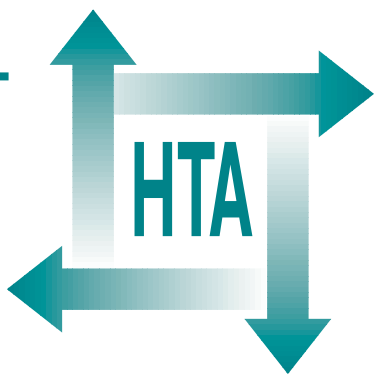
Health Technology Assessment 1999; Vol. 3: No. 22

Review

Health promoting schools and health promotion in schools: two systematic reviews

D Lister-Sharp
S Chapman
S Stewart-Brown
A Sowden

Health Technology Assessment
NHS R&D HTA Programme



Standing Group on Health Technology

Current members

Chair:
Professor Kent Woods
Professor of Therapeutics,
University of Leicester

Professor Martin Buxton
Director & Professor of
Health Economics,
Health Economics
Research Group,
Brunel University

Professor Shah Ebrahim
Professor of Epidemiology
of Ageing, University of Bristol

Professor Francis H Creed
Professor of
Psychological Medicine,
Manchester Royal Infirmary

Professor John Gabbay
Director, Wessex Institute
for Health Research
& Development

Professor Sir John
Grimley Evans
Professor of Clinical Geratology,
Radcliffe Infirmary,
Oxford

Dr Tony Hope
Clinical Reader in Medicine,
Nuffield Department of
Clinical Medicine,
University of Oxford

Professor Richard Lilford
Regional Director of R&D,
NHS Executive West Midlands

Dr Jeremy Metters
Deputy Chief Medical Officer,
Department of Health

Professor Maggie Pearson
Regional Director of R&D,
NHS Executive North West

Mr Hugh Ross
Chief Executive,
The United Bristol
Healthcare NHS Trust

Professor Trevor Sheldon
Joint Director, York Health
Policy Group, University of York

Professor Mike Smith
Faculty Dean of Research
for Medicine, Dentistry,
Psychology & Health,
University of Leeds

Dr John Tripp
Senior Lecturer in Child Health,
Royal Devon and Exeter
Healthcare NHS Trust

Professor Tom Walley
Director,
Prescribing Research Group,
University of Liverpool

Dr Julie Woodin
Chief Executive,
Nottingham Health Authority

Past members

Professor Sir Miles Irving*
Professor of Surgery,
University of Manchester,
Hope Hospital, Salford

Dr Sheila Adam
Department of Health

Professor Angela Coulter
Director, King's Fund,
London

Professor Anthony Culyer
Deputy Vice-Chancellor,
University of York

Dr Peter Doyle
Executive Director, Zeneca Ltd,
ACOST Committee on Medical
Research & Health

Professor John Farndon
Professor of Surgery,
University of Bristol

Professor Charles Florey
Department of Epidemiology
& Public Health, Ninewells
Hospital & Medical School,
University of Dundee

Professor Howard
Glennester
Professor of Social Science
& Administration, London
School of Economics &
Political Science

Mr John H James
Chief Executive,
Kensington, Chelsea &
Westminster Health Authority

Professor Michael Maisey
Professor of
Radiological Sciences,
Guy's, King's & St Thomas's
School of Medicine & Dentistry,
London

Mrs Gloria Oates
Chief Executive,
Oldham NHS Trust

Dr George Poste
Chief Science & Technology
Officer, SmithKline Beecham

Professor Michael Rawlins
Wolfson Unit of
Clinical Pharmacology,
University of Newcastle-
upon-Tyne

Professor Martin Roland
Professor of General Practice,
University of Manchester

Professor Ian Russell
Department of Health Sciences
& Clinical Evaluation,
University of York

Dr Charles Swan
Consultant Gastroenterologist,
North Staffordshire
Royal Infirmary

* Previous Chair

Details of the membership of the HTA panels, the NCCHTA Advisory Group and the HTA Commissioning Board are given at the end of this report.

How to obtain copies of this and other HTA Programme reports.
An electronic version of this publication, in Adobe Acrobat format, is available for downloading free of charge for personal use from the HTA website (http://www.hta.ac.uk). A fully searchable CD-ROM is also available (see below).

Printed copies of HTA monographs cost £20 each (post and packing free in the UK) to both public **and** private sector purchasers from our Despatch Agents.

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

You can order HTA monographs from our Despatch Agents:

– fax (with **credit card** or **official purchase order**)
– post (with **credit card** or **official purchase order** or **cheque**)
– phone during office hours (**credit card** only).

Additionally the HTA website allows you **either** to pay securely by credit card **or** to print out your order and then post or fax it.

Contact details are as follows:

HTA Despatch
c/o Direct Mail Works Ltd
4 Oakwood Business Centre
Downley, HAVANT PO9 2NP, UK

Email: orders@hta.ac.uk
Tel: 02392 492 000
Fax: 02392 478 555
Fax from outside the UK: +44 2392 478 555

NHS libraries can subscribe free of charge. Public libraries can subscribe at a very reduced cost of £100 for each volume (normally comprising 30–40 titles). The commercial subscription rate is £300 per volume. Please see our website for details. Subscriptions can only be purchased for the current or forthcoming volume.

Payment methods

Paying by cheque
If you pay by cheque, the cheque must be in **pounds sterling**, made payable to *Direct Mail Works Ltd* and drawn on a bank with a UK address.

Paying by credit card
The following cards are accepted by phone, fax, post or via the website ordering pages: Delta, Eurocard, Mastercard, Solo, Switch and Visa. We advise against sending credit card details in a plain email.

Paying by official purchase order
You can post or fax these, but they must be from public bodies (i.e. NHS or universities) within the UK. We cannot at present accept purchase orders from commercial companies or from outside the UK.

How do I get a copy of *HTA on CD*?

Please use the form on the HTA website (www.hta.ac.uk/htacd.htm). Or contact Direct Mail Works (see contact details above) by email, post, fax or phone. *HTA on CD* is currently free of charge worldwide.

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

Health promoting schools and health promotion in schools: two systematic reviews

D Lister-Sharp[1]
S Chapman[2]
S Stewart-Brown[2*]
A Sowden[1]

[1] NHS Centre for Reviews and Dissemination, University of York, UK
[2] Health Service Research Unit, Department of Public Health, University of Oxford, UK

* Corresponding author

Competing interests: none declared

Published December 1999

This report should be referenced as follows:

Lister-Sharp D, Chapman S, Stewart-Brown S, Sowden A. Health promoting schools and health promotion in schools: two systematic reviews. *Health Technol Assess* 1999;**3**(22).

Health Technology Assessment is indexed in *Index Medicus*/MEDLINE and *Excerpta Medica*/EMBASE. Copies of the Executive Summaries are available from the NCCHTA web site (see overleaf).

NHS R&D HTA Programme

The overall aim of the NHS R&D Health Technology Assessment (HTA) programme is to ensure that high-quality research information on the costs, effectiveness and broader impact of health technologies is produced in the most efficient way for those who use, manage and work in the NHS. Research is undertaken in those areas where the evidence will lead to the greatest benefits to patients, either through improved patient outcomes or the most efficient use of NHS resources.

The Standing Group on Health Technology advises on national priorities for health technology assessment. Six advisory panels assist the Standing Group in identifying and prioritising projects. These priorities are then considered by the HTA Commissioning Board supported by the National Coordinating Centre for HTA (NCCHTA).

This report is one of a series covering acute care, diagnostics and imaging, methodology, pharmaceuticals, population screening, and primary and community care. It was identified as a priority by the Primary and Community Care Panel and funded as project number 95/37/01.

The views expressed in this publication are those of the authors and not necessarily those of the Standing Group, the Commissioning Board, the Panel members or the Department of Health. The editors wish to emphasise that funding and publication of this research by the NHS should not be taken as implicit support for the recommendations for policy contained herein. In particular, policy options in the area of screening will be considered by the National Screening Committee. This Committee, chaired by the Chief Medical Officer, will take into account the views expressed here, further available evidence and other relevant considerations.

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

Series Editors: Andrew Stevens, Ruairidh Milne and Ken Stein
Monograph Editorial Manager: Melanie Corris

The editors have tried to ensure the accuracy of this report but cannot accept responsibility for any errors or omissions. They would like to thank the referees for their constructive comments on the draft document.

ISSN 1366-5278

Published by Core Research, Alton, on behalf of the NCCHTA.
Printed on acid-free paper in the UK by The Basingstoke Press, Basingstoke.

Copies of this report can be obtained from:

The National Coordinating Centre for Health Technology Assessment,
Mailpoint 728, Boldrewood,
University of Southampton,
Southampton, SO16 7PX, UK.
Fax: +44 (0) 23 8059 5639 Email: hta@soton.ac.uk
http://www.hta.nhsweb.nhs.uk

Contents

List of abbreviations

AAPT C	AAPT combined
AAPT NE	AAPT normative education
ANCOVA	analysis of covariance
ANOVA	analysis of variance
BA	before-and-after*
CI	confidence interval
cl	class*
CT	controlled trial*
HDL	high-density lipoprotein
HEA	Health Education Authority
HPO	health promotion officer
LEA	London Education Authority
NSW	New South Wales
OR	odds ratio
p	person*
PE	physical education
Qns	Queensland
RCT	randomised controlled trial
sch	school(s)*
WA	Western Australia

* Used only in tables

Executive summary

Objectives

The objectives of this study were to:

- evaluate the effectiveness of school-based health promotion interventions through:
  - a systematic review of primary studies of the effectiveness of the health promoting schools approach
  - a systematic review of existing reviews of the effectiveness of other health promoting interventions in schools in the following areas: nutrition, exercise, safety, psychological aspects of health, sexual health, substance use, personal hygiene, environmental issues and family life education
- indicate areas where further research is needed
- make recommendations for practice in the UK, if research findings permit.

Methods

Study selection

To be included in the review of the effectiveness of the health promoting schools approach, studies had to:

- be controlled studies or before-and-after studies evaluating school-based interventions involving health promoting activity in each of three areas: (i) the school ethos and/or environment, (ii) the curriculum, and (iii) the family and/or community; and demonstrate active participation by the school
- provide information about the components and delivery of the intervention
- report all evaluated outcomes.

To be included in the review of existing reviews of health promotion in schools, reviews of effectiveness of health promotion interventions in schools had to:

- provide evidence of a systematic search
- assess the quality of the research
- include some studies with a comparison group or some before-and-after studies
- report study details such as number of participants, give some details of the content of the interventions evaluated and include primary preventive interventions using a population approach.

Data sources

The following electronic databases were searched: ASSIA, BIDS, British Education Index, CINAHL, DHSS Data, Dissertation Abstracts, EMBASE, ERIC, MEDLINE, PsycINFO, PsycLIT, SIGLE, Sociofile. Reference lists were checked to identify other relevant studies, relevant web pages were scanned, and requests for unpublished data were made to people working in the field.

Data extraction

Data were extracted by one reviewer, using a pro forma, and checked by a second reviewer. The methodological quality of both primary studies and reviews were assessed and commented upon.

Data synthesis

A quantitative synthesis was judged impractical due to the multiplicity of outcomes and incomplete reporting of all the components of the interventions. A qualitative synthesis is presented.

Results

Review of primary studies of the health promoting schools approach

The search identified 1067 titles and abstracts relevant to health promoting schools. Of these, 111 appeared to be either useful background material or evaluations of interventions and were obtained. Twelve studies met the inclusion criteria.

Available evidence of effectiveness

Few studies were available for this review, and only two of these were adequately powered randomised controlled trials. None of the schools involved in the studies had implemented all the components of the health promoting schools approach. The evidence available to support the health promoting schools approach was limited but promising. The approach can be shown to impact on the social and physical environment of the school in terms of staff development, school lunch provision, exercise programmes and social atmosphere. Although failing to demonstrate effectiveness in all studies,

the approach was successful in some in improving aspects of health-related behaviour such as dietary intake and aspects of health such as fitness. There is some evidence that this approach is able to impact positively on aspects of mental and social well-being such as self-esteem and bullying, which have previously proved difficult to influence.

Costs

Insufficient information was given to be able to comment on relative costs, but in the UK study of health promoting schools a small financial investment in schools was considered important for success.

Theoretical bases of effective interventions

Although the interventions tested in these studies clearly drew implicitly on a number of health promotion theories, the theory base was explicitly stated for only two interventions.

