OR "indigenous health worker"	15,300
"birth attendant" OR "childbirth attendant" OR "child birth attendant" OR "labor attendant" OR "labour attendant"	6010
health (linkworker OR "link worker")	2110
"barefoot doctor"	898
"doula" OR "douladural" OR "monitrice"	55,700
"health trainer"	797
"lay health worker" OR "lay health adviser" OR "lay health advisor" OR "lay health supporter"	10,000
Health ("peer leader" OR "peer educator" OR "peer counsellor" OR "peer supporter" OR "peer mentor" OR "peer networker" OR "peer assistant")	10,800
"patient navigator" OR "peer navigator"	992
"community health educator" OR "community health worker" OR "community health adviser" OR "community health advisor" OR "community health activist"	57,700
"community health representative"	544
"community parent" OR "community mother"	18,800
"neighborhood helper" OR "neighborhood leader" OR "neighborhood assistant" OR "neighbourhood helper" OR "neighbourhood leader" OR "neighbourhood assistant"	602
"expert patient"	6210
"workplace health adviser" OR "workplace health advisor"	7

Appendix 9

Website search results

Website	URL (number of results received)	Date searched
The National Audit Office	www.nao.org.uk (61)	16 October 2008
The Home Office	www.homeoffice.gov.uk (54)	16 October 2008
The Joseph Rowntree Foundation	www.jrf.org.uk (4312)	16 October 2008
The Office of the Deputy Prime Minister (now Communities.gov)	www.odpm.gov.uk (191)	16 October 2008
ISRCTN Register	www.controlled-trials.com/isrctn (2)	16 October 2008
The Department of Health	www.dh.gov.uk (251)	16 October 2008
The American Institutes for Research	www.air.org (2)	17 October 2008
The Office of Policy	www.ssa.gov/policy (12)	17 October 2008
The Medical Research Council	www.mrc.ac.uk (310)	17 October 2008
The Urban Institute	www.urban.org(4)	17 October 2008
Wellcome Trust	www.wellcome.ac.uk (26)	17 October 2008
		Total search results = 5225

Appendix 10

Table of excluded studies

Study	Reference(s)	Reason for exclusion	Design
Adair (1960)	Adair J. The Indian Health Worker in the Cornell-Navaho Project. *Hum Organ* 1960;**19**:59–63	Poor methodological quality	Qualitative
Aiken *et al.* (1984)	Aiken LS, LoSciuto LA, Ausetts MA, Brown BS. Paraprofessional versus professional Drug Counselors: The Progress of Clients in Treatment. *Int J Addict* 1984;**19**:383–401	Poor methodological quality	Quantitative
Albrecht and Petres (1997)	Albrecht L, Petres KE. Peer intervention in case management practice. *J Case Manag* 1997;**6**:43–9	Not an evaluative design	Descriptive material
Allen (2004)	Allen T. Preventing falls in older people: evaluating peer education approach. *Br J Community Nurs* 2004;**9**:195–200	Poor methodological quality	Quantitative
Andrews *et al.* (2004)	Andrews JO, Felton G, Wewers ME, Heath J. Use of community health workers in research with ethnic minority women. *J Nurs Scholarsh* 2004;**36**:358–65	Not an evaluative design	Review
Artz *et al.* (1981)	Artz L, Cooke CJ, Meyers A, Stalgaitis S. Community change agents and health interventions: hypertension screening. *Am J Community Psychol* 1981;**9**:361–70	Not an evaluative design	Quantitative
Baker *et al.* (1997)	Baker EA, Bouldin N, Durham M, Lowell, ME, Gonzalez M, Jodaitis N, *et al.* The Latino Health Advocacy Program: a collaborative lay health advisor approach. *Health Educ Behav* 1997;**24**:495–509	Poor methodological quality	Qualitative
Barnett and Parker (1985)	Barnett B, Parker G. Professional and non-professional intervention for highly anxious primiparous mothers. *Br J Psychiatry* 1985;**146**:287–93	Poor methodological quality	Quantitative
Beckham *et al.* (2008)	Beckham S, Bradley S, Washburn A, Taumua T. Diabetes management: utilizing community health workers in a Hawaiian/Samoan population. *J Health Care Poor Underserved* 2008;**19**:416–27	Poor methodological quality	Quantitative
Birkel *et al.* (1993)	Brikel RC, Golaszewski T, Koman JJ, Singh BK, Catan V, Souply K. Findings from the Horizontes Acquired Immune Deficiency Syndrome education project: The impact of indigenous outreach workers as change agents for injection drug users. *Health Educ Q* 1993;**20**:523–38	Poor methodological quality	Quantitative
Boyd *et al.* (2005)	Boyd MR, Moneyham L, Murdaugh C, Phillips KD, Tavakoli A, Jackwon K, *et al.* A peer-based substance abuse intervention for HIV+ rural women: a pilot study. *Arch Psychiatr Nurs* 2005;**19**;10–17	Poor methodological quality	Quantitative
Braun *et al.* (2005)	Braun KL, Fong M, Kaanoi ME, Kamaka ML, Gotay CC. Testing a culturally appropriate, theory-based intervention to improve colorectal cancer screening among Native Hawaiians. *Prev Med* 2005;**40**:619–27	Poor methodological quality	Quantitative
Briscoe and Pichert (1999)	Briscoe VJ, Pichert JW. Evaluation of a program to promote diabetes care via existing agencies in African American communities. *ABNF J* 1999;**10**:111–15	Poor methodological quality	Quantitative
Brooker and Moore (2007)	Brooker C, Moore S. *New futures health trainers: an impact assessment – summary of findings*. Lincoln: University of Lincoln, Centre for Clinical and Academic Workforce Innovation; 2007	Poor methodological quality	Quantitative
Buller *et al.* (2000)	Buller D, Buller MK, Larkey L, Sennott-Miller L, Taren D, Aickin M, *et al.* Implementing a 5-a-day peer health educator program for public sector labor and trades employees. *Health Educ Behav* 2000;**27**:232–40	Poor methodological quality	Quantitative
Bullock *et al.* (1995)	Bullock LFC, Wells JE, Duff GB, Hornblow AR. Telephone support for pregnant women: Outcome in late pregnancy. *N Z Med J* 1995;**108**: 476–8	Poor methodological quality	Quantitative
Burnhill *et al.* (1985)	Burnhill MS, King E, Koteen E. *Impact of counselling on repeated unplanned pregnancy and contraceptive behavior in low SES abortion population*. New Brunswick, NJ: Department of Obstetrics and Gynecology Rutgers Medical School; 1985	Poor methodological quality	Quantitative

Study	Reference(s)	Reason for exclusion	Design
Castro *et al.* (1995)	Castro F, Elder J, Coe K, Tafoya-Barraza H, Moratto S, Campbell N, *et al.* Mobilizing churches for health promotion in Latino communities: Companeros en la Salud. *J Natl Cancer Inst Monogr* 1995;**18**:127–35	Poor methodological quality	Quantitative
Caufield *et al.* (1998)	Caufield LE, Gross SM, Bentley ME, Bronner Y, Kessler L, Jensen J, *et al.* WIC-based interventions to promote breastfeeding among African-American women in Baltimore: Effects on breastfeeding initiation and continuation. *J Hum Lact* 1998;**14**:15–22	Poor methodological quality	Quantitative
Centres for Disease Control and prevention (CDC) (1996)	CDC. Community-level prevention of human immunodeficiency virus infection among high-risk populations: the AIDS Community Demonstration Projects. *Morb Mortal Wkly Rep* 1996;**45**:1–17	Not an evaluative design	Quantitative
CDC AIDS Community Demonstration Projects Research Group (1999)	CDC. Community-level HIV intervention in 5 cities: final outcome data from the CDC AIDS Community Demonstration Projects. *Am J Public Health* 1999;**89**:336–45	Poor methodological quality	Quantitative
Cohen *et al.* (1986)	Cohen J, Sauter S, DeVellis R, DeVellis B. Evaluation of arthritis self management courses led by laypersons and by professionals. *Arthritis Rheum* 1986;**29**:388–93	Poor methodological quality	
Corkery *et al.* (1997)	Corkery E, Palmer C, Foley M, *et al.* Effect of a bicultural community health worker on completion of diabetes education in a Hispanic population. *Diabetes Care* 1997;**20**:254–7	Poor methodological quality	Quantitative
Cottler *et al.* (1998)	Cottler LB, Compton WM, Ben AA, Cunningham-Williams R, Abram F, Fichtenbaum C, *et al.* Peer-delivered interventions reduce HIV risk behaviors among out-of-treatment drug abusers. *Public Health Rep*;**113**(Suppl. 1):31–41.	Poor methodological quality	Quantitative
Cox (1979)	Cox C. A pilot study: using the elderly as community health educators. *Int J Health Educ* 1979;**22**:49–52.	Poor methodological quality	Quantitative
Crose *et al.* (1987)	Crose R, Warren J, Duffy M, Franklin B. Project OASIS: volunteer mental health paraprofessionals serving nursing home residents. *Gerontologist* 1987;**27**:359–62	Poor methodological quality	Quantitative
Dale (2007)	Dale J. Telecare motivational interviewing for diabetes patient education and support: a randomised controlled trial based in primary care comparing nurse and peer supporter delivery. *Trials* 2007;**8**:1–8	Poor methodological quality	Quantitative
Davis *et al.* (1994)	Davis DT, Bustamante A, Brown CP, *et al.* The urban church and cancer control: a source of social influence in minority communities. *Public Health Rep* 1994; **109**:500–6	Poor methodological quality	Quantitative
Davison *et al.* (1999)	Davison DM, Reeder GD, Teverbaugh K. African-American volunteers carrying an HIV prevention message: selective communication. *AIDS Educ Prev* 1999;**11**:436–49	Poor methodological quality	Quantitative
Deakin *et al.*(2002)	Deakin TA, Cade JE, Williams DRR, Greenwood D. Expert patient education versus routine treatment (X-PERT) *Diabetologia* 2002;**45**:A317.	Poor methodological quality	Quantitative
Delveaux and Blanchette(2001)	Delveaux K, Blanchette K. Results of an evaluation of the Peer Support Program at Nova Institution for women (R-87, 2000). *Forum Correct Res* 2001;**13**:28–9	Not an evaluative design	Descriptive material
DeNardo *et al.* (1995)	DeNardo BA, Stebulis JA, Tucker LB, Schaller JG. Parents of children with rheumatic disease as peer counselors. *Arthritis Care Res* 1995;**8**:120–5	Poor methodological quality	Quantitative
Dennis *et al.* (2002)	Dennis CL, Hodnett E, Gallop R, Simmer K. Telephone-based peer support increased the duration of breast feeding in primiparous mothers. *Evid Based Med* 2002;**7**:156	Poor methodological quality	Quantitative
Dennis (2003)	Dennis CL. The effect of peer support on post-partum depression: a pilot randomised controlled trial. *Can J Psychol* 2003;**48**:115–24	Poor methodological quality	Quantitative
deWeerdt *et al.* (1991)	deWeerdt I, Visser A, Kok G, deWeerdt O, van der Veen E. Randomized controlled multicentre evaluation of an education programme for insulin-treated diabetic patients: effects on metabolic control, quality of life, and costs of therapy. *Diabet Med* 1991;**8**:338–45.	Poor methodological quality	Quantitative

Study	Reference(s)	Reason for exclusion	Design
deWeerdt *et al.* (1989)	deWeerdt I, Visser A, Kok G, van der Veen E. Randomized controlled evaluation of an education program for insulin treated patients with diabetes: effects on psychosocial variables. *Patient Educ Couns* 1989;**14**:191–215	Poor methodological quality	Quantitative
Diggle (2008)	Diggle S. *An evaluation of the Nottingham City Health Trainer Programme.* Nottingham: NHS; 2008	Poor methodological quality	Combined
Dignan *et al.* (1996)	Dignan M, Michielutte R, Blinson K, Wells H, Case L, Sharp P, *et al.* Effectiveness of health education to increase screening for cervical cancer among eastern-band Cherokee Indian women in North Carolina. *J Natl Cancer Inst* 1996;**88**:1670–6	Poor methodological quality	Quantitative
Dignan *et al.* (1998)	Dignan M, Michielutte R, Wells HB, Sharp P, Blinson K, Case Ld, *et al.* Health education to increase screening for cervical cancer among Lumbee Indian women in North Carolina. *Health Educ Res* 1998;**13**:545–56	Poor methodological quality	Quantitative
Dracup and Frerichs (1986)	Dracup K, Frerichs, P. Evaluation of a community-based health information service. *Am J Prev Med* 1986;**2**:6–13	Poor methodological quality	Quantitative
Duan *et al.* (2000)	Duan N, Fox SA, Derose KP, Carson S. Maintaining mammography adherence through telephone counseling in a church-based trial. *Am J Public Health* 2000;**90**:1468–71	Poor methodological quality	Quantitative
Elder (2005)	Elder JP, Ayala GX, Campbell NR, Slymen D, Lopez-Madurga ET, Engelberg M, Baquero B. Interpersonal and print nutrition communication for a Spanish-dominant Latino population: Secretos de la Buena Vida *Health Psychol* 2005;**24**:49–57	Poor methodological quality	Quantitative
Elder *et al.* (1986)	Elder JP, McKenna CA, Lazieh M, Ferreira A, Lasater TM, Carleton RA. The use of volunteers in mass screening for high blood pressure. *Am J Prev Med* 1986;**2:**268–72	Not an evaluative design	Descriptive material
Elford *et al.* (2001)	Elford J, Bolding G, Sherr L. Peer education has no significant impact on HIV risk behaviours among gay men in London. *AIDS* 2001;**15**:535–8	Poor methodological quality	Quantitative
Elford *et al.* (2002)	Elford J, Sherr L, Bolding G, Serle F, Maguire M. Peer-led HIV prevention among gay men in London: process evaluation. *AIDS Care* 2002;**14:**351–60	Poor methodological quality	Quantitative
Ell *et al.* (2002)	Ell K, Padgett D, Vourlekis B, Nissly J, Pineda D, Sarabia O, Walther V, Blumenfield S, Lee P. Abnormal mammogram follow-up: a pilot study in women with low income. *Cancer Pract: Multidisciplin J Cancer Care* 2002;**10**:130–8	Poor methodological quality	Quantitative
Eng (1993)	Eng E. The Save our Sisters Project. A social network strategy for reaching rural black women *Cancer* 1993;**72**:1071–7	Not an evaluative design	Qualitative (descriptive)
Eng and Smith (1995)	Eng E, Smith J. Natural helping functions of lay health advisors in breast cancer education *Breast Cancer Res Treat* 1995;**35**: 23–9	Not an evaluative design	Qualitative (descriptive)
Fedder *et al.* (2003)	Fedder DO, Chang RJ, Curry S, Nichols G. The effectiveness of a community health worker outreach program on health-care utilization of West Baltimore City Medicaid patients with diabetes, with or without hypertension. *Ethn Dis* 2003;**13**:22–7	Poor methodological quality	Quantitative
Fernandez-Esquer *et al.* (2003)	Fernandez-Esquer ME, Espinoza P, Torres I, Ramirez AG, McAlister AL. A Su Salud: a quasi-experimental study among Mexican American women. *Am J Health Behav* 2003;**27**:536–45	Poor methodological quality	Quantitative
Flaskerud *et al.* (1997)	Flaskerud JH, Nyamathi AM, Uman C. Longitudinal effects of an HIV testing and counseling programme for low-income Latina women. *Ethn Health* 1997;**2**:89–103	Poor methodological quality	Quantitative
Flowers *et al.* (2000)	Flowers P, Frankis J, Hart G. Evidence and the evaluation of a community-level intervention: research the Gay Men's Task Force. In Watson J, Platt S, editors. *Researching health promotion.* London: Routledge; 2000. pp.102–24	Poor methodological quality	Combined
Flowers *et al.* (2002)	Flowers P, Hart GJ, Williamson LM, Frankis JS, Der GJ. Does bar-based, peer-led sexual health promotion have a community-level effect amongst gay men in Scotland? *Int J STD AIDS* 2002;**13**:102–8	Poor methodological quality	Quantitative

Study	Reference(s)	Reason for exclusion	Design
Fogarty (2001)	Fogarty LA, Heilig CM, Armstrong K, Cabral R, Galavotti C, Gielen AC, Green BM. Long-term effectiveness of a peer-based intervention to promote condom and contraceptive use among HIV-positive and at-risk women. *Public Health Rep* 2001;**116**(Suppl. 1):103–19	Poor methodological quality	Quantitative
Foley *et al.* (2005)	Foley K, Duran B, Morris P, Lucero J, Jiang YZ, Baxter B, *et al.* Using motivational interviewing to promote HIV testing at an American Indian substance abuse treatment facility. *J Psychoactive Drugs* 2005;**37**:321–9	Poor methodological quality	Quantitative
Foley and Pollard (1998)	Foley RM, Pollard CM. Food Cent$: implementing and evaluating a nutrition education project focusing on value for money. *Austr N Z J Public Health* 1998;**22**:494–501	Poor methodological quality	Quantitative
Fourth Hurdle Consulting Ltd (2007)	Fourth Hurdle Consulting Ltd. *Connect 4 Life economic evaluation report*; 2007	Not an evaluative design	Quantitative
Fridinger and Vincent (1989)	Fridinger FW, Vincent ML. A comparison of peer educator, media and screening only approaches in reducing cardiovascular risk among corrections personnel. *Health Educ* 1989;**20**:30–5	Poor methodological quality	Quantitative
Gabram *et al.* (2008)	Gabram SGA, Lund MJB, Gardner J, Hatchett N, Bumpers HL, Okoli J, *et al.* Effects of an outreach and internal navigation program on breast cancer diagnosis in an urban cancer center with a large African-American population. *Cancer* 2008;**113**:602–7	Poor methodological quality	Quantitative
Garret (2006)	Garret R. *Expert Patient Mentoring Project: evaluation report*. Sheffield: Sheffield Hallam University Mentoring and Coaching Research Unit; 2006	Poor methodological quality	Quantitative
Garrido Rodriguez *et al.* (1995)	Garrido Rodriguez P, Castillo Herraiz I, Colomer Revuelta C. A support intervention for giving up smoking at health centers. A pilot experience with trained volunteer therapists. *Rev Espa Salud Publica* 1995;**69**: 419–26	Article written in Spanish	
Gielen *et al.* (1997)	Gielen AC, Windsor R, Faden RR, O'Campo P, Repke J, Davis M. Evaluation of a smoking cessation intervention for pregnant women in an urban prenatal clinic. *Health Education Res* 1997;**12**:247–54	Poor methodological quality	Quantitative
Gifford *et al.* (1998)	Gifford A, Laurent D, Gonzales V, Chesney M, Lorig K. Pilot randomized trial of education to improve self-management skills of men with symptomatic HIV/AIDS. *J Acquir Immune Defic Syndr Human Retrovirol* 1998;**18**: 136–44	Poor methodological quality	Quantitative
Glasgow *et al.* (1986)	Glasgow RE, Klesges RC, O'Neill HK. Programming social support for smoking modification: an extension and replication. *Addict Behav* 1986;**11**:453–7	Poor methodological quality	Quantitative
Glasgow *et al.* (1995)	Glasgow RE, Terborg JR, Hollis JF Severson HH, Boles SM. Take Heart: results from the initial phase of work-site Wellness Program. *Am J Public Health* 1995;**85**:209–16	Poor methodological quality	Quantitative
Goldfinger *et al.* (2008)	Goldfinger JZ, Arniella G, Wylie-Rosett J, Horowitz CR. Project HEAL: peer education leads to weight loss in Harlem. *J Health Care Poor Underserved* 2008;**19**:180–92	Poor methodological quality	Quantitative
Graffy *et al.* (2004)	Graffy J, Taylor J, Williams A, Eldridge S. Randomised controlled trial of support from volunteer counsellors for mothers considering breast feeding. *BMJ* 2004;**328**:26–31	Poor methodological quality	Quantitative
Graham (1992)	Graham AV, Frank SH, Zyzanski SJ, Kitson GC, Reeb KG. A Clinical Trial to Reduce the Rate of Low Birth Weight in an Inner- City Black Population. *Fam Med* 1992;**24**:439–46.	Poor methodological quality	Quantitative
Grant *et al.* (1996)	Grant TM, Ernst CC, Streissguth AP. An intervention with high-risk mothers who abuse alcohol and drugs: the Seattle Advocacy Model. *Am J Public Health* 1996;**86**:1816–17	Poor methodological quality	Qualitative
Green	Green J. *One step closer to the real people: An evaluation of HealthWORKS' Linkworker scheme*. Newcastle Upon Tyne: Northumbria University	Poor methodological quality	Qualitative
Grinstead *et al.* (1997)	Grinstead O, Faigeles B, Zack B. The effectiveness of peer HIV education for male inmates entering state prison. *J Health Educ* 1997;**28**:S31–7	Poor methodological quality	Quantitative