Review of reviews of health promotion in schools

Over 200 reviews of the effectiveness of school health promotion were identified. Of these, 32 met the inclusion criteria.

Available evidence of effectiveness

Systematic reviews of effectiveness are available in the following areas: nutrition and exercise, safety, psychological aspects of health, sexual health, substance use and personal hygiene. Most of the studies included in the reviews originated from outside the UK; mostly from North America. Reviews varied in their methodological quality.

Almost all the interventions, for which this outcome was reported, demonstrated improved health knowledge, which is an important pre-requisite for future health. The impact of interventions on attitudes, health-related behaviour and health was much less reliable. Some effective or partially effective interventions have been identified in most areas, but many were ineffective, and a few were shown to have adverse effects. Interventions to promote healthy eating and fitness, prevent injuries and abuse, and promote mental health were the most likely to be effective and those to prevent substance misuse, promote safe sex and oral hygiene the least effective.

Effectiveness of different approaches

Most interventions have used classroom (curriculum) approaches only. Some interventions combined a classroom approach with changes to the school ethos and environment or with family and community involvement. Although the environmental approaches varied in the different areas of health need, interventions which included these approaches were more likely to be effective than those which did not. Interventions involving families varied in intensity and approach and in many reviews were inadequately described, but overall interventions incorporating this approach were more likely to be successful than those that did not.

Effective components of classroom approaches

Assessment of the effectiveness of different components was limited by inadequate reporting of intervention content. Against a background of relative ineffectiveness there is evidence that substance use programmes incorporating normative education and resistance skills were more likely to be effective than those which did not. Programmes involving peers were most common in substance misuse reviews. They varied in approach and intensity, and in some studies were inadequately described. Substance misuse interventions incorporating this approach were, however, more likely to be effective than those which did not. There was evidence that stress management and life skills training had a positive impact in interventions addressing psychological aspects of health.

Theoretical bases of effective interventions

Reviews often failed to report explicitly the theoretical basis of interventions. From the very limited evidence available there are indications that programmes based on social learning theory and social influences are the most effective.

Conclusions

The health promoting schools approach

The health promoting schools initiative is a new, complex, developing initiative, and the optimum method of evaluation is currently under debate. There are indications that this approach is promising. The development of programmes to promote mental and social well-being would be likely to improve overall effectiveness and the impact of staff health and well-being needs more consideration. The development of measures of mental and social well-being is important for future evaluation. Continued investment, and ongoing evaluation are necessary to provide evidence about the effectiveness of this approach.

Health promotion in schools

This review of reviews has shown that school health promotion initiatives can have a positive impact on children's health and behaviour but do not do so

consistently. It would appear that most interventions are able to increase children's knowledge but that changing other factors which influence health, such as attitudes and behaviour, is much harder to achieve, even in the short-term. Overall, a multifaceted approach is likely to be most effective, combining a classroom programme with changes to the school ethos and/or environment and/or with family/community involvement. This is consistent with the health promoting schools approach.

Implications and recommendations

Implications for practice in the UK

Evidence would support:

- Continuing experimentation with the health promoting school initiative taking into account the potential importance of the health and well-being of school staff. Ensuring that experimentation is accompanied by evaluation.
- Where schools are still providing meals and commercial considerations permit, improving the content of school meals and promoting healthy options.
- Encouraging and supporting physical activity in schools, but not on a compulsory basis.
- Experimenting with school-based clinics providing advice on contraception and safe sex, and coordinating with sex education in the classroom.
- Experimenting with involving parents in school health promotion initiatives.
- Experimenting with programmes which make use of peers.
- Establishing school injury prevention programmes particularly those covering cycle helmets.
- Encouraging debate and developing consensus on the mental and social goals of health promoting schools.
- Developing methods to improve mental and social well-being within the context of the health promoting school initiative.
- Investing small amounts of finance in schools which are interested in developing health promotion initiatives.

Recommendations for research

Recommendations for commissioners of research

- Invest in primary UK-based studies of health promoting school initiatives giving priority to those which aim to promote the social and mental well-being of staff and pupils.
- Commission the development of new outcome measures for school health promotion interventions (see recommendations for research below).
- Commission a review of primary studies of school-based family life education programmes and a further review of school mental health promotion programmes.
- Encourage and enable further debate on the value of including studies using observational and qualitative methodologies in reviews of effectiveness of health promotion interventions.
- Commission a further review in this area in two years time, taking into account the outcome of the debate proposed in the fourth point in recommendations for research below.

Recommendations for researchers

- Ensure that process evaluation which describes the way in which programmes have been implemented is undertaken and reported in all studies of health promotion in schools.
- Develop valid and reliable measures for evaluating the outcome of the health promoting school initiatives, particularly those measuring mental and social well-being for children and adults. Incorporate these in all studies of health promotion in schools.
- Investigate the relationship between staff health and well-being and that of pupils taking account of research which has been conducted on staff morale and the social ethos of schools.
- Research the impact of randomisation on participation in health promotion intervention studies and continue the debate on methods of evaluating school health promotion interventions. Investigate costs and benefits of very large trials of health promotion programmes.
- Ensure that future reviews of school health promotion programmes include a systematic search and critical appraisal of studies and that they describe the development of interventions, and their content and implementation as well as the design and implementation of the studies.

Recommendations for journal editors and peer reviewers

- Ensure, in publications of studies of school health promotion interventions, that the following are reported: the theoretical basis or assumptions underpinning the interventions; the content of the interventions; and the process of delivery.

Chapter 1

Structure of the report

This review was commissioned by the UK Health Technology Assessment Programme with the aim of evaluating the effectiveness of school-based interventions, including the health promoting schools approach, in promoting health and preventing risk behaviours (such as smoking) in children.

It consists of seven chapters: an introduction, research questions, a review of effectiveness of the health promoting schools approach, a review of existing reviews of health promotion in schools, an overview, conclusions and recommendations for research. Additional information is given in appendices.

The introduction consists of a discussion of some of the key concepts associated with health promotion in schools and the health promoting schools approach, and their evaluation. This is followed by a chapter defining the research questions.

The chapters reporting the review of effectiveness of the health promoting schools approach and the review of reviews of health promotion interventions used in schools are each comprised of methods, results and discussion. The effectiveness of the health promoting schools approach was evaluated through a review of primary studies. The effectiveness of other school health promotion programmes was evaluated by searching for and reviewing existing good-quality reviews.

The overview, conclusions, and implications and recommendations for practice and research chapters draw on both of the reviews.

Chapter 2
Introduction

Health promotion and health education

A considerable proportion of the academic literature on health promotion and health education is devoted to discussion about the meaning of these terms. The definitions inevitably depend on the definition of health, but health itself is a surprisingly complex concept. Although the word is in common household usage, it is at the same time a concept whose meaning is debated by social scientists and health professionals. The origins of health promotion and health education may be found in the WHO original and classic description of health (dating from 1946) as a state of complete physical, social and mental well-being.[1] However, this definition of health with its holistic emphasis and focus on positive health is not widely accepted as a legitimate or attainable goal for the UK health service. Although there is a measure of agreement in relation to physical well-being, concepts of mental and social well-being and their relationship to emotional and psychological health are not yet agreed.[2] The UK health service, like that in other Western countries, is based on an implicit assumption that physical well-being is more important than social and mental well-being. In the practice of health promotion this assumption is not necessarily valid. It is therefore perhaps not surprising that there is ongoing debate about definitions of health promotion and health education. Although this may be seen as an exercise in semantics by practising health professionals there can be little expectation of agreement over the benefit and value of health promotion interventions until the debate about the goal of health promotion and health education has been resolved.

A range of different definitions of health promotion presented in *Table 1* has been compiled for a recent WHO publication.[3] These encompass in varying degrees an individual focus and a societal focus. The societal focus derives from recognition that an individual's capacity to change the way in which he or she lives is constrained by the social and physical fabric of society. It has given rise to definitions such as that of Labonte (1992): 'any activity or program designed to improve social and environmental living conditions such that people's experience of well-being is increased' (see *Table 1*). The individual focus derives from two related but contrasting beliefs. The first is that individuals have control over their health-related behaviour and that societal constraints are not important. This has given rise to definitions such as those of the US Surgeon General (1979): 'activities which individuals and communities can use to promote healthy lifestyles' (see *Table 1*). The second, originating from the WHO (1984 and 1986), 'the process of enabling people to increase control over and to improve their health' (see *Table 1*), while accepting that many individuals feel powerless to influence the way they live, recognises that the development of this capacity (self efficacy, personal autonomy) is in itself important for mental well-being and therefore for health. Underlying definitions based on the latter set of beliefs is a recognition that with appropriate support many apparently powerless individuals can develop or regain a sense of their capacity to influence. The process of enabling this personal development is called empowerment.

The wide range of definitions of health promotion has spawned a wide variety of health promoting interventions from those provided in clinical practice which target individuals and focus on delivering changes in health-related behaviour, to those provided by pressure groups such as Action on Smoking and Health, whose focus is on combating powerful commercial interests and changing the social and physical environment. At the same time, research and development in health promotion has led to an increased level of understanding of the determinants of both health and health-related behaviour[1,4] and of the barriers to change at the level of the individual and society. This has led to an increasing level of sophistication in intervention design. An important step forward was the recognition that different approaches to health promotion – those focusing on individuals and those focusing on communities and societies, as well as different modes of delivery – those using the media, those delivered to groups and those providing one-to-one support – may be synergistic. This recognition has led to the development of multifaceted approaches to health promotion.[1,5] An alternative classification of methods of

TABLE I *Definitions of health promotion*

Source	Definition
Lalonde (1974)	A **strategy** 'aimed at informing, influencing and assisting both individuals and organisations so that they will accept more responsibility and be more active in matters affecting mental and physical health'
US Surgeon General (1979)	'**Activities** which individuals and communities can use to promote healthy lifestyles'
US Office of Health Information (1980)	'Any combination of health education and related organisational, political and economic **interventions** designed to facilitate behavioural and environmental adaptations that will improve or protect health'
Perry and Jessor (1983)	'The implementation of **efforts** to foster improved health and well-being in all four domains of health'
WHO (1984, 1986), Epps (1986)	'The **process** of enabling people to increase control over, and to improve, their health'
Goodstadt and co-workers (1987)	'The maintenance and enhancement of existing levels of health through the **implementation** of effective **programs**, **services** and **policies**'
Kar (1987)	'The advancement of well-being and the avoidance of health risks by achieving optimal levels of the behavioural, societal, environmental and biomedical determinants of health'
O'Donnell (1989)	'The **science** and **art** of helping people choose their lifestyles to move toward a state of optimal health'
Nutbeam (1986)	'The **process** of enabling (individuals and communities) to increase control over (the determinants of health) and (thereby) improve their health'
Labonte (1992)	'Any **activity** or **program** designed to improve social and environmental living conditions such that people's experience of well-being is increased'

Reproduced from Rootman and co-workers[3]

health promotion and disease prevention identifies primary, secondary and tertiary preventive approaches. Primary preventive approaches are more relevant to health promotion, and these may be of two types, population approaches and high-risk approaches. Population approaches cover all individuals living in a community, country or attending a school. high-risk approaches focus on individuals who are at high risk of developing a disease, that is, people who smoke or who are obese. These approaches are not mutually exclusive, and some interventions may include aspects of both. Both these primary preventive approaches aim to prevent disease occurring. Secondary preventive approaches are those which aim to detect disease in its early stages and reverse the process of disease development. Tertiary preventive approaches are those which aim to identify disease and treat or ameliorate its consequences. There is thus a myriad of different approaches to the practice of health promotion. Its diversity and complexity may in future prove as great as that of the practice of clinical medicine.

Health education is one part of health promotion. Knowledge about health and its determinants is important for the maintenance of health, and ignorance is dis-empowering. The relationship between health education and health promotion has, like their definitions, been debated in the literature, but the provision of health-related information to individuals and policy makers is now accepted as an important part of health promotion. Many definitions of health education also now include skill development.[6] The aim of health education like the aim of health promotion is still, however, debated. Some authors have defined the goal of health education as the making of informed, healthy choices about health-related lifestyles.[6] This interpretation does not deal with the potential conflict between informed decision making and healthier decision making, which are not necessarily synonymous. Knowledge of the impact of behaviour on health does not inevitably lead to healthy behaviour. The argument that health education is only valid when it results in healthier decision making is both

contrary to the broad principals of education and difficult to sustain. Educational models regard health knowledge as a valuable resource in its own right. Nutbeam[7] has introduced the concept of health literacy as an outcome of health education. Health literacy is comprised of the 'cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways that promote health'. This definition introduces the concept of empowerment into health education, and implies that didactic teaching may not be sufficient as an approach. This definition, however, like that of Naidoo,[6] does not explicitly acknowledge the importance of respecting and developing aspects of mental well-being such as personal autonomy in the delivery and evaluation of health education. Respect for personal autonomy is important in the development of self-efficacy and therefore essential for interventions which aim to empower.