Study	Reference(s)	Reason for exclusion	Design
Haas *et al.* (2005)	Haas M, Groupp E, Muench J, Kraemer D, Brummel S, Sharma R, *et al.* Chronic disease self-management program for low back pain in the elderly. *J Manipulative Physiol Ther* 2005;**28**:228–37	Poor methodological quality	Quantitative
Hager and Krasse (1983)	Hager B, Krasse B. Dental health education by "barefoot doctors". *Community Dent Oral Epidemiol* 1983;**11**:333–6	Poor methodological quality	Quantitative
Hammond *et al.* (2000)	Hammond SL, Leonard B, Fridinger F. The Centers for Disease Control and Prevention Director's Physical Activity Challenge: an evaluation of a worksite health promotion intervention. *Am J Health Promot* 2000;**15**: 17–20	Poor methodological quality	Quantitative
Han *et al.* (2008)	Hae-Ra H, Lee H, Kim MT, Kim KB. Tailored lay health worker intervention improves breast cancer screening outcomes in non-adherent Korean-American women. *Health Educ Res* 2008;**24**:318–29	Poor methodological quality	Quantitative
Hansen *et al.* (2005)	Hansen LK, Feigl P, Modiano MR, *et al.* An educational program to increase cervical and breast cancer screening in Hispanic women: a Southwest Oncology Group study. *Cancer Nurs* 2005;**28**:47–53	Poor methodological quality	Qualitative
Hanson (1998)	Hanson J. Parental self-efficacy and asthma self-management skills. *J Spec Pediatr Nurs* 1998;**3**:146–54	Poor methodological quality	Quantitative
Haour-Knipe *et al.* (1999)	Haour-Knipe M, Fleury F, Dubois-Arber F. HIV/AIDS prevention for migrants and ethnic minorities: three phases of evaluation. *Soc Sci Med* 1999;**49**:1357–72	Poor methodological quality	Qualitative
Harding *et al.* (2004)	Harding R, Bensley J, Corrigan N. Targeting smoking cessation to high prevalence communities: outcomes from a pilot intervention for gay men. *BMC Public Health* 2004;**4**:43–7	Poor methodological quality	Quantitative
Harris and Larsen (2007)	Harris GE, Larsen D. HIV peer counseling and the development of hope: perspectives from peer counselors and peer counseling recipients. *AIDS Patient Care STDS* 2007;**21**:843–59	Poor methodological quality	Qualitative
Hart *et al.* (2004)	Hart GJ, Williamson LM, Flowers P. Good in parts: The Gay Men's Task Force in Glasgow: a response to Kelly. *AIDS Care* 2004;**16**:159–65	Not an evaluative design	Qualitative
Havas *et al.* (1998)	Havas S, Anliker J, Damron D, Langenburg P, Ballesteros M, Feldman R. Final results of the Maryland WIC 5-a-day Promotion Program. *Am J Public Health* 1998;**88**:1161–7	Poor methodological quality	Quantitative
Healthworks (2004)	Healthworks. *Link Workers Report*; 2004	Not an evaluative design	Qualitative (descriptive)
Heller *et al.* (1991)	Heller K, Thompson MG, Trueba PE, Hogg JR, Vlachos-Weber I. Peer support telephone dyads for elderly women: was this the wrong intervention? *Am J Community Psychol* 1991;**19**:53–74	Not solely health-related LAs	Combined
Heller (1995)	Heller RF. A randomized controlled trial of community based counselling among those discharged from hospital with ischaemic heart disease. *Austr N Z J Med* 1995;**25**:362–4	Poor methodological quality	Quantitative
Henderson *et al.* (1989)	Henderson JB, Glekin BM, McIntosh WB, Dunnigan MG. A Health Education campaign to prevent osteomalacia in Asian women in Glasgow: 1984–86. *J Hum Nutr Diet* 1989;**2**:237–51	Poor methodological quality	Quantitative
Hill *et al.* (1999)	Hill MN, Bone LR, Hilton SC, Roary MC, Kelen GD, Levine DM. A clinical trial to improve high blood pressure care in young urban black men—Recruitment, follow-up, and outcomes. *Am J Hypertens* 1999;**12**:548–554.	Poor methodological quality	Quantitative
Hill *et al.* (2003)	Hill MN, Han HR, Dennison CR, Kim MT, Roary MC, Blumenthal RS, *et al.* Hypertension care and control in underserved urban African American men: Behavioral and physiologic outcomes at 36 months. *Am J Hypertens* 2003;**16**:906–13	Poor methodological quality	Quantitative
Hoare *et al.* (1994)	Hoare T, Thomas C, Biggs A, Booth M, Bradley S, Friedman E. Can the uptake of breast screening by Asian women be increased? A randomized controlled trial of a linkworker intervention. *J Pub Health Med* 1994;**16**:179–85	Poor methodological quality	Quantitative
Hodnett (1999)	Hodnett E. Efficacy of home-based peer counseling to promote exclusive breast-feeding: a randomized controlled trial. *J Pediatr* 1999;**135**:649–50	Poor methodological quality	Quantitative

Study	Reference(s)	Reason for exclusion	Design
Holtrop *et al.* (2002)	Holtrop JS, Hickner J, Dosh S, Noel M, Ettenhofer TL. "Sticking to it – diabetes mellitus": a pilot study of an innovative behavior change program for women with type 2 diabetes. *Am J Health Educ* 2002;**33**:161–6	Poor methodological quality	Quantitative
Holtrop and Slonim (2000)	Holtrop JS, Slonim A. Sticking to it: a multifactor cancer risk-reduction program for low-income clients. *J Health Educ* 2000;**31**:122–7	Poor methodological quality	Quantitative
Holtrop *et al.* (2002)	Holtrop JS, Hickner J, Dosh S, Noel M, Ettenhofer TL. "Sticking to it: diabetes mellitus": a pilot study of an innovative behavior change program for women with type 2 diabetes. *Am J Health Educ* 2002;**33**:161–6	Poor methodological quality	Quantitative
Hovell *et al.* (1984)	Hovell MF, Geary DC, Black DR. The effects of lay counseling on medication adherence and blood pressure: Adjunctive treatment for hypertension. *Patient Educ Couns* 1984;**6**:91–4.	Poor methodological quality	Qualitative
Ingram *et al.* (2007)	Ingram M, Torres E, Redondo F, Bradford G, Wang C, O'Toole ML. The impact of promotoras on social support and glycemic control among members of a farm worker community on the US-Mexico border. *Diabetes Educ* 2007;**33**(Suppl. 6):S172–8	Poor methodological quality	Qualitative
Ireys *et al.* (1996)	Ireys HT, Sills EM, Kolodner KB. A Social Support Intervention for Parents of Children with Juvenile Rheumatoid Arthritis: Results of a Randomized Trial. *J Pediatr Psychol* 1996;**21**:633–41	Poor methodological quality	Quantitative
Jandorf *et al.* (2005)	Jandorf L, Gutierrez Y, Lopez J, Christie J, Itzkowitz SH. Use of a patient navigator to increase colorectal cancer screening in an urban neighborhood health clinic. *J Urban Health* 2005;**82**:216–24	Poor methodological quality	Quantitative
Jenner (1988)	Jenner S. The influence of additional information, advice and support on the success of breast feeding in working class primiparas. *Child Care Health Dev* 1988;**14**:319–28	Poor methodological quality	Quantitative
Jolemore and Steeves (2006)	Jolemore S, Steeves D. A capital approach: Tobacco treatment and cessation within Nova Scotia's Capital Health District. *Healthc Q* 2006;**9**:66–70	Not an evaluative design	Qualitative
Kaczorowski *et al.* (2008)	Kaczorowski J, Chambers LW, Karwalajtys T, Dolovich L, Farrell B, McDonough B. Cardiovascular Health Awareness Program (CHAP): A community cluster-randomised trial among elderly Canadians. *Prevent Med* 2008;**46**:537–44	Poor methodological quality	Quantitative
Kalampakorn (2000)	Kalampakorn S. Linking practice and research. Effects of peer education on dietary change. *AAOHN J* 2000;**48**:551–2	Poor methodological quality	Quantitative
Katz *et al.* (2007)	Katz ML, Tatum CM, Degraffinreid CR, Dickinson S, Paskett ED. Do cervical cancer screening rates increase in association with an intervention designed to increase mammography usage? *J Womens Health* 2007;**16**:24–35	Poor methodological quality	Quantitative
Katz *et al.* (2007)	Katz ML, Tatum C, Dickinson SL, Murray DM, Long-Foley K, Cooper MR, *et al.* Improving colorectal cancer screening by using community volunteers: results of the Carolinas cancer education and screening (CARES) project. *Cancer* 2007;**110**:1602–10	Poor methodological quality	Quantitative
Kegeles *et al.* (2002)	Kegeles SM, Rebchook GM, Hays RB, Pollack LM. Staving off increases in young gay/bisexual men's risk behavior in the HAART era. XIV International Conference on AIDS, Barcelona, 2002	Poor methodological quality	Quantitative
Kelly *et al.* (1991)	Kelly JA, St. Lawrence JS, Diaz YE, *et al.* HIV risk behavior reduction following intervention with key opinion leaders of population: an experimental analysis. *Am J Public Health* 1991;**81**:168–71	Poor methodological quality	Quantitative
Kelly *et al.* (1997)	Kelly JA, Murphy DA, Sikkema KJ, *et al.* Randomised, controlled, community-level HIV-prevention intervention for sexual-risk behaviour among homosexual men in US cities. *Lancet* 1997;**350**:1500–5	Poor methodological quality	Quantitative
Keyserling *et al.* (2008)	Keyserling TC, Samuel Hodge CD, Jilcott SB, Johnston LF, Garcia BA, Gizlice Z, *et al.* Randomized trial of a clinic-based, community-supported, lifestyle intervention to improve physical activity and diet: The North Carolina enhanced WISEWOMAN project. *Prevent Med* 2008;**46**:499–510	Poor methodological quality	Quantitative

Study	Reference(s)	Reason for exclusion	Design
Kim *et al.* (2004)	Kim S, Koniak-Griffin D, Flaskerud JH, Guarnero PA. The impact of lay health advisors on cardiovascular health promotion: using a community based participatory approach. *J Cardiovasc Nurs* 2004;**19**:192–9	Poor methodological quality	Quantitative
Klecan (1999)	Klecan D. Development and evaluation of a smoking cessation training for border lay advisors. *Cancer Res Ther Control*; 2004;**8**:233–44	Poor methodological quality	Quantitative
Kleiman *et al.* (1977)	Kleiman MA, Mantell JE, Alexander ES. RX for social death: the cancer patient as counsellor. *Commun Ment Health J* 1977;**13**:115–24	Poor methodological quality	Qualitative
Kocken *et al.* (2001)	Kocken PL, Voorham T, Brandsma J, Swart W. Effects of peer-led AIDS education aimed at Turkish and Moroccan male immigrants in The Netherlands: A randomised controlled evaluation study. *Eur J Pub Health* 2001;**11**:153–9	Poor methodological quality	Quantitative
Kocken and Voorham (1998)	Kocken PL, Voorham AJJ. Effects of a peer-led senior health education program. *Patient Educ Couns* 1998;**34**:15–23	Poor methodological quality	Quantitative
Komaroff *et al.* (1974)	Komaroff AL, Black WL, Flatley M, Knopp RH, Reiffen B, Sherman H. Protocols for physician assistants: management of diabetes and hypertension. *N Engl J Med* 1974;**290**:307–12	Poor methodological quality	Quantitative
Konstant *et al.* (1991)	Konstant LC, Hughes KV, Dowdy RP. Using trained volunteer instructors: an example of community health education programming. *SO: Source J Commun Dev Soc* 1991;**22**:99–117	Poor methodological quality	Qualitative
Krieger *et al.* (1999)	Krieger J, Collier C, Song L, Martin D. Linking community based blood pressure measurement to clinical care: A randomized controlled trial of outreach and tracking by community health workers. *Am J of Pub Health* 1999;**89**:856–61	Poor methodological quality	Quantitative
Kviz *et al.* (1994)	Kviz FJ, Crittenden KS, Madura KJ, Madura RB. Use and effectiveness of buddy support in a self-help smoking cessation program. *Am J Health Promotion* 1994;**8**:191–201	Poor methodological quality	Quantitative
Lacey *et al.* (1991)	Lacey L, Tukes S, Manfredi C, Wamecke R. Use of lay health educators for smoking cessation in a hard-to-reach urban community. *J Commun Health* 1991;**16**:269–82	Poor methodological quality	Quantitative
Lam *et al.* (2003)	Lam TK, McPhee SJ, Mock J, Wong C, Doan HT, Nguyen T, *et al.* Encouraging Vietnamese-American women to obtain Pap tests through lay health worker outreach and media education. *J Gen Intern Med* 2003;**18**:516–24	Poor methodological quality	Quantitative
Lapham *et al.* (1993)	Lapham SC, Hall M, McMurray-Avila M, Beaman H. Residential Care: Alburquerque, Evanston/VA, Los Angeles. *Alcohol Treat Q* 1993; **10**(3–4):139–54	Poor methodological quality	Quantitative
Lapham *et al.* (1995)	Lapham SC, Hall M, Skipper BJ. Homelessness and Substance Use Among Alcohol Abusers Following Participation in ProjectH&ART. *J Addict Dis* 1995;**14**:41–55	Poor methodological quality	Quantitative
Larkey *et al.* (1999)	Larkey LK, Alatorre C, Buller DB, Morrill C, Klein Buller M, Taren D, *et al.* Communication strategies for dietary change in a worksite peer educator intervention. *Health Educ Res* 1999;**14**:777–90	Poor methodological quality	Quantitative
Larkey (2006)	Larkey L. Las Mujeres Saludables: reaching Latinas for breast, cervical and colorectal cancer prevention and screening. *J Commun Health* 2006;**31**:69–77.	Poor methodological quality	Quantitative
Latka *et al.* (2008)	Latka MH, Hagan H, Kapadia F, Golub ET, Bonner S, Campbell JV, *et al.* A randomized intervention trial to reduce the lending of used injection equipment among injection drug users infected with hepatitis C. *Am J Pub Health* 2008;**98**:853–61	Poor methodological quality	Quantitative
Latkin (1998)	Latkin CA. Outreach in natural settings: the use of peer leaders for HIV prevention among injecting drug users' networks. *Pub Health Rep* 1998;**113**:S151–9	Poor methodological quality	Quantitative
Latkin *et al.* (2003)	Latkin CA, Sherman S, Knowlton A. HIV prevention among drug users: outcome of a network-oriented peer outreach intervention. *Health Psychol* 2003;**22**:332–9	Poor methodological quality	Quantitative
Lavallee *et al.* (1991)	Lavallee C, James CA, Robinson EJ. Evaluation of a Community Health Representative Program among the Cree of Northern Quebec. *Can J Pub Health* 1991;**82**:181–4	Not an evaluative design	Combined

Study	Reference(s)	Reason for exclusion	Design
Lesser *et al.* (2005)	Lesser PA, Maurer M, Stephens S, Yolkut R. Doulas for all. *Int J Childbirth Educ* 2005;**20**:28–32	Poor methodological quality	Quantitative
Levine and Bone (1990)	Levine DM, Bone L. The impact of a planned health education approach on the control of hypertension in a high risk population. *J Hum Hypertens* 1990;**4**:317–21	Poor methodological quality	Quantitative
Liberty *et al.* (1998)	Liberty HJ, Johnson BD, Jainchill N, Ryder J, Messina M, Reynolds S, *et al.* Dynamic recovery: comparative study of therapeutic communities in homeless shelters for men. *J Subs Abuse Treat* 1998;**15**:401–23	Poor methodological quality	Quantitative
Lieberman (2002)	Lieberman. Practice notes: strategies in health education. *Health Educ Behav* 2002;**29**:649–55	Not an evaluative design	Combined
Lierman *et al.* (1994)	Lierman LM, Young HM, Powell-Cope G, Georgiadou F, Benoliel JQ. Effects of education and support on breast self-examination in older women. *Nurs Res* 1994;**43**:158–63	Poor methodological quality	Quantitative
Lipkus *et al.* (1999)	Lipkus IM, Lyna PR, Rimer BK. Using tailored interventions to enhance smoking cessation among African-Americans at a community health center. *Nicotine Tob Res* 1999;**1**:77–85	Poor methodological quality	Quantitative
Malchodi *et al.* (2003)	Malchodi ,CS, Oncken C, Dornelas EA, Caramanica L, Gregonis E, Curry SL. The effects of peer counseling on smoking cessation and reduction. *Obstet Gynecol* 2003;**101**:504–10	Poor methodological quality	Quantitative
Malott *et al.* (1984)	Malott JM, Glasgow RE, O'Neill K, *et al.* Co-worker social support in a worksite smoking control program. *J Appl Behav Anal* 1984;**17**:485–95	Poor methodological quality	Quantitative
Margolis *et al.* (1998)	Margolis K, Lurie N, McGovern P, Tyrell M, Slater J. Increasing breast and cervical cancer screening in low-income women. *J Gen Int Med* 1998;**13**:515–21	Poor methodological quality	Quantitative
Martin *et al.* (2005)	Martin M, Camargo M, Ramos L, Lauderdale D, Krueger L, Lantos J. The evaluation of a Latino community health worker HIV prevention program. *Hisp J Behav Sci* 2005;**27**:371–84	Poor methodological quality	Quantitative
Martijn *et al.* (2004)	Martijn C, de Vries NK, Voorham T, Brandsma J, Meis M, Hospers HJ. The effects of AIDS prevention programs by lay health advisors for migrants in The Netherlands. *Patient Educ Couns* 2004;**53**:157–65	Poor methodological quality	Quantitative
Mayo *et al.* (2004)	Mayo RM, Sherrill WW, Crew L, Watt P, Mayo WW. Connecting rural African American and Hispanic women to cancer education and screening: the Avon Health Connector Project. *J Cancer Educ* 2004;**19**:123–6	Poor methodological quality	Combined
McCormick *et al.* (1989)	McCormick M, Brooks-Gunn J, Shorter T, Holmes J, Wallace C, Heagarty M. Outreach as case finding: its effect on enrolment in prenatal care. *Med Care* 1989;**27**:103–11	Poor methodological quality	Quantitative
McFarlane and Fehir (1994)	McFarlane J, Fehir J. De Madres a Madres: A community, primary health care program based on empowerment. *Health Educ Q* 1994;**21**:381–94	Poor methodological quality	Quantitative
McGregor (2008)	McGregor A. *Health Trainer Programme, Bradford and Airedale primary care trust*. BMJ Health Intelligence; 2008	Poor methodological quality	Qualitative
McIntyre-Kingsolver *et al.* (1986)	McIntyre-Kingsolver K, Lichtenstein E, Mermelstein RJ. Spouse Training in a Multicomponent Smoking-Cessation Program. *Behav Ther* 1986;**17**:67–74	Poor methodological quality	Quantitative
McNeil (1995)	McNeil JK. Effects of nonprofessional home visit programs for subclinically unhappy and unhealthy older adults. *J Appl Gerontol* 1995;**14**:333–42	Poor methodological quality	Quantitative
Medina *et al.* (2007)	Medina A, Balcazar H, Hollen ML, Nkhoma E, Mas FS. Promotores de Salud: educating Hispanic communities on heart-healthy living. *Am J Health Educ* 2007;**38**:194–202	Poor methodological quality	Combined
Merelle *et al.* (2006)	Merelle S, Sorbi M, Passchier J. The preliminary effectiveness of migraine lay trainers in a home-based behavioural management training. *Patient Educ Couns* 2006;**61**:307–11	Poor methodological quality	Quantitative
Mermelstein *et al.* (1986)	Mermelstein R, Cohen S, Lichtenstein E, Baer JS, Kamarck T. Social Support and Smoking Cessation and maintenance. *J Consult Clin Psychol* 1986;**54**:447–53	Poor methodological quality	Quantitative