Much of the controversy over definitions of both health promotion and health education therefore appears to reflect the debate about the relative importance of physical, mental and social well-being to health. Definitions which encompass the concept of empowerment are based on the belief that health improvement should be achieved through the active participation of the individuals and communities concerned. Behaviour change can theoretically be achieved by subtle coercion or deception, but such approaches would by definition be dis-empowering. If self-autonomy and self-efficacy are of critical importance to mental and social well-being and if the latter are of equal importance to physical well-being, then interventions which manage to achieve lifestyle change through subtle coercion or deception could have an overall detrimental impact on health. If mental and social well-being prove, as has been suggested,[8,9] to be important determinants of physical well-being, pyschosocial outcomes might arguably need to have preferential status to physical and behavioural health outcomes in evaluating the success of health promotion interventions. At present, methods of measuring mental and social well-being are not as robust as those for measuring physical well-being, and a detrimental impact on the latter may be difficult to detect. Evaluators of health promotion programmes have therefore suggested that it is critically important to monitor the way in which health promotion interventions are delivered to determine whether they are empowering and participatory or whether they are deceptive or coercive.

Health promotion in schools

Schools have been regarded as an important setting for health education and health promotion since the 1950s, both in the UK and worldwide,[10,11] but the development of health promotion in this setting has been subtly different from that in other settings. Educational models and theories have played a greater role. For example, child-centred educational ideology played a part in the incorporation of self-esteem development and empowerment into many early school health education programmes. As schools have a role in socialisation and the development of 'approved' adult behaviours, medical/preventive approaches which permit aspects of social control have also had a part to play. Tones[1] argues that 'an interplay between medical/preventive and educational/empowerment approaches can be observed in the development of school health education in all countries'.

What has been slower to develop in school health promotion programmes relative to programmes in other settings is the societal perspective, which recognises the importance of supportive social and physical environments for health promotion. Until recently, school programmes have concentrated on the health education aspects of health promotion, developing the knowledge and skills of pupils in the classroom and have paid less attention to the impact that schools as organisations and communities have on the health of their pupils. Although the importance of socio-economic inequalities in health have been central in the development of health promotion programmes in other settings, this phenomenon does not seem to be prominent in the school health promotion literature.

In the UK, although health is not one of the statutory subjects currently prescribed by the National Curriculum, the science and PE curricula incorporate relevant elements, and health was identified in 1990 as one of five cross-curricular themes.[12] It was recommended that the following components of health education should be covered:[13]

- psychological aspects
- environmental aspects of health
- substance use and misuse
- family life education
- safety
- health-related exercise
- food and nutrition
- personal hygiene
- sex education.

In 1997 the relationship between education and health was recognised in the White Paper *Building Excellence in Schools Together*,[14] which states 'Schools also have a role in helping to tackle our most pressing health problems … We intend to help all schools become healthy schools' (cited by Cockerill, 1988[13]). In 1998, the UK Green Paper *Our Healthier Nation: A Contract for Health*[15] sets targets in four areas of health – heart disease and stroke, accidents, cancer and mental health – and identifies the school as one setting which 'offers opportunity to focus the drive against health inequalities and improve overall health' (p. 48). The nine components of health education recommended in Curriculum Guidance Five (see above)[12] tie in with these four areas. The Green Paper proposes a healthy schools initiative which will 'raise awareness of children and young people as well as teachers, families and local communities to the important opportunities that exist in schools for improving health, particularly the physical and mental health of children and young people' (p. 49).

Recently, an advisory group on Personal and Social Health Education convened by ministers of the Department of Health and the Department of Education and Employment has provided advice on the aims and purposes of personal social and health education in schools and consider its relationship to other curriculum areas, particularly citizenship and democracy. This contributed to the Qualifications and Curriculum Authorities review of the National Curriculum, which recommended a framework for personal social and health education.

Whole-school approaches to health promotion

Recognition of the importance of multifaceted approaches to health promotion has led to the development of comprehensive school health programmes in the USA and to whole-school approaches to health promotion in Europe. The former deliver multifaceted programmes covering changes to the school environment (e.g. school meals, smoking policies) and extending outwards to involve parents and the wider community.[5,17] The importance of the physical environment of the school is emphasised in these programmes. Schools are the only setting where children and young people of all backgrounds are bought together for many hours a week for several years. Children are particularly sensitive to environmental effects.[18] Comprehensive school health programmes include family and community outreach initiatives on the basis that most of what children and young people learn is gained outside school, and in the face of contradictory messages from the home and community, schools have limited influence. These programmes may include the provision of health services to schools and, more recently, have also included school physical education (PE) programmes, school meals services, school counselling services and initiatives to promote the health of staff as well as students.[19]

Similar thinking has led to the development of the concept of a whole-school approach to health promotion in which both the explicit (or formal) curriculum and the hidden curriculum (what is learnt at school from norms, values and school life are targeted).[20] The formal curriculum includes the material presented in the classroom setting together with enabling and skill development programs. Skill development may cover both generic (life skills) and specific skills (road crossing). The WHO classification of life skills[21] covers programmes such as decision making, problem solving and coping with stress. It also covers other aspects of psychological health such as the development of self-awareness, self-esteem, self-efficacy, empathy, interpersonal skills, communication skills, critical thinking, creative thinking and coping with emotions. 'Social skills training' is an older term covering a more limited range of skills important for health – communication skills, self-awareness, decision making and problem solving.

The hidden curriculum has been defined as:

> 'the whole ethos established by the atmosphere of the school, its code of discipline, the prevailing standards of behaviour, the attitudes adopted by staff towards pupils, and the values implicitly asserted by its mode of operation'

(quoted by Piette[22]). It includes what is taught about interpersonal relationships by role modelling from teachers and by pupil experience. It includes relationships between individuals and groups, both within the school and outside the school (parents and community) and the impact of the physical environment of the school such as the 'constructed environment' (e.g. classroom lighting, space, and the use of colour) and other physical conditions (e.g. noise, chemical and biological factors).[18] The hidden curriculum may serve to reinforce or contradict desirable attitudes to health delivered in the classroom.

Health promoting schools

The health promoting school initiative represents a recent development in the evolution of health promotion practice in schools. It is a multifaceted approach to health promotion which covers the hidden as well as explicit curriculum:

> 'A health promoting school aims at achieving healthy lifestyles for the total school population by developing supportive environments conducive to the promotion of health. It offers opportunities for, and requires commitment to, the provision of a safe and health-enhancing environment'

(WHO Regional Office for Europe, 1995, cited by Parsons[23]). The ethos of the health promoting schools initiative is very much a participative one. The whole school is required to be committed to projects developed under this framework and schools are encouraged to develop the programmes in accordance with their own strategies and time-table.[24] The concept of the self-esteem of pupils and the well-being of school staff is central to this approach. It has been argued that if the health promoting schools initiative achieves its aims there will be no hidden health-related curriculum as what was hidden will have been revealed and turned into health-enhancing policy.[25]

The European Network of Health Promoting Schools was established in 1992 with support from the WHO, the European Commission and the Council for Europe. The aim of the initiative is to demonstrate that schools can be powerful agents for the promotion of health through the adoption of whole-school approaches.[26]

The WHO has developed the following 12 criteria for schools to work towards to become 'Health Promoting Schools:[23]

(1) Active promotion of the self-esteem of all pupils by demonstrating that everyone can make a contribution to the life of the school.
(2) The development of good relations between staff and pupils and between pupils in the daily life of the school.
(3) The clarification for staff and pupils of the social aims of the school.
(4) The provision of stimulating challenges for all pupils through a wide range of activities.
(5) Using every opportunity to improve the physical environment of the school.
(6) The development of good links between the school, the home and community.
(7) The development of good links between associated primary and secondary schools to plan a coherent health education curriculum.
(8) The consideration of staff exemplars in health-related issues.
(9) The active promotion of the health and well-being of school staff.
(10) The complementary role of school meals to the health education curriculum.
(11) The realisation of the potential of specialist services in the community for advice and support in health education.
(12) The development of the education potential of the school health services beyond routine screening towards active support for the curriculum.

The health promoting school initiative therefore builds on previous developments in school health promotion. Implicitly if not explicitly the initiative aims to promote health according to the WHO definition, and is based on a model of health promotion which recognises the importance of both environmental change and personal development. Arguably one of its most important developments is the explicit recognition of the importance of the health and well-being of school staff. By 1996, the European Network of Health Promoting Schools was operational in 38 European countries. Each country has developed the project in its own way, guided by the above 12 WHO health promoting schools criteria.[27] The UK joined the European Network Of Health Promoting Schools project in 1993.[27]

Health promoting schools in practice

Schools participating in this initiative may focus on just one (or more) of the 12 criteria and target one or several health needs. This allows considerable flexibility in the ways in which schools work towards becoming health promoting schools. The criteria themselves may be slightly modified. For example, in Wales, the tenth criterion was expanded to include all school health-related policies, such as those on smoking. In addition, schools were encouraged to begin their involvement in the project by concentrating on one or two activities linked to one or two criteria of their choice.[28] Similarly, in Scotland a range of topics have been targeted and one or more of the 12 criteria addressed.[29] In the evaluation of Health Promoting Schools participating in the English evaluation three key elements were identified as being central to schools: the curriculum, school ethos and environment and the interaction

between school and the home and the wider community.[30] The importance of staff well-being is not explicitly recognised in this definition, but as the atmosphere in schools is determined to a considerable extent by staff well-being, success may depend on its implicit recognition.

In the UK, local health promoting schools initiatives have been established by collaboration between local education services, health authorities and health trusts to encourage schools to become more health promoting. This initiative gives recognition to schools which are trying to develop in line with the health promoting schools criteria. A recent survey, using postal questionnaires, of all the UK health promotion units found that 68 (approximately half of the respondents) were involved in a health promoting schools award scheme.[31] Those who responded reported that 845 schools were participating in this UK scheme, two thirds of which were primary schools. Schools in other health districts may have developed and adopted all or some of the criteria of the health promoting schools approach, without belonging to a formal scheme or calling themselves health promoting schools.

Evaluating the effectiveness of the health promoting school

The evaluation of health promotion interventions has been the subject of debate as intense as that covering the definition of health promotion (e.g. see Speller,[32] Oakley,[33] Kippax[34] and Stephenson[35]). Indeed, the two debates are connected in that one of the criticisms which has been levelled at evaluations of health promoting interventions which use an experimental approach, is that the outcomes used to establish effectiveness have been restricted to physical well-being and health-related behaviour to the exclusion of other aspects of health. Lack of widely accepted and well-validated measures of social and mental well-being creates difficulty for evaluators. This lack may reflect a lack of agreement that these aspects of health are important. This criticism is not a criticism of the experimental model, only of the sort of outcome measures that tend to be used in experimental designs.

Some of the debate about evaluation in health promotion centres on the practical difficulty of applying the experimental model, in particular the randomised controlled trial (RCT) to health promotion interventions. Where the aim of the intervention is to influence an organisation, community or society and the intervention needs to be delivered at that level, the statistical assumptions on which calculations of the number of individuals required in the study are based become invalid. Sample size calculations need to be based on a standard experimental acknowledgement of the cluster design and the number of individuals involved in the trial becomes very large. This makes such studies very expensive. The large size means that evaluators may have difficulty in following the process of implementation of the intervention and ensuring that it has been carried out in the way that was intended. At the end of the study evaluators may know that something was or was not effective, but may not be clear exactly what it was. If an intervention proves ineffective it may be difficult to decide whether this was because the intervention was ineffective or because it was not appropriately implemented. As the way in which health promoting interventions are implemented may be as important in achieving health as the content of the intervention, this is very important. At present, evaluators often rely on qualitative methods to determine whether the intervention has been effectively implemented; however, qualitative methods become difficult with large samples.