Study	Reference(s)	Reason for exclusion	Design
Miller *et al.* (1998)	Miller RL, Klotz D, Eckholdt HM. HIV prevention with male prostitutes and patrons of hustler bars: replication of an HIV preventive intervention. *Am J Community Psychol* 1998;**26**:97–131	Poor methodological quality	Combined
Mishra *et al.* (1998)	Mishra SI, Chavez LR, Magana JR, Nava P, Valdez RB, Hubbell FA. Improving breast cancer control among Latinas: Evaluation of a theory-based educational program. *Health Educ Behav* 1998;**25**:653–70	Poor methodological quality	Quantitative
Mock *et al.* (2006)	Mock J, Nguyen T, Nguyen K, Bui-Tong N, McPhee S. Processes and capacity-building benefits of lay health worker outreach focused on preventing cervical cancer among Vietnamese. *Health Prev Pract* 2006;**7**:S223–32.	Not an evaluative design	Descriptive material
Mock *et al.* (2007)	Mock J, McPhee SJ, Nguyen T, Wong C, Doan H, Lai KQ. Effective lay health worker outreach and media-based education for promoting cervical cancer screening among Vietnamese American women. *Am J Public Health* 2007;**97**:1693–700	Poor methodological quality	Quantitative
Mohr *et al.* (2005)	Mohr DC, Burke H, Beckner V, Merluzzi N. A preliminary report on a skills-based telephone-administered peer support programme for patients with multiple sclerosis. *Mul Scler* 2005;**11**:222–6	Poor methodological quality	Quantitative
Moore *et al.* (1974)	Moore F, Ballinger P, Beasley J. Influence of postpartum home visits on postpartum clinic attendance. *Public Health Rep* 1974;**89**:360–4	Not solely a health related LA	Quantitative
Morisky *et al.* (2002)	Morisky DE, Lees NB, Sharif BA, Liu KY, Ward HJ. Reducing disparities in hypertension control: a community-based hypertension control project (CHIP) for an ethnically diverse population. *Health Promot Pract* 2002;**3**:264–75	Not an evaluative design	Quantitative
Muirhead *et al.* (2006)	Muirhead PE, Butcher G, Rankin J, Munley A. The effect of a programme of organised and supervised peer support on the initiation and duration of breastfeeding: a randomised trial. *Br J Gen Pract* 2006;**56**:191–7	Poor methodological quality	Quantitative
Nair *et al.* (2002)	Nair P, Schuler ME, Kettinger L, Harrington D. Cumulative environmental risk in substance abusing women: parenting stress, child abuse potential, and development. *Pediatr Res* 2002;**51**:186A	Poor methodological quality	Quantitative
Navarro *et al.* (1995)	Navarro AM, Senn KL, Kaplan RM, McNicholas L, Campo MC, Roppe B. Por La Vida intervention model for cancer prevention in Latinas. *J Nat Cancer Inst Monogr* 1995;**18**:137–45	Poor methodological quality	Quantitative
Navarro *et al.* (1998)	Navarro A, Senn K, McNicholas L, Kaplan R, Roppe B, Campo M. Por La Vida model intervention enhances use of cancer screening tests among Latinas. *Am J Prev Med* 1998;**15**:32–41	Poor methodological quality	Quantitative
Navarro *et al.* (2007)	Navarro AM, Raman R, McNicholas LJ, Loza O. Diffusion of cancer education information through a Latino community health advisor program. *Prev Med* 2007;**45**:135–8	Poor methodological quality	Quantitative
Nebelkopf *et al.* (2005)	Nebelkopf E, Penagos M. Holistic Native Network: Integrated HIV/AIDS, substance abuse, and mental health services for native Americans in San Francisco. *J Psychoactive Drugs* 2005;**37**:257–64	Poor methodological quality	Quantitative
Neittaanmaki *et al.* (1980)	Neittaanmaki L, Koskela K, Puska P, McAlister AL. The role of lay workers in community health education: experiences of the North Karelia project. *Scand J Soc Med* 1980;**8**:1–7	Poor methodological quality	Quantitative
Nielsen *et al.* (1972)	Nielsen M, Blenker M, Bloom M, Downs T, Beggs H. Older Persons after Hospitalization: A Controlled Study of Home Aide Service. *Am J Public Health* 1972;**62**:1094–101	Poor methodological quality	Quantitative
Newman *et al.* (1996)	Newman DK, Wallace J, Blackwood N, Spencer C. Promoting healthy bladder habits for seniors: the development, implementation, and results of a health promotion project, DRY EXPECTATIONS, for incontinence education in the community. *Ostomy Wound Manage* 1996;**42**:18–20	Poor methodological quality	Quantitative
Nies *et al.* (2004)	Nies MA, Artinian NT, Schim SM, Vander Wal JS, Sherrick-Escamilla S. Effects of lay health advisor interventions on activity, diet, and health risks in an urban Mexican American community. *J Prim Prev* 2004,**25**:441–55	Poor methodological quality	Quantitative

Study	Reference(s)	Reason for exclusion	Design
Norr *et al.* (2003)	Norr KF, Crittenden KS, Lehrer EL, Reyes O, Boyd CB, Nacion KW. Maternal and infant outcomes at one year for a nurse-health advocate home visiting program serving African Americans and Mexican Americans. *Public Health Nurs* 2003;**20**:190–203	Not adult health focused	Quantitative
Nyamathi *et al.* (2001)	Nyamathi A, Flakerud J, Leake B, Dixon E, Lu A. Evaluating the impact of peer, nurse case-managed, and standard HIV risk reduction programs on psychosocial and health promoting behavioral outcomes among homeless women. *Res Nurs Health* 2001;**24**:410–22	Poor methodological quality	Quantitative
Olney *et al.* (2007)	Olney CA, Warner DG, Reyna G, Wood FB, Siegel ER. MEDLINE Plus and the challenge of low health literacy: findings from the Colonias project. *J Med Libr Assoc* 2007;**95**:31–9	Poor methodological quality	Qualitative
Perez-Stable *et al.* (1996)	Perez-Stable EJ, Otero-Sabogal R, Sabogal F, Napoles-SpringerAM. Pathways to early cancer detection for Latinas: En Acción Contra el Cáncer. *Health Educ Q* 1996;**23**:S41–59	Poor methodological quality	Quantitative
Perkins and MacFarlane (2001)	Perkins ER, MacFarlane J. Family support by lay workers: a health visiting initiative. *Br J Community Nurs* 2001;**6**:26–32	Poor methodological quality	Combined
Persily (2003)	Persily CA. Lay home visiting may improve pregnancy outcomes. *Holist Nurs Pract* 2003;**17**:231–8	Not an evaluative design	Review
Plescia *et al.* (2008)	Plescia M, Herrick H, Chavis L. Improving health behaviors in an African American community: the Charlotte Racial and Ethnic Approaches to Community Health project. *Am J Public Health* 2008;**98**:1678–84	Poor methodological quality	Quantitative
Powell and McCann (1981)	Powell DR, McCann BS. The effects of a multiple treatment program and maintenance procedures on smoking cessation. *Prev Med* 1981;**10**:94–104	Poor methodological quality	Quantitative
Powell *et al.* (2005)	Powell ME, Carter V, Bonsi E, Johnson G, Williams L, Taylor-Smith L, *et al.* Increasing mammography screening among African American women in rural areas. *J Health Care Poor Underserved* 2005;**16**:11–21	Poor methodological quality	Quantitative
Quinn and McNabb (2001)	Quinn M, McNabb W. Training lay health educators to conduct a church-based weight-loss program for African American women. *Diabetes Educ* 2001;**27**:231–8	Not an evaluative design	Descriptive material
Ratima *et al.* (1999)	Ratima MM, Fox C, Fox B, Te Karu H, Gemmell T, Slater T, *et al.* Long-term benefits for Maori of an asthma self-management program in a Maori community which takes a partnership approach. *Austr N Z J Public Health* 1999;**23**:601–5	Poor methodological quality	Qualitative
Reath and Carey (2008)	Reath J, Carey M. Breast and cervical cancer in indigenous women – Overcoming barriers to early detection. *Austr Fam Physician* 2008;**37**:178–82	Not an evaluative design	Quantitative
Reijneveld *et al.* (2003)	Reijneveld SA, Westhoff MH, Hopman-Rock M. Promotion of health and physical activity improves the mental health of elderly immigrants: results of a group randomised controlled trial among Turkish immigrants in the Netherlands aged 45 and over. *J Epidemiol Community Health* 2003;**57**:405–11	Poor methodological quality	Quantitative
Rene *et al.* (1992)	Rene, J. Weinberg, M. Mazzuca, S.A. Brandt, K.D. Katz, B.P. Reduction of joint pain in patients with knee osteoarthritis who have received monthly telephone calls from lay personnnel and whose medical treatment regimens have remained stable. *Arthritis Rheum* 1992;**35**:511–15	Poor methodological quality	Quantitative
Reinschmidt *et al.* (2006)	Reinschmidt KM, Hunter JB, Fernandez ML, Lacy-Martinez CR, Guernsey de Zapien J, Meister J. Understanding the success of promotoras in increasing chronic diseases screening. *J Health Care Poor Underserved* 2006;**17**:256–64	Poor methodological quality	Qualitative
Resnicow *et al.* (2002)	Resnicow K, Jackson A, Braithwaite R, Dilorio C, Blisset D, Rahotep S, *et al.* Healthy Body/Healthy Spirit: a church-based nutrition and physical activity intervention. *Health Educ Res* 2002;**17**:562–73	Poor methodological quality	Quantitative
Rhodes *et al.* (2007)	Rhodes SD, Foley KL, Zometa CS, Bloom FR. Lay health advisor interventions among Hispanics/Latinos: a qualitative systematic review. *Am J Prev Med* 2007;**33**:418–27	Not an evaluative design	Review