The need to research communities and organisations that are geographically separate adds to the organisational problems of such studies. Effective health promotion provides people with helpful new knowledge or skills, and it is in the nature of human beings that such knowledge and skills will be passed on. Unlike medical or surgical interventions, effective health promotion cannot be restricted to the recipient. In interpreting the negative results of several major trials of heart health promotion, researchers have suggested that the lack of effect might be due to the fact that changes which took place in control communities were as great as those which took place in experimental communities. In the era of modern communication, it may be naíve to expect to be able to contain the spread of information from one school, local authority, community or even country to another.

The experimental model performs best when it is used to evaluate the effectiveness of a single intervention. Health promotion interventions are often multifaceted, and each component of the intervention may interact with every other in ways which are either synergistic or enabling. In such situations components tested on their own may prove ineffective even though they are an essential part of an effective multifaceted approach.

There are other difficulties with the application of the experimental model to health promoting interventions which arise from the need for active participation in health promotion programmes. This is a critical step in the development of health promoting school initiatives, but evaluators of health promotion interventions require that a standardised package is put in place so that at the end of the experiment they can tell what has been evaluated. Empowered, participating teachers demonstrate these attributes by contributing to the initiative, making it more likely to work in their school or community, but in doing so cut across the need to implement a standardised package. This process is positively encouraged in the health promoting school initiative. It has been argued that active participation in behaviour change depends on individuals being 'ready for change'.[36] Schools wanting to take part in the health promoting schools initiative are therefore required to show commitment and enthusiasm in order to be accepted into the scheme. Individuals and organisations in this frame of mind are by definition not in a state of 'equipoise'. If committed enthusiastic organisations or individuals are randomised to a non-intervention group they may attempt to get what they have been denied from elsewhere, thus 'contaminating' the study. Submitting to the process of randomisation requires an element of 'not caring', which is the antithesis of 'readiness to change'. The process takes control away from the individual, and may of itself be dis-empowering. Thus there is the potential for the RCT to interfere with the process of implementation. This problem may not be confined to trials of health promotion. The issue of patient preference and its impact on health outcomes has also been recognised in clinical trials.[37,38]

The value of the RCT is that it is the best solution so far developed to overcome the very real phenomenon of experimenter bias. By randomly allocating control and intervention groups, the experimenter has no hand in deciding who does and does not get the intervention, and cannot influence the process. This process also ensures that factors likely to interfere with the intervention, both those which are known (confounding factors) and those which are not yet identified, are allocated equally to control and treatment arms and do not influence the outcome of the study. Oakley[33] has argued strongly that this criteria should overrule all others, and cites the observation that the results of non-randomised experiments are more likely to be positive than randomised ones.[39] This finding is taken as evidence of bias in non-randomised experiments. A more recent publication[40] has, however, refuted this claim, suggesting that there are no systematic differences. The WHO has recently published guidelines on the evaluation of health promotion which, although strongly supportive of evaluation in general, suggest that the use of RCTs to evaluate health promotion interventions is in most cases 'inappropriate misleading and unnecessarily expensive'.[41]

This debate about evaluation has not yet been resolved. The issues are complex and difficult to address. Within the European Network Of Health Promoting Schools, the EVA project has been established with the goal of aiding its members in the task of evaluation.[22] It encourages the selection of an evaluation which takes cognisance of some of the problems outlined above and suggests that evaluators should be guided by various criteria such as financial constraints, the type of action to be evaluated and the interests of the groups involved. Three main types of evaluation are identified. The first, process evaluation, involves features such as whether the programme was delivered in the way it was designed to be delivered and whether the target group found it helpful. The second consists of assessing the impact of initiatives on intermediate factors, such as knowledge, attitudes, behaviour, and the pyscho-social or physical environment. The effect of interventions on health status, well-being and quality of life is identified as the final stage of evaluation. It is suggested that this type of effect is rarely immediate and may require long-term follow-up.

This broad range of outcomes calls for a variety of measures, all of which should theoretically be validated and reliable. Some of these measures are more readily available than others. Although knowledge and attitudes are frequently assessed outcomes of health promotion programmes, few of the measures used in studies have been validated. Measurement of health-related behaviour often relies on self-report questionnaires which are potentially subject to reporting bias. Some of these questionnaires have been validated against objective measurements, but many have not. Physiological measurements are usually well developed, as are epidemiological measurements of disease incidence or events. Measures of children's and young people's mental and social well-being as opposed to physical well-being are in an earlier stage of development. One example of the development of outcome tools is the Health Behaviour of School-age Children Study, a survey of adolescent

health behaviours and lifestyle, which has been adapted for use by some of the countries participating in the European Network of Health Promoting Schools. The 'Health Behaviour of School-age Children – School as a Setting' package was designed to assess how pupils perceive their school milieu. It included questions about, for example, feelings of belonging to the school, the physical environment, relations between parents and the school, perception of classroom atmosphere and teacher attitudes.[42] Other challenges to evaluation which have been identified by those conducting health promoting schools projects within The European Network Of Health Promoting Schools are factors such as the timescale of projects, the resources available for commissioning external researchers and the commitment of school staff to evaluation research.[29]

The project described in this report was commissioned by the UK Health Technology Assessment Programme with a view to answering some important questions about health promotion in schools. The systematic review methodology is recommended by the programme because of its ability to cover a wide range of interventions and to draw evidence-based conclusions. By requiring a systematic search and the application of pre-determined inclusion criteria this process avoids the very real phenomenon of reviewer bias in deciding which studies should feature in the review. By including a critical appraisal of study design, systematic reviews can give additional weight to studies with a robust methodology. The methodology of systematic review has been developed in the context of decisions about clinical practice where the RCT is regarded as the 'gold standard' of practice and experimental studies superior to observational ones. This review, therefore, focuses on experimental studies and systematic reviews of health promotion. In doing so it covers a very large number of robust experimental studies which have been carried out in school health promotion and draws together in one place research on diverse health topics. It also excludes, and therefore fails to draw on, the results of a large number of studies evaluating health promotion in schools which have chosen for a legitimate reason not to use an experimental model design. Although the conclusions which can be drawn from this project are inevitably constrained by the review process and by the limitations of experimental studies in the evaluation of health promotion interventions, the range of studies and the detailed analysis provides a unique insight into experimental studies of health promotion in schools and allows conclusions to be drawn about issues of effectiveness and research priorities for the future.

Chapter 3

Research questions

The research questions were defined by the Health Technology Assessment Programme in its commissioning brief.

Research questions

(1) Is there evidence that health promoting schools are effective in improving health-related outcomes?
(2) Is there evidence that health promoting schools are more effective than other ways of delivering health promoting interventions and what are the relative costs?
(3) What is the available evidence of effectiveness of health promotion interventions in schools?
(4) How effective is each type of approach (e.g. curriculum) in promoting positive health outcomes in each area of health need (e.g. exercise)? Are some approaches effective across several areas and if so what do these approaches have in common?
(5) What are the effective components of these approaches? What are the theoretical bases of effective interventions?
(6) Which (if any) areas require further research, for example where there are suggestive results from poor evaluations or potentially effective interventions which have not yet been evaluated?

Review methods

The first two questions were addressed by a review of primary studies of the effectiveness of the health promoting schools approach. Research questions 3, 4, and 5 were investigated by reviewing existing reviews of health promotion in schools. Question 6 was addressed in both reviews.

The review of primary studies of the effectiveness of the health promoting schools approach and the review of reviews of the effectiveness of health promotion in schools have been carried out according to published guidelines.[43] The methods are described in detail in chapters 3 and 4.

Chapter 4

Review of the effectiveness of the health promoting schools approach

Review questions

This chapter addresses two of the review questions:

(1) Is there evidence that health promoting schools are effective in improving health-related outcomes?
(2) Is there evidence that health promoting schools are more effective than other ways of delivering health promoting interventions and what are the relative costs?

Methods

Searches

A very general search strategy was used to identify any literature concerned with health promoting schools (see appendix 1A). The following databases were searched: ERIC, PsycLIT, MEDLINE, CINAHL, ASSIA, Sociofile, EMBASE and the British Education Index. No time or language restrictions were applied. The following databases were searched for 'grey literature': SIGLE, DHSS Data and Dissertation Abstracts. The MEDLINE strategy was adapted for use with other databases.

Relevant web pages were scanned, including those of the European Network of Health Promoting Schools. Reference lists of retrieved papers were examined to identify further relevant studies. Requests for unpublished data were made to individuals and organisations in the field of health promotion (see appendix 2). The bibliographies of reviews identified in the second part of this project were scanned for relevant studies.

Initial inclusion criteria

The initial inclusion criteria defined by the research group during development of the research protocol were as follows:

(1) Concerned with health promoting schools for children and young people aged from 5 to 16 years, including special schools, and providing details of the components and delivery of the intervention.
(2) Controlled studies with a comparison group, or a before–after design with no comparison group.
(3) Include and report health-related outcomes (including health-related behaviour).

Decision procedure

Titles (and where possible abstracts) of studies identified from all sources were assessed for relevance independently by two reviewers (SKC and DL-S). If either reviewer considered the paper relevant, it was obtained. Obtained papers were independently 'pre-screened' by the two reviewers against the inclusion criteria and any disagreements or queries resolved by discussion (or if necessary by recourse to a third reviewer).

Data extraction and synthesis

For each study, data on both the study methodology and the intervention were extracted using a pro forma (see appendix 3). Information was also sought about aspects of the study such as attrition and an appraisal is given under 'comments' at the end of each study summary. Data were extracted by one reviewer and checked by a second reviewer.

Steering group

A multidisciplinary group was established (see appendix 4), and members invited to:

(1) help identify literature
(2) comment on the protocol and a draft of the report
(3) comment on the interpretation of the literature
(4) offer peer review and advice on implications.

The group did not determine the contents of the review.

Initial results

The various search strategies identified 1067 titles and abstracts relevant to health promoting schools. Of these, 111 appeared to be either useful background material or evaluations of projects. These were obtained. On scrutiny, initially, no studies were found which met all three inclusion criteria. Since the initial search was undertaken, four

evaluations which met these criteria have been published. These have now been included.

The result of the initial search were discussed with the steering group, and it was agreed that rather than either abandon the review or attempt to assess the effectiveness of the evidence with studies which did not meet the second and third criteria, the first criteria should be broadened to cover studies evaluating the effectiveness of interventions using a 'health promoting schools approach'. After consultation with the steering group, such interventions were defined as ones which involved activity in each of the three domains used in the English evaluation of the Health Education Authority (HEA) European Network of Health Promoting Schools project, that is, ethos and environment, curriculum and community, and showed evidence of active participation by the school.

Revised inclusion criteria

To be included studies had to meet the following criteria:

(1) Concerned with explicit health promoting schools or with interventions utilising the health promoting schools approach with children and young people aged from 5 to 16 years, including special schools, that is, programmes in which there is health promotion activity in the areas of
   (a) ethos and/or environment of the school
   (b) the curriculum and
   (c) family and/or community
   in which there was evidence of active participation by the school and which provided information detailing the components and delivery of the intervention.
(2) Controlled studies with a comparison group, or a before–after design with no comparison group.
(3) Include and report health-related outcomes (including health-related behaviour).

Results

Four evaluations of explicit health promoting schools were identified. In addition, eight evaluations of programmes using a health promoting schools approach were located. (See *Table 2* for summary details.)

Range of studies

Studies of interventions in schools meeting criteria for health promoting schools

Of the four studies which met the inclusion criteria, two were evaluations explicitly concerned with health promoting schools (HEA European Network of Health Promoting Schools projects[26] and the Wessex Healthy School Awards Study[44]), one examined a healthy eating policy as part of a whole-school approach,[46] and one examined the Health Promotion Schools of Excellence programme in the USA.[45] With the exception of the Health Promoting Schools of Excellence study, all these studies originated in the UK. The HEA European Network of Health Promoting Schools study[26] was concerned with a wide variety of schools, including special schools; the Health Promoting Schools of Excellence study[45] involved elementary, middle and high schools, and the Wessex Healthy Schools Award study[44] and the healthy eating policy study[46] focused on secondary schools.

Studies using a health promoting schools approach

Eight studies of interventions demonstrating a health promoting schools approach, that is, with evidence of activity in the three domains of school ethos and environment, curriculum and links with family and community, met the inclusion criteria. With the exception of the English anti-bullying study[51] and the Danish dental health study[53] these all originated from the USA. Summaries of all the studies are given at the end of the chapter.

Programme focus

Of the four studies of health promoting schools, three were general and one focused on the development of a healthy eating policy. Of the studies using a health promoting schools approach, three evaluated cardiovascular health programmes with an emphasis on nutrition and exercise (Great Sensations,[47] The Cardiovascular and Adolescent Trial for Cardiovascular Health[48] and Heart Smart[49]); one compared three comprehensive school health programmes (Project SHARP, Project CHEK, Project PGHCP/SHCP – now 'Growing Healthy'[50]) in which multiple topics were addressed; one focused on skin cancer (Sunshine and Skin Health[52]), one on dental health,[53] one on the problem of bullying[51] and one on sexual health.[54,55]

Study design

The HEA European Network of Health Promoting Schools evaluation[26] involved the allocation of 48 selected schools to matched triads, and within these the random allocation of the schools to the status of 'pilot' (i.e. the intervention group), 'reference 1' and 'reference 2' (comparison groups). Both qualitative and quantitative data

TABLE 2 *Summary table of included studies*

Study	Design	Focus
HEA\ENHPS (1997), UK[26]	Schools assigned to matched triads and randomised to intervention or reference conditions	Health promoting school
Wessex Healthy Schools (1998), UK[44]	Schools matched	Healthy schools award scheme
Health Promotion Schools of Excellence (1995), USA[45]	Before and after	Health Promotion Schools of Excellence programme
Healthy eating policy (1993), UK[46]	CT (matched)	Healthy eating as part of a whole school approach
Great Sensations (1985), USA[47]	RCT	Cardiovascular health
CATCH (1996), USA[48]	RCT	Cardiovascular health
Heart Smart (1992), USA[49]	RCT	Cardiovascular health
Projects SHARP, CHEK and PGHCP\SHCP (1984), USA[50]	CT (matched)	Multiple topics
Anti-bullying programme (1994), UK[51]	Before and after	Mental health, safety (anti-bullying)
Sunshine and Skin Health (1994), USA[52]	RCT	Skin cancer
Dental hygiene programme (1979), Denmark[53]	RCT	Dental hygiene
Denmark School and Community Pregnancy Prevention programme[54,55]	CT (matched)	Sexual health and pregnancy preparation

CT, controlled trial

were collected by means of cross-sectional and longitudinal surveys. Regular auditing and monitoring of progress also took place. The Wessex Healthy Schools Award evaluation[44] recruited 11 secondary schools participating in the Health Promoting Schools Award scheme, and matched these with controls selected on the geographical area, percentage of free school meals and social status. Qualitative and quantitative data were collected by audit, curriculum and policy review, semi-structured interviews and self-completed questionnaires. The authors noted that the study lacked statistical power because the cluster design had not been taken into account in sample size calculations. The evaluation of the healthy eating policy[46] involved three schools – one intervention and two control schools (two control schools were chosen because it proved difficult to find a single school which had all the characteristics required for matching with the intervention school) and in which data were only collected after the evaluation. Data were collected by pupil questionnaires and structured staff interviews. The Health Promotion Schools of Excellence evaluation[45] was an uncontrolled study in which over 11,500 pupils in 15 schools were tested before and after the intervention at the beginning and end of the school year.

The evaluations of interventions using a health promoting schools approach ranged from a controlled study using random allocation involving 96 schools[48] to a before-and-after study conducted in one school.[51] Some studies suffered from incomplete reporting of study methodology, such as the method of allocation to groups or the number of participants, and or results; for example, the time between the intervention and subsequent data collection was not always clear. Although some studies involved data collection over several years of intervention, none included long-term follow-up after the intervention.

Outcomes

Evaluation of the HEA European Network of Health Promoting Schools project[26] was based on a longitudinal survey carried out three times to gather information about the pupils' background, self-esteem, health-related knowledge, attitudes and self-reported behaviour (eating habits, physical activity, leisure activities and, for secondary school students, smoking and drinking). Additional qualitative data were obtained from student, parent and staff surveys. The Wessex Healthy Schools Award evaluation[44] obtained information about pupils' health-related knowledge, attitudes and behaviour (alcohol, smoking, drugs, healthy eating) using self-completion questionnaires. The evaluation of the healthy eating policy[46] used a questionnaire to investigate diet-related knowledge, attitudes and behaviour. The Health Promotion Schools of Excellence study[45] used the 'Emory University Health Risk Appraisal Survey' and the YMCA's 'Y Ways to Fitness' to evaluate staff outcomes and assessed the physical fitness of pupils using the American Alliance of Health, Physical Education, Recreation and Dance 'Physical Best' programme. Pupils in grades 4 to 8 also completed the Student Health Education Evaluation survey (knowledge, attitudes and behaviour), while those in grades 9 to 12 completed the Youth Risk Behaviour survey.

Collectively the outcomes assessed in studies evaluating health promoting schools approaches were aspects of the school environment such as school lunches, staff training and involvement of students, aspects of health-related behaviour such as dietary intake (assessed by self-report, observed choices and plate waste, uptake of school meals and school lunch content analysis), cardiovascular risk factors (assessed by a variety of physiological measures) and physical fitness, dental health (plaque, gingivitis and caries assessed by clinical examinations), pregnancy rates, self-reports of self-esteem, experience of bullying and aggression, knowledge and attitudes, substance use and exposure to the sun.

Programme development and theoretical bases

To participate in the HEA European Network of Health Promoting Schools study,[26] schools were required to show a strong commitment to the project and to the development of health promotion. Selected schools were encouraged to devise their own programmes with activities in the three domains of school ethos/environment, curriculum and family/community and were required to provide school health development plans to identify the activities they would undertake in order to develop as health promoting schools. Details of some of these projects are given in the full report.

The Wessex Healthy Schools Award evaluation[44] involved schools participating in the Wessex Healthy Schools Award scheme. This was developed through an alliance between education and health authorities. The scheme covered nine key areas: curriculum, wider community, smoke-free schools, healthy eating, physical activity, responsibility for health, health promoting workplace, environment and equal opportunities and access to health. In the healthy eating policy study the policy[46] was in place before the study began. It was based on the Scottish Health Education Group's report *Promoting Good Health*, and evolved thorough discussions with pupils, parents, teachers, school meals staff and health education staff. The American Health Promoting Schools of Excellence project[45] was developed by members of a subcommittee representing the Medical Society, The Jefferson County Public Schools and the Jefferson County Health Department. Four key features were highlighted – a whole-school approach, development of individual health promotion programmes specific to schools needs, the creation of a week-long 'summer health institute' to train staff, and the development of age-appropriate testing tools. Four health areas were targeted: cancer control, cardiovascular risk reduction, injury prevention and physical fitness. Each school was required to organise a health promotion committee.

Of the programmes using a health promoting schools approach, Heart Smart,[49] the Cardiovascular and Adolescent Trial for Cardiovascular Health,[48] Great Sensations,[47] Sunshine and Skin Health[52] and the dental health programme[53] were devised outside the participating schools. Schools in the Cardiovascular and Adolescent Trial for Cardiovascular Health were required to show a commitment to the trial. The schools' ethos and physical environment, the curriculum and the family were targeted for intervention, and standard protocols were devised for use in the schools. Of the 56 schools in the intervention group, only half received the family programme and so could be classified as using a health promoting schools approach. The Heart Smart programme[49] was based on social learning theory, and the precede model was used in planning. It targeted predisposing factors such as knowledge and beliefs, enabling factors like resources and skills, and

reinforcing factors, including the attitudes of teachers and peers. A health advisory committee of teachers, school meals personnel, parents and Heart Smart staff was established to reinforce the programme at home and school. The Great Sensations programme was also based on social learning theory, and the programme was initially developed for elementary school students. The three comprehensive school health programmes[50] had also been developed by external agencies, including the American Lung Association and the US Bureau of Health Education, recognised by the Michigan School Health Association, and then implemented in the schools. The Sunshine and Skin Health[52] programme was developed through collaboration of health communication experts, dermatologists, teachers and curriculum consultants. The oral health programme[53] was devised as a supplement to the services already provided in schools. The study of the anti-bullying initiative[51] investigated a scheme developed in one school, through the impetus of the head teacher and senior management team. This programme apparently followed the example of similar programmes conducted elsewhere, but the theoretical basis was not explicit. The Denmark School and Community Pregnancy Prevention programme was developed through school and community recognition of a social problem.[54,55]

Content

The HEA European Network of Health Promoting Schools evaluation and the Wessex Healthy Schools Award evaluation investigated the effectiveness of health promoting schools as a setting in which to promote health in general. Each school made changes throughout the school, and each devised its own curricula covering a range of health issues. Details of individual schools are given in the reports.[26,44] Changes which were made included whole-staff training sessions, pupil involvement, environmental improvement, changes from specialist to tutor teaching, increase in the amount of curriculum time and revision of curricula for health education. The Health Promotion Schools of Excellence project[45] also had no specific requirements for health promotion activities; schools were encouraged to develop projects which would combine various school disciplines and involve not only students and teachers but also non-academic staff and families. Common projects included health fairs, food awareness programmes, walking programmes and first aid/cardiopulmonary resuscitation training. The healthy eating policy intervention included changes to the provision of food, parental cooperation and the contribution of the various topics of the curriculum.[46]

Among the programmes using a health promoting schools approach, examples of changes include those described in the following sections.

Ethos and environment

These included: increased supervision during breaks;[51] changes to the school meals service;[47–49] provision of free toothpaste and regular fluoride rinses;[53] staff development initiatives, including the provision of nutrition and exercise sessions and a programme to promote positive role modelling;[49] creation of a 'teen life centre' next to the school;[54,55] the encouragement of a philosophy to promote self-esteem, supportive values and responsibility for health decisions;[51] involvement of students in decision making about environmental improvements; and whole-staff training events.[26]

Curriculum

The Heart Smart classroom curriculum[49] presented material on physiology, nutrition and exercise with an emphasis on the development of self-esteem, communication skills, assertiveness and decision-making. Skills development was also a feature of Great Sensations[47] and The Cardiovascular and Adolescent Trial for Cardiovascular Health curriculum,[48] focusing on nutrition, exercise and smoking. School exercise programmes were modified to increase the amount of moderate-to-vigorous physical activity undertaken. Sunshine and Skin Health[52] consisted of multidisciplinary units involving material from science, history, social studies, health and geography into a 'comprehensive cause and consequence presentation'. The dental health programme[53] included theory and detailed instruction of tooth brushing and other oral health techniques. The anti-bullying intervention incorporated material on bullying into the pastoral care curriculum.[51] The curriculum component of the Denmark (USA) School and Community Pregnancy Prevention Programme aimed to increase knowledge about human reproduction and contraception.[54,55] In the HEA European Network of Health Promoting Schools, changes included modifications to the curriculum to increase the balance of time spent on health topics, and changing the teacher for these topics from specialist to form tutor.[26]

Family and community

Family links were fostered through families' participation in committees, through the circulation of newsletters and other printed material, and through the provision of activities for families both at home and at school. Great Sensations encouraged parents to make healthy snacks

available in the home and to generally support the programme.[47] The dental health programme also encouraged parental support and provided parents with written information about the prevention of common oral diseases.[53] In the Cardiovascular and Adolescent Trial for Cardiovascular Health, parental involvement was targeted through activity packets which required adult participation to complete.[48] The comparison of the three comprehensive school health programmes[50] described the non-curricular elements in general statements such as a 'healthful environment' or 'parental support'. The Denmark School and Community Pregnancy Prevention Programme provided mini courses for community leaders such as clergy, along with programme promotion through local newspapers and radio.[54,55]

Results

Identification of studies and study quality

The reports of the 12 studies covered in this review range from a four-page journal article[50] to a 326-page report.[26] The description in these studies both of what was done, and of how it was evaluated varies greatly. The methodological rigour of the studies also varied greatly. Most of the studies included in this review would, because of their size and/or lack of prospectively allocated control groups, not normally be considered in a systematic review. For example there were two before-and-after studies with no control groups,[45,51] one of which involved all the schools in one USA county and one only a single school. There were three studies with non-randomly allocated controls,[44,46,54,55] but one was small and only reported postintervention results; the other two were large studies, but the results of one were based on an analysis of routinely collected data. There were four RCTs[47,49,52,53] in which less than five classrooms or schools were randomly allocated, giving inadequate power in a cluster design trial. There were only two studies which had both a robust methodology and an adequate description of the intervention. The first of these concentrated on self-report and process outcomes,[26] and the second on physiological measurements and self-reported behaviour.[48] The third larger RCT compared three different programmes with no control group and gave very scanty information about the programme content or the implementation.[50]

General results

Several of the studies were evaluated using general health questionnaires. Pupils in all schools completed these regardless of whether their school had made changes which might be expected to impact on these health needs. The HEA European Network of Health Promoting Schools evaluation found that 'learning gains' occurred in both pilot and reference school with little difference between them. Similarly, few differences between intervention and control groups (see below) in pupil questionnaire responses were found in the Wessex Healthy Schools Award study.[44] Overall results in the Health Promotion Schools of Excellence project[45] showed 'encouraging' 1 year trends in health-related behaviour (see below) but no changes in either grade 4 to 8 children or young people in grades 9 to 12. There was also no change in the level of risk detected in grades 9 to 12. Disease or lifestyle-specific results are grouped below under the nine areas of Curriculum Guidance Five.[12]

Substance use and misuse

Pupils in pilot secondary schools in the HEA European Network of Health Promoting Schools project[26] were less likely to report smoking or drinking alcohol than reference school pupils at the beginning and end of the project, but there was no change attributable to the intervention. In the Wessex Healthy Schools Award study,[44] although both intervention and control schools showed an increase in the percentage of current smokers among boys in years 7 to 8, the rise was significantly smaller among boys in intervention schools. Average reductions were found in the number of year 11 pupils who were current smokers in the intervention group compared with increases in current smokers in the control group; however, it is not clear if this reached statistical significance. These results are consistent with reported changes in attitudes to smoking. Non-significant positive effects of the intervention were found concerning drug use in year 11. Alcohol related results were inconclusive. The Health Promotion Schools of Excellence project[45] reported knowledge gains in the area of substance use and abuse among children in grades 4 to 8.