Study	Reference(s)	Reason for exclusion	Design
Richert *et al.* (2007)	Richert ML, Webb AJ, Morse NA, O'Toole ML, Brownson CA. Move More Diabetes: using lay health educators to support physical activity in a community-based chronic disease self-management program. *Diabetes Educ* 2007;**33**(Suppl. 6):S179–84	Poor methodological quality	Combined
Rodney *et al.* (1998)	Rodney M, Clasen C, Goldman G, Market R, Deane D. Three evaluation methods of a community health advocate program. *J Community Health* 1998;**23**:371–81	Poor methodological quality	Quantitative
Romer *et al.* (2002)	Romer LT, Richardson ML, Nahom D, Aigbe E, Porter A. Providing family support through community guides. *Ment Retard* 2002;**40**:191–200	Poor methodological quality	Quantitative
Rose (1992)	Rose MA. Evaluation of a peer-education program on heart disease prevention with older adults. *Public Health Nurs* 1992;**9**:242–7	Poor methodological quality	Quantitative
Ross *et al.* (2006)	Ross MW, Harzke AJ, Scott DP, McCann K, Kelley M. Outcomes of Project Wall Talk: an HIV/AIDS peer education program implemented within the Texas State prison system. *AIDS Educ Prev* 2006;**18**:504–17	Poor methodological quality	Quantitative
Ross and Williams (2002)	Ross MW, Williams ML. Effective targeted and community HIV/STD prevention programs. *J Sex Res* 2002; **39**:58–62	Not an evaluative design	Review
Russell *et al.* (1976)	Russell RK, Wise F. Treatment of speech anxiety by cue-controlled relaxation and desensitization with professional and paraprofessional counselers. *J Couns Psychol* 1976;**23**:583–6	Poor methodological quality	Quantitative
Ryan *et al.* (1999)	Ryan T, Smith I, Hancock J, Dovaston G, Smith M. Applying aspects of the community reinforcement approach to alcohol and drug services. *J Subst Use* 1999,**4**:70–5	Poor methodological quality	Quantitative
Sadler *et al.* (2000)	Sadler GR, Thomas AG, Yen JY, Dhanjal SK, Ko CM, Tran HQ, *et al.* Breast cancer education program based in Asian grocery stores. *J Cancer Educ* 2000;**15**:173–7	Poor methodological quality	Quantitative
Samuel-Hodge *et al.* (2006)	Samuel-Hodge CD, Keyserling TC, France R, Ingram AF, Johnston LF, Pullen Davis L, Davis G, Cole AS. A church-based diabetes self-management education program for African Americans with type 2 diabetes. *Prev Chronic Dis* 2006;**3**:101–6	Poor methodological quality	Quantitative
Schafer *et al.* (1998)	Schafer E, Vogel MK, Viegas S, Hausafus C. Volunteer peer counselors increase breastfeeding duration among rural low-income women. *Birth* 1998;**25**:101–6	Poor methodological quality	Quantitative
Schover *et al.* (2006)	Schover LR, Jenkins R, Sui D, Adams JH, Marion MS, Jackson KE. Randomized trial of peer counseling on reproductive health in African American breast cancer survivors. *J Clin Oncol* 2006;**24**:1620–6	Poor methodological quality	Quantitative
Shannon *et al.* (1983)	Shannon BM, Smiciklas Wright H, Davis BW, Lewis C. A peer educator approach to nutrition for the elderly. *Gerontologist* 1982;**23**:123–126.	Poor methodological quality	Quantitative
Shulkin *et al.* (1991)	Shulkin JJ, Mayer JA, Wessel LG, de Moor C, Elder JP, Franzini LR. Effects of a peer-led AIDS intervention with university students. *J Am Col Health* 1991;**40**:75–9	Poor methodological quality	Quantitative
Simoni *et al.* (2007)	Simoni JM, Pantalone DW, Plummer MD, Huang B. A randomized controlled trial of a peer support intervention targeting antiretroviral medication adherence and depressive symptomatology in HIV-positive men and women. *Health Psychol* 2007;**26**:488–95	Poor methodological quality	Quantitative
Sixta and Ostwald (2008)	Sixta CS, Ostwald S. *Border intervention by Promotores for type 2 diabetes*. Texas: University of Texas School of Nursing; 2007	Poor methodological quality	Quantitative
Soloman and Flynn (2005)	Soloman LJ, Flynn BS. Telephone support for pregnant smokers who want to stop smoking. *Health Prom Pract* 2005;**6**:105–8	Poor methodological quality	Quantitative
Soloman *et al.* (2000)	Soloman LJ, Scharoun GM, Flynn BS, Secker-Walker RH, Sepinwall D. Free nicotine patches plus proactive telephone peer support to help low-income women stop smoking. *Prev Med* 2000;**31**:68–74	Poor methodological quality	Quantitative
South *et al.* (2006)	South J, Woodward J, Lowcock D, Woodall J. *An Evaluation of the Bradford District Health Trainers programme: an early adopters*. Leeds: Leeds Metropolitan University; 2006	Poor methodological quality	Combined

Study	Reference(s)	Reason for exclusion	Design
South *et al.* (2007)	South J, Woodward J, Lowcock D. New beginnings: stakeholder perspectives on the role of health trainers. *J R Soci Promot Health* 2007;**127**:224–30	Poor methodological quality	Qualitative
Spencer (1988)	Spencer B. *The family workers project: evaluation of a randomized controlled trial of a pregnancy social support service*. Proceedings of International Symposium on Advances in the Prevention of Low Birthweight. Cape Cod, MA; 1988. pp.109–21	Poor methodological quality	Quantitative
Spencer and Morris (1986)	Spencer B, Morris J. The family worker project: social support in pregnancy. Papiernik E, Breart G, Spira editors. *Prev Preterm Birth* 1986;**138**:363–82	Poor methodological quality	Quantitative
Squire *et al.* (2006)	Squire S, Hill P. The expert patients programme. *Clin Gov Int J* 2006;**11**:17–21	Not an evaluative design	Qualitative
Steen and Dallabetta. (2003)	Steen R, Dallabetta G. Sexually transmitted infection control with sex workers: regular screening and presumptive treatment augment efforts to reduce risk and vulnerability. *Reprod Health Matters* 2003;**11**:74–90	Focus on implementation strategies not on effectiveness	Qualitative
Stewart *et al.* (1998)	Stewart MJ, Doble S, Hart G, Langille L, MacPherson K. Peer visitor support for family caregivers of seniors with stroke. *Can J Nurs Res* 1998;**30**:87–117	Poor methodological quality	Qualitative
Suarez *et al.* (1993)	Suarez L, Nichols DC, Brady CA. Use of peer role models to increase Pap smear and mammogram screening in Mexican-American and black women. *Am J Prev Med* 1993;**9**:290–6	Poor methodological quality	Quantitative
Sung *et al.* (1997)	Sung JF, Blumenthal DS, Coates RJ. Effect of a cancer screening intervention conducted by lay health workers among inner-city women. *Am Jo Prev Med* 1997;**13**:51–6	Poor methodological quality	Quantitative
Swerissen *et al.* (2006)	Swerissen H, Belfrage J, Weeks A, Jordan L, Walker C, Furler J, *et al.* A randomised control trial of a self-management program for people with a chronic illness from Vietnamese, Chinese, Italian and Greek backgrounds. *Patient Educ Couns* 2006;**64**:360–8	Poor methodological quality	Quantitative
Tameside and Glossop PCT (2006)	Tameside and Glossop PCT. *Connect for life: Health and Wellbeing Evaluation Report*. Manchester: Vielife; 2006	Poor methodological quality	Quantitative
Taylor (1994)	Taylor S. *NSW prison HIV Peer Education Program: an evaluation*. New South Wales, NSW Department of Health; 1994	Poor methodological quality	Quantitative
Taylor *et al.* (2002)	Taylor VM, Jackson JC, Yasui Y, Kuniyuki A, Acorda E, Marchand A, *et al.* Evaluation of an outreach intervention to promote cervical cancer screening among Cambodian American women. *Cancer Detect Prev* 2002;**26**:320–7	Poor methodological quality	Quantitative
Tessaro *et al.* (2000)	Tessaro IA, Taylor S, Belton L, Campbell MK, Benedict S, Kelsey K, *et al.* Adapting a natural (lay) helpers model of change for worksite health promotion for women. *Health Educ Res* 2000;**15**:603–14	Poor methodological quality	Combined
Thompson *et al.* (2007)	Thompson JR, Horton C, Flores C. Advancing diabetes self management in the Mexican American population: a community health worker model in a primary care setting. *Diabetes Educ* 2007;**33**(Suppl. 6):S159–65	Poor methodological quality	Quantitative
Tobin and Dietrich (2006)	Tobin J, Dietrich A. A patient navigator approach boosts cancer screening in low-income women. *Cancer J Clin* 2006;**56**:190–2	Poor methodological quality	Quantitative
Toseland *et al.* (1979)	Toseland RW, Decker J, Bliesner J. A community outreach program for socially isolated older persons. *J Gerontol Soc Work* 1979;**1**:211–24	Poor methodological quality	Qualitative
Trickey *et al.* (2008)	Trickey R, Kelley-Gillespie N, Faley OW. A look at a community coming together to meet the needs of older adults: an evaluation of the neighbors Helping Neighbors program. *J Gerontol Soc Work* 2006;**50**:81–98	Poor methodological quality	Quantitative
Tudiver *et al.* (1992)	Tudiver F, Myers T, Kurtz RG, *et al.* The Talking Sex Project. *Eval Health Prof* 1992;**15**:26–42	Poor methodological quality	Quantitative
Two Feathers *et al.* (2005)	Two Feathers J, Kieffer EC, Palmisano G, Anderson M, Sinco B, Janz N. Racial and Ethnic Approaches to Community Health (REACH) Detroit Partnership: improving diabetes-related outcomes among African American and Latino adults. *Am J Public Health* 2005;**95**:1552–60	Poor methodological quality	Quantitative

Study	Reference(s)	Reason for exclusion	Design
Uccelli *et al.* (2004)	Uccelli MM, Mohr LM, Battaglia MA, Zagami P, Mohr DC. Peer support groups in multiple sclerosis: Current effectiveness and future directions. *Multiple Scler* 2004;**10**:80–4	Poor methodological quality	Quantitative
Ungar *et al.* (2004)	Ungar M, Manuel S, Mealey S, Thomas G, Campbell C. A study of community guides: lessons for professionals practicing with and in communities. *Soc Work* 2004;**49**:550–61	Poor methodological quality	Qualitative
Vari *et al.* (2000)	Vari PM, Camburn J, Henly SJ. Professionally mediated peer support and early breastfeeding success. *J Perinat Educ* 2000;**9**:22–30	Poor methodological quality	Quantitative
Venne *et al.* (2007)	Venne VL, Hamann HA. Successful use of peer educators for sharing genetic information. *J Genet Couns* 2007;**16**:515–25	Poor methodological quality	Quantitative
Von Korff *et al.* (1998)	Von Korff M. Moore JE. Lorig K, Cherkin DC, Saunders K, Gonzalez VM, Laurent D, Rutter C, Comite F. A randomized trial of a lay person-led self-management group intervention for back pain in primary health care. *Spine* 1998;**23**:2608–15	Poor methodological quality	Qualitative
Walls (2005)	Walls, P. *Kelso Lifestyle Adviser Service: 12 month evaluation*. Melrose: NHS Borders; 2005	Poor methodological quality	Combined
Wan *et al.* (1980)	Wan TTH, Weissert WG, Livieratos BB. geriatric day care and homemaker services: an experimental study. *J Gerontol* 1980;**35**:256–74	Poor methodological quality	Quantitative
Warrick *et al.* (1992)	Warrick LH, Wood AH, Meister JS, de Zapien JG. Evaluation of a peer health worker prenatal outreach and education program for Hispanic farmworker families. *J Community Health* 1992;**17**:13–26	Poor methodological quality	Qualitative
Wasserman *et al.* 2006	Wasserman MR, Bender DE, Lee S, Morrissey JP, Mouw T, Norton EC. Social support among Latina immigrant women: bridge persons as mediators in cervical cancer screening. *J Immigr Minor Health* 2006;**8**:67–84	Poor methodological quality	Combined
Weinberger *et al.* (1989)	Weinberger M, Tierney WM, Booher P, Katz BK. Can the Provision of Information to Patients with Osteoarthritis Improve Functional Status? A Randomised Controlled Trial. *Arthritis Rheum* 1989;**32**:1577–83	Poor methodological quality	Quantitative
Weinberger *et al.* (1991)	Weinberger M, Tierney WM, Booher P, Katz BP. The impact of increased contact on psychosocial outcomes in patients with osteoarthritis: a randomized controlled trial. *J Rheum* 1991;**18**:849–54	Poor methodological quality	Quantitative
Weinrich *et al.* 1998	Weinrich SP, Boyd MD, Weinrich M, Green F, Reynolds WA, Metlin C. Increasing prostate cancer screening in African American men with peer-educator and client-navigator interventions. *J Cancer Educ* 1998;**13**:213–19	Poor methodological quality	Quantitative
Welsh *et al.* (2005)	Welsh AL, Sauaia A, Jacobellis J. Min SJ, Byers T. The effect of two church-based interventions on breast cancer screening rates among Medicaid-insured Latinas. *Prev Chronic Dis* 2005;**2**:1–11	Poor methodological quality	Quantitative
Wertz *et al.* (1986)	Wertz R, Weiss DG. Aten JL, Brookshire RH, Garcia-Bunuel L, Holland AL, *et al.* Comparison of Clinic, Home, and Deferred Language Treatment for Aphasia. *Arch Neurol* 1986;**43**:653–8	Poor methodological quality	Quantitative
Whitehorse *et al.* (1999)	Whitehorse LE, Manzano R, Baezconde-Garbanati LA, Hahn G. Culturally tailoring a physical activity program for Hispanic women: recruitment success of La Vida Buena's salsa aerobics. *J Health Educ* 1999;**30**:S18–24	Poor methodological quality	Qualitative
Whitley *et al.* (2006)	Whitley EM, Everhart RM, Wright RA. Measuring Return on Investment of Outreach by Community Health Workers. *J Health Care Poor Underserved* 2006;**17**:6–15	Not an evaluative design	Quantitative
Williams *et al.* (2001)	Williams JH, Belle GA, Houston C, Haire-Joshu D, Auslander WF. Process evaluation methods of a peer-delivered health promotion program for African American women. *Health Promot Pract* 2001;**2**:135–42	Poor methodological quality	Quantitative
Williams (1996)	Williams MP. Increasing participation in health promotion among older African-Americans. *Am J Health Behav* 1996;**20**:389–99	Poor methodological quality	Qualitative
Williamson *et al.* (2001)	Williamson LM, Hart GJ, Flowers P, Frankis JS, Der GJ. The Gay Men's Task Force: the impact of peer education on the sexual health behaviour of homosexual men in Glasgow. *Sex Transmi Infect* 2001;**77**:427–32	Poor methodological quality	Quantitative