Sex and family life education

The Health Promotion Schools of Excellence study[45] reported knowledge gains in the area of human sexuality among grades 4 to 8. The Denmark School and Community Pregnancy Prevention programme found that adjusted pregnancy rates in the intervention area significantly decreased from an annual average of 77 pregnancies per 1000 prior to the intervention to 37 per 1000 during the intervention, and rose to 66 per 1000 after the intervention.[54,55]

Food and nutrition

The healthy eating policy study,[46] which was based on a postintervention comparison of intervention and control schools, found that more children and young people chose school lunches in the intervention school, where school lunches had been modified to make them healthier, and that intervention pupils had significantly fewer and healthier snacks at school than controls. Self-reported breakfast consumption was comparable, although pupils from the intervention school had a higher consumption of full-fat milk. No differences were found in the consumption of confectionery or fizzy drinks outside school.

Three RCTs of programmes using a health promoting schools approach focused on nutrition. Both Heart Smart[49] and the Cardiovascular and Adolescent Trial for Cardiovascular Health[48] programmes were successful in modifying school lunches. Fat intake and dietary cholesterol were significantly reduced in the Cardiovascular and Adolescent Trial for Cardiovascular Health schools,[48] and the intervention school students reported healthier food choices, although no significant differences were found in blood cholesterol. Children and young people in the Heart Smart intervention schools[49] had significantly increased high-density lipoprotein (a healthy outcome) compared to controls. Students choosing 'cardiovascular healthful' lunches in Heart Smart schools[49] showed the greatest reduction in total cholesterol. In the third RCT, all students receiving the Great Sensations intervention[47] showed an immediate reduction in salty snack food consumption but only those receiving class instruction showed sustained reductions in the use of these foods. Conversely, only students who did **not** receive the instruction increased their consumption of high-sugar and high-fat foods. The Cardiovascular and Adolescent Trial for Cardiovascular Health[48] study evaluated the added benefit of the family intervention, and found that pupils in the latter arm of the study had greater dietary knowledge gains than the school-only intervention group. This arm included activity packs for parents to complete complementing school curricula, score cards to encourage family involvement and family fun nights with dance performances, food booths, healthy snacks, distribution of recipes and games. This was not the case in Great Sensations schools,[47] where two telephone calls and three brochures to parents did not increase children's knowledge. In the evaluation of the three comprehensive school programmes,[50] only one showed a statistically significant improvement in the nutrition profiles (students were asked to specify how often they ate certain foods from particular groups); this was the one programme which involved both 'healthful' changes to the school environment and 'parental support'.

The HEA European Network of Health Promoting Schools evaluation,[26] which carried out an overall evaluation of healthy eating, even though some schools did not intervene on healthy eating, found no differences between schools in terms of trends on self-report of a variety of healthy eating indicators such as positive attitudes towards healthy eating. Some schools in this project were successful in increasing the provision of healthy meals in schools. The results of the Wessex Healthy Schools Award study,[44] which had a similar design in this respect, were inconclusive.

Health-related exercise

Fitness was evaluated in three of the studies. The first, Heart Smart,[49] was a programme in which parents were involved in planning the intervention, which offered a 12 week programme promoting physical fitness to teachers and parents at high risk of heart disease, as well as fitness promotion in PE sessions at school; improvements were found among both boys and girls but only the former reached statistical significance. Fitness was also evaluated in the Cardiovascular and Adolescent Trial for Cardiovascular Health,[48] in which the time devoted to vigorous physical activity in PE lessons was successfully increased and exercise was promoted, but in which the family and ethos/environment components concentrated on healthy eating not exercise. This study showed no improvement in fitness. The Health Promotion Schools of Excellence programme covered multiple topics, and although not all schools tried to improve fitness, walking programmes were common. This study[45] showed improvements in all physical categories of the American Alliance of Health Physical Education, Recreation and Dance 'Physical Best' assessment – these were 'run', 'sit-ups', 'pull-ups' and 'flex'. No changes in body mass index were found.

Safety

The Health Promotion Schools of Excellence study[45] reported knowledge gains in the area of safety and first aid among grades 4 to 8.

Psychological aspects of health

Three interventions specifically targeted aspects of general psychological health including self-esteem and relationships, and all three of these

also provided interventions for staff. Only two measured these aspects of psychological health and both showed some effect. Although no statistical analyses were presented, the HEA European Network of Health Promoting Schools project[26] found, in the context of an upward trend in self-esteem in all schools, that self-esteem scores improved more in pilot primary schools than in reference and control schools. Simple changes to schools, such as involving students in planning, were reported qualitatively to have an impact on pupils' general (as opposed to health-related) behaviour and on their self-esteem. In addition, in the primary phase, more pupils in pilot than reference schools reported that incidences of bullying had decreased. Bullying was also the focus of a before-and-after study.[51] There was a significant reduction in reported experiences of aggression and bullying over the 2 year study period. It was suggested that the intervention fostered a culture which sanctioned reporting of bullying by other pupils. The authors comment that this was not planned, but emerged because of the trusting relationship that was built up between staff and pupils. The Heart Smart project[49] targeted self-esteem, but measured only cardiovascular health-related outcomes.

Three other studies measured aspects of psychological health related to their heart disease prevention goals. The Health Promotion Schools of Excellence project[45] reported gains in attitudes in the areas of personal responsibility and rights and roles (27%) among grades 4 to 8. The Wessex Healthy Schools Award study[44] found no change in 'taking responsibility for self'. In the Cardiovascular and Adolescent Trial for Cardiovascular Health,48 intervention school students showed significant gains in perceived social reinforcement for healthy eating and self-efficacy measures for diet and exercise after 1 year, but not at follow-up. Self-reported positive social support for physical activity differed between the end of the third and the fourth grade only.

Personal hygiene

The Health Promotion Schools of Excellence project[45] reported knowledge and attitude gains in the area of disease prevention and healthy body, respectively, among grades 4 to 8. A small Danish randomised controlled study[53] found that increasing curriculum input and parental involvement produced no significant differences between the dental health of the intervention group and those receiving usual care – which included free toothpaste and regular fluoride rinses.

Environmental aspects of health

The Health Promotion Schools of Excellence project[45] reported attitude gains in the area of healthy environment and knowledge gains in consumer health and community health, respectively, among grades 4 to 8. The two-school RCT of the Sunshine and Skin Health programme, which used a health promoting schools approach,[52] found positive changes in knowledge and attitudes in the intervention school. After the intervention, the fourth graders said they more frequently used sunscreen during the summer, fifth graders said they less frequently did so and the sixth graders reported no change in this behaviour compared with control students. All students receiving the curriculum also said they used sunscreen in winter more than did control students. Fifth and sixth graders, but not fourth graders in the intervention school, reported wearing protective clothing more frequently immediately after the intervention. At the 8 week follow-up this applied to all students. Intervention students reported sunbathing less often at immediate follow-up.

Effects on the school

The HEA European Network of Health Promoting Schools evaluation[26] reported that although many schools broadened their concepts of health promotion, only a minority of project schools developed general health promotion policy documents. Most schools restricted themselves to developing policies on particular topics. By the end of the project, many pilot schools were seeking to adjust the balance of teaching time between National Curriculum subjects and cross-curricular themes. Project schools made increasing use of outside agencies to support and contribute to health promotion. There was a marked increase in the number of whole-staff development activities on health in the pilot schools and commitment of key individuals was reported as central to the initiative's success. Several schools made improvements to the physical environment, including safety aspects and opportunities for physical activity and relaxation. They actively involved pupils in planning these.

Although the Wessex Healthy Schools Award study[44] found small gains in smoke-free environments, healthy food choices, healthy workplace for staff, stimulating, clean healthy environment and equal opportunities for health, none of these proved statistically significant in the audit. There was no effect on physical activity. The study of anti-bullying activities[51] acknowledged the importance of good communication between staff and the full involvement of all those concerned, including pupils, staff, parents and governors.

Impact on school lunches is described in the section on healthy eating.

Costs and resources

All the pilot schools in the HEA European Network of Health Promoting Schools study[26] considered that the provision of funding had made a significant positive impact on their health promotion activities. Schools could apply for up to £18,000 over 3 years. Overall, the greatest expenditure was used to enable existing staff to undertake the additional work involved in becoming a health promoting school. Support costs varied from school to school in the Wessex Healthy Schools Award study.[44] Support came from either Local Education Authority (LEA) Advisers (£45 per hour) or health promotion officers (HPOs: £13 per hour) The largest amount of support in one school was 45.5 hours given by an LEA Adviser, costing £2047.5; the smallest was 2.8 hours, also given by an LEA adviser and costing £126. Average costs for schools supported by the LEA was £676.38 and by HPOs was £327.87. Two control schools reported costs – one used an HPO, costing £168.95; the other had 1 hour of LEA support at £45. The Health Promotion Schools of Excellence project[45] gave the cost per pupil in the first year of the study as $8.61 and estimated that the entire cost of the programme per pupil throughout a 13 year school career to be $135.00.

Of the remaining studies, where resource information was given, it included financial support, training sessions for teachers and non-teaching staff, manuals and other programme materials, and external help with planning and ongoing support. Two studies did not provide details about resources.

Generalisability

Of the evaluations of health promoting schools, only the HEA European Network of Health Promoting Schools study[26] covered a wide range of English schools, in terms of age, location and the inclusion of special schools. In this case the results may be generalisable to other English schools. Both the Wessex Healthy Schools Award study[44] and the healthy eating policy study[46] were limited to secondary schools within a given geographic area (Wessex and Lothian Region, respectively). The Health Promotion Schools of Excellence project[45] took place in the USA, so it is uncertain how applicable the results are to British schools. With the exception of the anti-bullying policy study based in one Sheffield school,[51] none of the evaluations of programmes using a heath promoting schools approach originated in the UK.

Discussion

Identification and inclusion of studies – definitions of health promoting schools

The health promoting schools initiative is part of a continuing process of development of health promotion in schools. The concept is still relatively new, and development is continuing. Although often described as such, it is not really an intervention or a project, but a way of delivering health promotion. Its aim is to enable schools to develop in such a way that those learning or working in schools enjoy better health. In order to help schools develop in this way, a number of interventions or projects have been set up which carry various labels to do with health promoting schools. Although it is clear from the above that the initiative is a process not a product, the schools taking part have called themselves 'health promoting schools'. Although there are clear criteria defining what constitutes a health promoting school, schools are not required to meet all of these criteria in order to call themselves, and be recognised as, health promoting schools. Recognition is given to schools who are explicitly developing in the right direction. To make matters more complicated, schools may be developing in this direction and be meeting many of the health promoting schools criteria without explicitly adopting the label 'health promoting school'. From this it follows that the definition of health promoting schools is not clear cut and the nomenclature is very complex. In such circumstances, systematic reviews of the literature are flawed. We have searched the literature widely and included the full range of pertinent studies we identified. Together they provide a picture of the sort of experimental studies which have been undertaken and demonstrate the inherent complexity of applying the systematic review methodology to this type of intervention.