Study	Reference(s)	Reason for exclusion	Design
Wolitski (1999)	Wolitski RJ. Community-level HIV intervention in 5 cities: Final outcome data from the CDC AIDS community demonstration projects. *Am J Public Health* 1999;**89**:336–345.	Poor methodological quality	Quantitative
Wolitski *et al.* (2005)	Wolitski RJ, Gómez CA, Parsons JT, and the SUMIT Study Group. Effects of a peer-led behavioral intervention to reduce HIV transmission and promote serostatus disclosure among HIV-seropositive gay and bisexual men. *AIDS* 2005;**19**(Suppl. 1):S99–109	Poor methodological quality	Quantitative
Young *et al.* (1996)	Young DR, Haskell WL, Taylor CB, Fortmann SP. Effect of community health education on physical activity knowledge, attitudes, and behavior: The Stanford Five-City Project. *Am J Epidemiol* 1996;**144**:264–74	Poor methodological quality	Quantitative
Zhu *et al.* (2002)	Zhu K, Hunter S, Bernard L, Payne-Wilks K, Roland C, Elam L, *et al.* An intervention study on screening for breast cancer among single African American women aged 65 and older. *Prev Med* 2002;**34**:536–45.	Poor methodological quality	Quantitative
Ziersch *et al.* (2000)	Ziersch A, Gaffney J, Tomlinson DR. STI prevention and the male sex industry in London: Evaluating a pilot peer education programme. *Sexually Transm Infect* 2000;**76**:447–53	Poor methodological quality	Quantitative
Zuvekas *et al.* (1999)	Zuvekas A, Nolan L, Tumaylle C, Griffin L. Impact of community health workers on access, use of services, and patient knowledge and behaviour. *J Ambul Care Manage* 1999;**22**:33–44	Not an evaluative design	Qualitative

Appendix 11

Intervention intensity rating

Study	Population level targeted (general population, groups, family, individual)	Nature of the contacts (groups session, telephone, face to face)	Other intervention components	No. of sessions	Duration/session	Intervention duration	Intensity score (minutes/ week + other scores)
Anand 2007[80]	Family – **3**	Home visits – **3**	Provision of water cooler, recipes; food preparations classes; grocery store tours; activity programme for children – **1**	Regular visits	?	6 months	Medium
Andersen 2000[42,81,82]	Individual and community – **4**	Telephone calls and group sessions – **2**	CA, such as video showings or mammography-themed bingo nights – **1**	One telephone call (frequency of the message varied for the CA)	?	3 years	Low (though women in the IC arm were telephoned once in 3 years, some in the CA arm may have had more exposure)
Barlow 2000[83]	Groups of people with chronic conditions – **2**	Group sessions – **1**	Handbook – **1**	Six weekly sessions	Two hours	6 weeks	124
Bird 1998[84–87]	General population – **1**	Small group sessions – **1**	Distribution of health education materials and promotional events (health fairs) – **1**	232	10–15 minutes plus discussion (25 minutes)	30 months	Not all participants got intervention exposure – low
Griffiths 1998[101,102]	Groups of people with chronic conditions – **2**	Small group sessions – **1**	Video cassette – **1**	Six	Three hours	6 weeks	184
Emmons 2005[27,97]	Individual – **4**	Telephone calls – **2**	NRT made available; tailored written materials – **1**	Up to six	?	7 months	11
Dennis 2002[88]	Individual – **4**	Telephone calls – **2**	Referrals to other professionals – **1**	Five or more	Mean 16.2 minutes	3 months	14
*Dickson-Gomez 2003[89,90]	Individual – **4**	Small group sessions – **1**	**0**	10	90 minutes	6 months	43
Earp 2002[16,63,93,94]	Individual and Community – **4**	Face to face and presentations to local community groups – **3**	Brochures, posters, holiday cards promoting mammography – **1**	Two face to face per week and two presentations per month/health advisor	?	32 months	Not all participants got intervention exposure – low
Elder 2006[95,96]	Individual – **4**	Face to face or telephone – **3**	Twelve tailored newsletters – **1**	14	?	14 weeks	33

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Study	Population level targeted (general population, groups, family, individual)	Nature of the contacts (groups session, telephone, face to face)	Other intervention components	No. of sessions	Duration/session	Intervention duration	Intensity score (minutes/ week + other scores)
Gary 2003[98–100]	Individual – **4**	Face to face or telephone – **3**	**0**	Aimed for six visits (but fell short of that)	45–60 minutes	24 months	10
Ireys 2001[103]	Individual – **4**	Face to face and telephone – **3**	Bowling parties or small group lunches – **1**	Seven visits, two weekly telephone calls and three community events	60–90 minutes face to face and at least five-minute telephone calls	15 months	22
Kennedy 2002[104–107]	Group of people with chronic conditions – **2**	Group sessions – **1**	0	Six	2 hours 30 minutes	6 weeks	153
Keyserling 2002[108,109]	Individual – **4**	Telephone calls – **2**	0	12 telephone calls	20 minutes	12 months	12
Lujan 2007[110]	Groups of people with diabetes – **2**	Group sessions + telephone follow-up – **2**	Inspirational faith-based postcards mailed twice a week for 16 weeks – **1**	8 + 16 telephone calls	2 hours/group session	8 weeks	125
Lorig 1999[110]	Groups of people with chronic conditions – **2**	Group sessions – **1**	A textbook detailing the content of the course – **1**	Seven weekly sessions	2.5 hours/group session	7 weeks	154
Lorig 2003[111]	Groups of people with chronic conditions – **2**	Group sessions – **1**	A book, an audio exercise tape, an illustrated booklet and an audio relaxation tape – **1**	Six weekly sessions	2.5 hours/ group session	6 weeks	154
May 2006[113]	Individual – **4**	Telephone calls – **2**	NRT or Zyban was provided to four of the buddy groups; smoking cessation group – **1**	1.4 times (on average)	?	4 weeks	
Morrow 1999[114,115]	Individual – **4**	Face to face – **3**	Additional support on demand – **1**	Six	?	8 weeks	31
Paskett 2006[116,117]	Individual – **4**	Face to face – **3**	Educational material follow-up telephone calls and mailing after each visit – **1**	Three	45 minutes	9–12 months	11
Resnicow 2004[118]	Group and individual – **4**	Telephone calls – **2**	Self-help materials – **1**	Two	?	6 months	Nine

Study	Population level targeted (general population, groups, family, individual)	Nature of the contacts (groups session, telephone, face to face)	Other intervention components	No. of sessions	Duration/session	Intervention duration	Intensity score (minutes/ week + other scores)
Staten 2004[119]	Individual – **4**	Telephone calls – **2**	Two HE classes + 12 newsletters + reminder telephone calls to women who had missed a session –1	24 (average)	?	12 months	17
West 1998[30]	Individual – **4**	Telephone calls – **2**	One-to-one smoking cessation intervention – **1**	1.5 times (on average)	?	4 weeks	14
Woodruff 2002[120]	Individual – **4**	Home visits and telephone calls – **3**	Video, booklet, 'quit kit' – **1**	Four face-to-face, three telephone calls	1–2 hours face to face, 15–30 minutes' telephone call	3 months	43
Young 2005[121–123]	Individual – **4**	Telephone calls – **3**	**0**	Tailored four to 12 (eight average)	20 minutes	12 months	10

HE, health education.

a Studies in which the population for which results reported focus on the LAs themselves.

Population targeted: general population – rating 1; small groups of people – 2; family – 3; and individual – 4. The intervention was considered as targeting the individual as long as one intervention component was doing so.

Nature of sessions: face to face – 3; telephone calls – 2; small groups – 1; general population – 0.

If the intervention comprised several components, either the component most used was rated, or the one associated with the greatest intensity was considered for calculations.

When the number of sessions varied between participants, numbers were averaged for calculations – the same thing applies to session duration.

Home visits were estimated to last 30 minutes on average.

Telephone calls were estimated to last 20 minutes on average.

Overall ratings were rounded to the nearest decimal.

Scores below 15 are considered as a low-intervention intensity; 16–69, medium-intervention intensity and > 70 high-intervention intensity.

For all dimensions, studies were rated according to the intervention component that would bring the highest rating, i.e. if a study described two intervention arms, one being face to face and the other involving small groups, only the face to face components would be taken into account in this rating.