For these reasons it is perhaps unsurprising that the initial literature search focusing on experimental evaluations of health promoting schools had a low yield and it was necessary to extend the search criteria dealing with relevance. By doing so we extended the number of initiatives which could be considered and enabled more detailed consideration of the complexity of the research questions posed by the Health Technology Assessment programme. The extension was justified on the grounds that it covered the three domains specified as essential in the English definition[30] together with school participation which is essential to the ethos of the health promoting school. These criteria appear to be common to all the interventions

developed within UK health promoting schools schemes, although there is variety in which of the 12 WHO criteria are addressed. In other ways this demarcation is artificial because the concept of the health promoting school is part of a continuing process of practice development which differs only slightly from what has gone before. For example, one difference between an 'explicitly' health promoting school[23] and a health promoting school approach appears to be the added emphasis on school staff well-being in the former. The boundary is, however, not clear-cut because the English definition of 'explicitly' health promoting schools[30] appears to play down the importance of staff well-being. Another possible difference is the greater emphasis in the 'explicitly' health promoting school on holistic as opposed to topic-based approaches to improving health. However, here again the boundaries are not clear cut. Most of the schools in the European Network of Health Promoting Schools study[26] restricted themselves to developing policies on particular topics. Finally, the term 'health promoting school' appears to be used more commonly in Europe than in the USA, where the term 'comprehensive school health programme' has been used to describe interventions using multifaceted whole-school approaches. Interventions in the USA are therefore less likely to carry the explicit label health promoting school even though they meet all the criteria. For example, Heart Smart, which was not described as a health promoting school programme, is a programme in which the hidden curriculum is consciously targeted, with a philosophy of promoting self-esteem and responsibility for health decisions running throughout the programme, as well as measures to promote positive role modelling by staff and to address their health needs.[49] In this report we have made a distinction between 'explicit' health promoting schools, which have adopted that label, and schools using the health promoting schools 'approach', which appear to be adopting the health promoting schools way of delivering health promotion but have not adopted the label, but this distinction may be arbitrary.

Decisions about which studies were and were not included in this review were also dependent on what was recorded about them in the available literature. Relevant studies of appropriate interventions may have been left out because reporting of details was constrained by the length of the publication or because it was not considered relevant. For example, two studies were identified which described and evaluated a health promotion initiative in Canada.[56,57] The focus in these studies was on the effectiveness of using a coordinated approach to school health in which multi-disciplinary committees planned activities unique to each school. The evaluation paper[57] did not give details of the interventions, a range of which were described in an earlier paper.[56] One of the examples given in the latter used a health promoting school approach. The school negotiated with the local bakery to obtain low-fat cookies which they sold in the school canteen, to complement the heart health curriculum, so combining environment, curricular and community approaches. The other examples involved activities in only two domains. As the evaluation paper did not state which of the possible interventions were assessed, it could not be included in the review. Some of the studies identified in the review of reviews of the health promoting school appeared to include programme elements in all three domains, but once the original paper was obtained and assessed it became clear that they had not in reality covered three domains. In one, no curricular component was included,[58] and in a second there was no community/parent component.[59] Other studies identified in the systematic review did clearly cover all three domains but the primary studies reported no evidence of active school participation.[60–64]

At the UK Health Promotion Research Conference (Edinburgh, 1998) a number of papers were presented describing ongoing research which was not at a stage to be included in a review. These included an evaluation of the Wessex Healthy Schools Award[65] and a large RCT evaluating safety promotion in primary schools including health promoting schools.[66]

Evaluating the health promoting school

Evaluation of health promoting schools initiatives present methodological challenges, and there is no clear agreement on the most appropriate methods. Important discussions and debates about both the concept of health promoting schools and approaches to evaluation took place during the course of this project. In terms of the Health Technology Assessment programme, the trajectory of the 'intervention' may not yet be sufficiently stable to warrant evaluation in a systematic review. However, health promotion is a rapidly developing and evolving field, and experimental model research is complex, expensive and takes a long time. The results of this sort of research are therefore always likely to lag behind the results of experiential learning and may never meet the criteria for a 'gold standard' evaluation in a systematic review.[67] It is, however, still important

to ensure that the results of experiential learning are validated before they are disseminated. This review covers a wide range of experimental studies, most of which do not meet widely accepted criteria for a robust study. It excluded studies which were not experimental in design and therefore excludes much of the literature on which justification for the development of the health promoting school approach rests.

The health promoting school initiative has developed in the light of the relatively low success rate of previous approaches to health promotion in schools, which focused on health-related behaviour. It has developed the implicit goal of improving health in the WHO sense of physical, mental and social well-being. Although there are good reasons to suppose that interventions which take mental and social well-being into account are likely to be more successful in improving physical health and health-related behaviour in the long-term, they are unlikely to deliver immediate changes in physical well-being. The health promoting schools concept therefore sits uncomfortably within a framework for evaluation that requires the demonstration of immediate physical and health-related behaviour outcomes. Yet these outcomes were those most commonly employed in the studies we identified and only a minority of studies evaluated the impact of the interventions on mental well-being.

Some of the studies included in this review aimed to evaluate the effectiveness of the different domains of the health promoting school approach by comparing one combination of approaches with another,[47,48,50] but most compared the health promoting schools approach with standard practice and most failed to clearly define the latter. This is a problem common to many other evaluations of school health promotion programmes. It is therefore difficult to answer with precision either of the two research questions 'Is there evidence that Health Promoting Schools or programmes utilising the health promoting schools approach are effective?' and 'Is there evidence that Health Promoting Schools or schools with programs utilising the health promoting schools approach are more effective than other ways of delivering health promoting interventions and what are the relative costs?'.

Findings

Each intervention included in this review was unique in its conception, aim and implementation. Each study used a range of health outcome measures, and none were common to all studies. The large UK studies of health promoting schools used a common questionnaire to evaluate change across all schools. Data were therefore collected on healthy eating and smoking in all schools regardless of the intervention implemented. Changes occurring in schools which implemented healthy eating or smoking interventions could have been masked by lack of change in schools implementing other policies. Because of the variety of interventions and outcomes measured it is impossible to synthesise the results of studies which were identified. Nevertheless, by drawing together in one place the range of interventions which have been evaluated in experimental studies, this review is able to provide useful evidence about which aspects of health are most likely to be amenable to change using this approach.

Taken together the studies included in this review show that a health promoting school approach can impact on the social and physical environment of the school in terms of staff development, school lunch provision, exercise programmes, and social atmosphere. Although failing to demonstrate change on all measures in all studies, the approach could be successful in improving aspects of health-related behaviour such as dietary intake and physical fitness. The programmes which targeted healthy eating or cardiovascular disease prevention were more successful in achieving these ends than those with more general health goals. The approach also appeared successful in impacting on aspects of mental and social well-being which have in the past proved difficult to change. The two studies which looked at bullying both showed a reduction in reported experiences of aggression and bullying. A reduction in bullying is a valuable goal in its own right but has also been shown to be an important cause of depression and a risk factor for physical health problems in childhood.[68,69] It is difficult from the descriptions of the studies to be sure what was the effective ingredient, but both interventions specifically targeted psychological health and both tried to involve staff in the development of programmes. It is possible that a whole-school approach in which an attempt is made to improve mental and social health by changing the way both staff and pupils relate to each other, is important for success. If this is the case the measurement of staff mental health might need to be incorporated into health promoting school studies. Only one study reported changes to staff health but these were focused on cardiovascular disease rather than mental and social health.

It is difficult to draw conclusions from the small number of studies which attempted to isolate the

impact of the different domains of activity. One programme involving parents appeared to make little difference;[53] in another two programmes beneficial differences were observed.[47,48] One of the programmes which was successful described a range of parental involvement including personal contact and support for parental behaviour change. The one which was not effective gave brief information based on parental contact.

The studies we reviewed were less successful in changing health damaging behaviour such as smoking or alcohol misuse, or specific skills such as dental care. It is notable that one study which adopted a health promoting school approach and specifically focused on sex education showed an impressive short-term reduction in pregnancy rates, with a smaller reduction in the longer term. Substance misuse and safe sex have proved the most difficult outcomes to influence in school health promotion programmes, so the success of the latter study is worth noting. Longer and more intensive programmes may be necessary to enable young people to pass through all the necessary phases of behaviour change.[36]

The direct costs of the two English health promoting school initiatives were relatively low, amounting at maximum to £6000 per annum per school together with staff support costs, which were also low. These small amounts of funding were regarded as very important in the implementation process. As many schools are currently unable to develop in ways they would like because they are over-stretched both in terms of staff time and financial resources, a relatively small amount of dedicated financial support may be sufficient to encourage schools to develop in health promoting ways.

Conclusions

The health promoting schools approach can have a positive impact in both primary and secondary schools on aspects of the social and physical environment of the school, family and community links with the school, the school curriculum and pupils' knowledge. There is suggestive evidence of an impact on pupils' self-esteem and aggressive behaviour, dietary intake, physiological measurements and a few aspects of self-reported and observed health-related behaviour. None of the interventions were designed to achieve all of these aims and none were demonstrated to achieve all the aims that they had been designed to achieve. The conclusion which can reasonably be drawn is that carefully and skilfully executed interventions following the health promoting schools approach have the potential to improve children's and young people's health. Given the relatively low cost of these interventions and their potential for improving health, further experimentation should be encouraged.

The evaluation of a small number of these interventions has been carried out in large and expensive studies using careful design, attention to detail and thorough reporting. Studies of this approach remain methodologically challenging, and too little attention has been given to the way in which the intervention and the evaluation impact on each other. There is a need for more widespread understanding of the aims of health promoting schools as well as further debate on the optimum way of evaluating such interventions.

Summaries of included studies

(1) The HEA European Network of Health Promoting Schools evaluation (1997), UK[26]

Name of intervention. European Network of Health promoting schools.

Authors' objectives. These were: to identify methods by which schools can develop as health promoting institutions and the factors which influence this process; to assess the impact of school health promotion on young people in terms of their knowledge, attitudes and to a lessor extent, their behaviour; to assess what can be achieved by schools with the use of some additional resources.

Study methodology
School selection. A total of 21,000 English schools were invited to take part in the initiative. Of the 500 who replied in full, 48 schools were selected to participate. The two main selection criteria were: (1) evidence of strong commitment both to the development of health education and the project as a whole and (2) the need for each pilot school to be matched with two reference schools.

Design. Schools were randomly allocated the status of 'pilot', 'reference 1' and 'reference 2' in matched triads.

Outcomes measured and tools used. These were: attitudes, knowledge, self-esteem and self-reported behaviour from longitudinal questionnaire survey; qualitative data from cross-sectional

survey; and perceptual and contextual data provided by school staff. Also, surveys of staff and parents were undertaken.

Time between intervention and post-tests. Children and young people were surveyed in 1994, 1995 and 1996.

Participants
Eighteen primary schools; 21 secondary schools and nine special schools in England participated.

Intervention
Health needs addressed. These were varied.

Setting. Primary, secondary and special schools in England participated in this study.

Programme development. Schools provided school health education development plans to identify the activities they would undertake in order to develop as health promoting schools. The number and nature of the activities were tailored by individual schools.

Theory base. This was unclear.

Content. This varied from school to school. Over the 3 years, pilot schools were expected to address the three domains of the European Network of Health Promoting Schools' criteria: school ethos and environment; curriculum and family; and community. The full report (unpublished) provides detailed case studies of how this was achieved.

Intensity/duration of intervention. This is 3 years and is ongoing.

Provider of activities. All staff were involved.

Resources. Pilot schools could apply to receive funding for health promotion initiatives and payment of staff up to a maximum of £18,000 over 3 years. They also received professional guidance on development planning, and the key staff from each pilot school were given training on handling sensitive issues, working with parents and the community, and dealing with the media. Regional and national networking meetings also took place.