Anand *et al.*[80] in which there was no description of number or duration of sessons, was rated as medium intensity intervention. For studies such as Bird *et al.*,[84,87] Earp *et al.*,[63,93] Earp and Flax,[16] Flax and Ear,[94] and McPhee *et al.*[85,86] in which the general population was targeted, and in which not all surveyed participants were exposed to the intervention were rated as having a low intervention level.

In Elder *et al.*,[95,96] the intervention was delivered by a mixture of face to face and telephone contacts – the average contact duration was estimated at 25 minutes.

In Anderson *et al.*,[42,81,82] women in the individual counseling arm were telephoned once, but there is a lack of details about the intensity and duration of intervention in the community activity arm. Pre and post interviews took place 3 years apart.

In Batts *et al.*,[99] Gary[98] and Gary *et al.*[100] the authors expected that participants would complete six intervention visits before the 24 months follow-up, but the participation fell short of that because of insufficient staff support and participants non compliance. Home visits were an average of 45–60 minutes, but some of the contacts were by telephone. The overall intervention intensity has therefore been overestimated in our calculations, but it still places the study in a low intensity category.

Appendix 12

Studies success rating

Study	Intervention focus	QoL/ health status	Study's primary outcome	Effect size/ context	Training intensity	Intervention intensity	Costs	Population accessibility	Rating
Barlow 2000[83]	CC	Health – NS **1**	Arthritis self-efficacy – sig **2**		Not described: **0**	High: **1**	Not measured – **0**	Easy – **0**	Medium (4)
Griffiths 2005[101,102]		QoL – NS **0**	Self-efficacy – sig **2**	After 4 months' self-efficacy change did not impact on health/ QoL: **1**	Intensive: **1**	High: **1**	£123/person (cost per change unknown) – **0**	Easy – **0**	Low (3)
Kennedy 2007[104–107]		QoL – NS, health – NS **0**	Self-efficacy – sig **2**	After 6 months' self-efficacy change did not impact on health/ QoL: **1**	Intensive: **1**	High: **1**	£250/person (cost per change unknown) – **0**	Easy – **0**	Low (3)
Gary 2003[98–100]		Not measured – **0**	HbA_{1c} – NS **0**		Not described: **0**	Low: **3**	Not measured – **0**	Easy – **0**	Low (3)
Young 2005[121–123]		Not measured – **0**	HbA_{1c} – sig **2**	Limited relevance of size of effect: **1**	Intensive: **1**	Low: **3**	Not measured – **0**	Easy – **0**	Medium (5)
Lujan 2007[112]		Not measured – **0**	HbA_{1c} – sig **2**	Limited relevance of size of effect: **1**	Intensive: **1**	High: **1**	Not measured – **0**	Easy – **0**	Low (3)
Lorig 1999[110]		Health – sig **2**	Health behaviours and health care use – sig **2**		Intensive: **1**	High: **1**	US$70 per participant/ 6 months (cost per change unknown) – **0**	Easy – **0**	Medium (6)
Lorig 2003[111]		Health – sig **2**	Health behaviour, health-care use and self-efficacy – sig **2**	Changes in health status maintained at 1 year: **1**	Intensive: **1**	High: **1**	Not measured – **0**	Easy – **0**	High (7)

Study	Intervention focus	QoL/ health status	Study's primary outcome	Effect size/ context	Training intensity	Intervention intensity	Costs	Population accessibility	Rating
Dennis 2002[88]	BF	Not measured – **0**	BF rates – sig **2**	BF rates included mixed or comfort feeding? Overestimation: **1**	Moderate – **2**	Low – **3**	Not measured – **0**	Easy – **0**	Medium (6)
Morrow 1999[114,115]		Not measured – **0**	BF rates – sig **2**	Calculated on exclusive breastfeeding only; reduction of childhood diarrhoea rates: **1**	Intensive **1**	Medium – **2**	Not measured – **0**	Easy – **0**	Medium (6)
Earp 2002[63,93,96]	Screening	Not measured – **0**	Screening rates – sig **2**	Relevant effect size: **1**	Moderate – **2**	Low – **3**	*'COSTLY'*[a] **– 2**	Medium – **1**	High (7)
Paskett 2006[116,117]		Not measured – **0**	Screening rates – sig **2**	Relevant effect size: **1**	Intensive – **1**	Low – **3**	US$4986/extra mammogram – **2**	Medium – **1**	Medium (6)
Bird 1998[84–87]		Not measured – **0**	Screening rates – sig **2**	Relevant effect size: **1**	Moderate – **2**	Low – **3**	Not measured – **0**	Medium – **1**	High (9)
Andersen 2000[42,81,82]		Not measured – **0**	Low users screening rates – NS **0**	Effect more relevant on prior mammography users: **1**	Not described – **0**	Low – **3**	Not measured – **0**	Easy – **0**	Medium (4)
Woodruff 2002[120]	Smoking	Not measured – **0**	Smoking cessation rates – sig **2**	Relevant effect size: **1**	Intensive – **1**	Medium – **2**	Not measured – **0**	Easy – **0**	Medium (6)
West 1998[30]		Not measured – **0**	Cessation rates – sig **2**	Relevant effect size: **1**	No training – **4**	Low – **3**	Not measured – **0**	Easy – **0**	High (10)
May 2006[113]		Not measured – **0**	Cessation rates – NS **0**	No significant changes, even at week: **1**	No training – **4**	Low – **3**	Not measured – **0**	Easy – **0**	Medium (6)
Emmons 2005[26,97]		Not measured – **0**	Cessation rates – sig **2**	Relevant effect size: **1**	Not described – **0**	Low – **3**	US$298/person – US$5317 per additional quit –**2**	Easy – **0**	Medium (4)

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Study	Intervention focus	QoL/ health status	Study's primary outcome	Effect size/ context	Training intensity	Intervention intensity	Costs	Population accessibility	Rating
Keyserling 2002[108,109]	Diet and PA	Not measured – **0**	PA sig – kcal NS – **2**	Limited relevance of size of effect – **1**	Intensive – **1**	Low – **3**	Not measured – **0**	Easy – **0**	Medium (5)
Anand 2007[80]		Not measured – **0**	PA – NS, kcal NS; F&V – NS – **0**		Moderate – **2**	Medium – **2**	Not measured – **0**	Medium – **1**	Medium (5)
Staten 2004[119]		Not measured – **0**	PA – NS; F&V – NS – **0**		No training – **4**	Medium – **2**	Not measured – **0**	Medium – **1**	High (7)
Resnicow 2004[118]		Not measured – **0**	F&V – sig **2**	Relevant effect size: **1**	Moderate – **2**	Low – **3**	Not measured – **0**	Medium – **1**	High (9)
Elder 2006[95,96]		Not measured – **0**	kcal – sig **2**	At 12 months, the effect of the *promotores* dissipated – **1**	Not described – **0**	Medium – **2**	US$135/participant US$0.36 per reduced calorie: **1**	Medium – **1**	Medium (5)
Dickson-Gomez 2003[89,90]	HIV infection prevention	Not measured – **0**	Injection risk behaviour – sig **2**	Good penetration into a hard-to-reach population: **1**	Intensive – **1**	Medium – **2**	Not measured – **0**	High – **2**	High (8)
Dickson-Gomez 2006[91,92]		N/A (qualitative study)	N/A (qualitative study)	Good penetration into a hard to reach population: **1**	Intensive – **1**	N/A	Not measured – **0**	High – **2**	Medium (4)
Ireys 2001[103]	Mental health	Not measured – **0**	Anxiety – sig **2**, depression – NS – **0**	Intervention not effective on one of the two primary outcomes – **1**	Intensive – **1**	Medium – **2**	Not measured – **0**	Easy – **0**	Medium (4)

BF, breastfeeding; CC, chronic conditions; F&V, fruit and vegetables; N/A, not available; NS, not significant; PA, physical activity; sig, significant.
a Costing details not reported, but the author qualify their intervention as 'costly'.
QoL/health status – not measured 0; one or both measured but not significant 1; 1 or both measured and significant 2
Study primary outcome: significant = 2; not significant = 0
Effect size/context: limited relevance of effect size = –1; relevant effect size = 1; study primary outcome; supportive evidence 1 study primary outcome; non supportive evidence = –1
Training intensity: professional 0; high intensity = 1; moderate = 2; low = 3; no training = 4
Intervention intensity: intensive = 0; medium = 1; low = 3
Cost: not measured or unknown cost per change = 0; low cost per change = 1; over $4000 per change = –2
Population accessibility: easy: well known/already accessing or easily accessible population group = 0; medium: population generally disengaged with health care services = 1; high: population avoiding engagement with health care services = 2.
Overall rating: 0–3 low/limited success rating; 4–6 moderate success rating; >6 high success rating

Appendix 13

Use of ICERs in the analysis of cost-effectiveness

The analysis of cost-effectiveness considers the marginal benefit and marginal cost of the programme under consideration in comparison with appropriate alternatives. Where data are available, the unit of effectiveness considered is the QALY,[377] a measure that captures the impact of the intervention on both longevity and HRQoL. The use of a consistent unit for each analysis facilitates comparisons across interventions. Calculation of ICERs is undertaken according to the principles outlined by Karlsson and Johannesson.[378] Alternative programmes are ranked according to cost. Any programme that is less effective and more expensive than an alternative programme is considered to be *dominated*. Clearly, it is inferior to the alternative. Any programme that produces a smaller effect than some combination of two other programmes is considered to be *extendedly dominated*. It would be better to implement the partial combination of the two alternatives than to implement this programme. We exclude all dominated and extendedly dominated programmes and rank the remaining programmes according to cost. The marginal cost (effectiveness) of each programme is calculated by subtracting, from the costs (effects) of the programme, the costs (effects) of the next lower ranking programme. The cheapest and least effective programme forms the baseline comparison. The ICER for the next most expensive programme is calculated by dividing the marginal cost by the marginal effectiveness. An ICER can be calculated for each of the remaining programmes.

The ICER provides a measure of the additional cost of gaining each additional unit of effectiveness delivered by that programme, over and above the next best alternative. Presentation of ICERs in this manner helps to guide decision-making. If the maximum threshold or maximum willingness to pay for a unit of effectiveness is established then the programme that should be implemented is the most effective programme with an ICER below that threshold. ICERs below the threshold indicate programmes with additional health gains that justify the additional cost; ICERs above the threshold indicate programmes whose additional health gains do not justify the additional resources required to implement them. Decision-making by NICE is not based on an arbitrary threshold, but interventions with an ICER > £25,000–35,000 per QALY require exceptional justifications to be considered good value for money.[379]

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We look forward to hearing from you.

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