Results
The results of the longitudinal student survey found generally that there was an improvement over time across all project schools in health knowledge, with little difference between the pilot and reference schools. Pupils in pilot secondary schools were less likely to report smoking or drinking alcohol than reference school pupils at the beginning and end of the project. The qualitative survey found that most interviewees were aware of and supported the schools' health promoting initiatives. Pupils had absorbed a considerable amount of knowledge about their health and influences on it. They were aware that applying this knowledge could benefit their health and well-being, but admitted that often this did not happen. Teachers were cautious about learning gains in less quantifiable areas.

Social and psychological effects. Levels of self-esteem rose in most schools during the study, more so in primary schools than in secondary schools. Some pilot schools showed a greater rate of improvement than reference schools. Some primary schools made changes which reduced the bullying rate, and pilot school pupils were less likely to be bullied.

Effects on the organisation. Many schools broadened their concepts of health promotion. In all schools, key committed individuals were central to the initiative's success. Only a minority of project schools developed broad health promotion policy documents – most focused on developing policies on particular topics. Simple environmental changes to schools where pupils were involved in planning and development had a significant impact on pupil (general as opposed to health-related) behaviour and on their self-esteem. By the end of the project, many pilot schools were seeking to adjust the balance of teaching time between National Curriculum subjects and cross-curricular themes, increasing the coverage of health topics. Project schools made increasing use of outside agencies to support and contribute to health promotion. There was a marked increase in the number of whole-staff development activities on health in the pilot schools.

Costs. All pilot schools considered the funding to have made a significant impact on their health promotion activities. Each school could apply for up to £18,000 per year over 3 years. Overall, the greatest expenditure was used to enable existing staff to undertake the additional work.

Comments
This study exemplifies the trade-off between design quality and intervention quality in the way that each school's tailoring of the scheme makes the replicability criterion unworkable. However, this is overcome if the input to schools in terms of funding and support is seen as the intervention. Unfortunately, it is not clear how consistent this was. The full (unpublished) report provides a wealth of detail in the form of case studies of how

individual schools implemented the scheme, and much qualitative data is presented. No statistical analysis is presented.

(2) Wessex Institute (1998), UK[44]

Name of intervention. Wessex Healthy Schools Award.

Authors' objectives. These were: to evaluate the impact of the Wessex Healthy Schools Award on health promotion activity, on the organisation and functioning of participating schools, and on all staff; to identify models of good practice; to determine effects on pupils' health-related knowledge, attitudes and behaviour; to determine methods used to implement change; to evaluate the feasibility and acceptability of different approaches; to estimate resource costs; and to disseminate findings.

Study methodology
School selection. Schools volunteered to participate. Eleven intervention schools were recruited from those about to start the award scheme in autumn 1995, and control schools were selected and matched on the basis of the area, percentage of free school meals and social status. Difficulties in recruiting control schools meant that only five were recruited.

Design. This was quasi-experimental. Schools were **not** randomly allocated to intervention or control conditions. The unit of analysis for responses to pupil questionnaires was the school.

Outcomes measured and tools used. Process evaluation involved a self-completion questionnaire and a school audit, curriculum and policy review, observation of the environment and a health education lesson, semi-structured interviews with teachers, non-teaching staff, parents and governors, and focus group interviews with pupils. Pupils' health-related knowledge was assessed by a self-completed questionnaire. Audits, observations, curriculum reviews and pupil questionnaires only were used in control schools. The tools were tested in a pilot study in three schools not in the sample.

Time between intervention and post-tests. Baseline data were collected in autumn 1995 and follow-up data in spring 1997. The pupil questionnaire was given to year 7 and 11 pupils at the baseline and to those in years 8 and 11 at follow-up.

Participants
Sixteen secondary schools in Hampshire (14), Wiltshire (1) and Dorset (1), England, participated. Pupil numbers ranged from 440 to 1486, while staff numbered from 27 to 96. The pupil sample was mostly white with between 1 and 20% Asians in a school and 2% black pupils.

Intervention
Health needs addressed. These were varied.

Setting. Secondary schools in Wessex, England, participated.

Programme development. The Wessex Healthy Schools Award scheme was developed through an alliance between education and health authorities, with local schools. Schools agreed objectives and targets with an HPO or teacher adviser supporter, within the constraints of their resources and other priorities.

Theory base. This was unspecified. The scheme aims to help schools become health promoting schools as defined by the WHO.

Content. This varied from school to school, within the framework of the scheme, which covers the key areas of curriculum, community, a smoke-free school, healthy eating, physical activity, taking responsibility for one's own health, health promoting workplace, environment, and equal opportunities and access to health. Each key area has a number of statements or targets relating to it which schools work to achieve. Action is required on the curriculum and two of eight other statements.

Provider of activities. All staff were involved.

Intensity/duration. The duration was 1 year to 18 months.

Resources. The amount and type of support provided varied from school to school. Guidance was received from LEA advisors or HPOs. There were termly meetings of Wessex Healthy Schools Award advisors. (See also costs, below.)

Results
One intervention school withdrew after the baseline assessment. The audit results suggest that intervention schools made more progress than controls in all areas except physical activities and taking responsibility for oneself. Intervention and control schools had similar mean audit scores at baseline in most areas; the total mean score (and standard deviation) at the baseline was intervention ($n = 10$) 58.9 (7.5) and control ($n = 5$) 58.6 (13.7). The change at follow-up was intervention 10.8 (7.4) and control 0.5 (18.6), suggesting that intervention

schools performed better, but the difference in mean total scores between intervention and control schools failed to reach statistical significance ($p = 0.29$). The survey of staff, parents and governors identified that, at the baseline and follow-up, many did not feel well informed about the scheme, and the level of consultation/involvement and availability of training was variable, although the scheme was generally viewed positively at follow-up. Pupils were not always aware of the school's participation in the scheme. Pupils' health-related knowledge was high at the baseline, and changed little. Self-reported smoking rose in both groups of year 7/8 pupils, though less so in intervention schools. It reduced in intervention schools among year 11 pupils, although it increased in control schools. Positive but non-significant effects on drug use were found in year 11 intervention school pupils, with no effects in years 7/8. The results in the areas of alcohol and healthy eating were inconclusive. No significant effects on exercise were shown.

Social and psychological effects. No information was provided.

Effects on the organisation. Being part of the scheme had a positive impact on the provision and practice of curriculum-based health education, with pupils benefiting from a more participatory approach to teaching. Lack of time and resources, poor facilities and the catering service were seen as barriers to change. The Wessex Healthy Schools Award appeared to have a positive effect on school management structures and processes.

Costs. Costs varied from school to school. The amount of financial support ranged from 45.5 hours given by an LEA advisor at £2047.50 to 2.8 hours by an LEA advisor at £126. Average costs for schools supported by the LEA was £676.38, and by HPOs was £327.87. HPOs were costed at £13/hour, and LEA advisors at £45/hour. Other resource costs (materials, telephone calls, etc.) were stated to be negligible. Additional costs were incurred by termly network meetings of all Wessex Healthy Schools Award supporters.

Comments
The authors note that the study lacked the power to detect significance through using the school as the unit of analysis, and that they were unable to recruit 12 intervention and 12 control schools as intended. It is significant that pupils were not necessarily aware of the school's involvement in the scheme, and the authors comment that the lack of active involvement in the majority of schools of parents, support staff, governors and pupils raises doubts about the achievement of a whole-school approach to health through the project. In this type of scheme, with schools tailoring the scheme to meet their needs and resources, the funding and other support provided can be seen as the intervention, but this seems to have varied considerably between schools.

(3) Sobczyk and co-workers (1995), USA[45]

Name of intervention. The Health Promotion Schools of Excellence.

Authors' objective. This was to review the development and progress of a comprehensive school health project – the Health Promotion Schools of Excellence.

Study methodology
School selection. All schools in Jefferson County Public School system were eligible. Schools were selected by committee on a competitive basis via written application, and were assessed on commitment and on well-defined needs, objectives and action plans.

Design. A pre- and post-test design was used.

Outcomes measured and tools used. Staff were tested using Emory University's Health Risk Appraisal Survey and the YMCA's 'Y Way to Fitness' evaluation. Students (grades K to 12 ('K' indicates kindergarten)) were evaluated using the American Alliance of Health Physical Education Recreation and Dance 'Physical Best' test of fitness; grades 4 to 8 also completed the Student Health Education Evaluation survey of health-related knowledge, attitudes and behaviour, and grades 9 to 12 the Youth Risk Behaviour survey of health-related behaviour and level of risk.

Time between intervention and post-tests. Students and staff were tested at the beginning and end of the school year. Staff were also tested before and after the 'summer institute'.

Participants
In the first year (1992–1993), nine elementary, three middle and three high schools (a total of 11,500 students) participated. In the third year (1994–1995), 16 elementary, three middle, three high and one environmental school (totalling 16,000 students) too part. Staff were also evaluated.

Intervention
Health needs addressed. These were cancer control, cardiovascular risk reduction, injury prevention and physical fitness.

Setting. The schools were located in Jefferson County school district, USA.

Theory base. This was not specified.

Programme development. A three-member team from each school attended a 5 day 'summer health institute' to gain health-related knowledge, relevant theories and teaching methods, and help with developing action plans. Each school was required to organise a health promotion committee and to submit monthly reports.

Content. There were no specific requirements. Schools were encouraged to develop projects combining various school disciplines, involving students, teachers, non-teaching school staff and families. Common projects included health fairs, food awareness programmes, walking programmes and first aid training.

Provider of activities. School staff participated.

Intensity and duration of intervention. No details were provided.

Resources. Each school received a minimum of $1000 per year, a 'Physical Best' educational kit, age-appropriate testing materials with technical support, a newsletter for each family and ongoing organisational support.

Results
Adult 'summer institute' participants in the first year showed slight gains in dietary behaviour, motor vehicle safety, frequency of Pap smears and breast and rectal examinations in women, but no change in weight, exercise, smoking, alcohol consumption, mammograms in women or rectal examination in men.

Composite results for all students in the American Alliance of Health, Physical Education Recreation and Dance 'Physical Best' assessment (1993–1994) showed improvement in all performance categories ('run', 'sit-ups', 'pull-ups', 'flex') and a stable body mass index. The results of the survey in grades 4 to 8 (1992–1993) showed an improvement in four categories of health-related attitudes (personal responsibility, healthy body, healthy environment, rights and roles) and in grades 6 to 11 of knowledge (human sexuality, safety and first aid, disease prevention, substance use, consumer health, community health). No change in behaviour was seen in children in grades 4 to 8 in the survey or in grades 9 to 12.

Social/psychological effects. No information was provided.

Effects on the organisation. No information was provided.

Costs. The cost of the programme for a child from kindergarten up to the age of 13 years was estimated at $135.00.

Comments
No baseline information was given about the participating schools. The development of projects within each school would have enabled them to use interventions appropriate to each setting, but lack of information about the projects in each school limit the conclusions that can be drawn about effectiveness. Results were not given for every year of the study in all areas.

(4) Young (1993), UK[46]

Name of intervention. Untitled healthy eating policy intervention.

Author's objectives. These were too determine the effect of a school's health promotion initiative on pupils' knowledge, attitudes and behaviour, including snack and lunch choices, in relation to healthy eating.

Study methodology
School selection. The intervention school was selected because it had developed a healthy eating policy as part of a whole-school approach to health promotion. Two control schools were matched for location (but the intervention school had a higher proportion of pupils from small villages), proximity to shops and percentage of pupils entitled to free school meals.

Design. This was a controlled study.

Outcomes measured and tools used. Pupils' knowledge, attitudes, eating behaviour were assessed by a questionnaire and interviews (staff) and break-time snack consumption (questionnaire and observation); uptake of school meals and census data were also recorded.

Time between intervention and post-tests. This was unclear.

Participants
A total of 158 young people in the second year (mean age 13.5 years) in secondary schools in Lothian, Scotland, participated.

Intervention
Health need addressed. This was nutrition.

Programme development. This evolved through discussions with pupils, parents, teachers, school meals staff and health education staff from the area health board.

Theory base. The study was based on the Scottish Health Education Group's report *Promoting Good Health – Proposals for Action in Schools* (1990).

Content. This was in three areas:

(a) Ethos/environment. Changes were made to the food and drinks available in schools, including the replacement of high-sugar fizzy drinks and confectionery with fruit juice, fruit and low-fat crisps, the use of wholemeal bread only for sandwiches, and the substitution of full-fat for skimmed milk. Healthier ingredients and cooking methods were introduced in the preparation of school meals. The school kitchen was made available to pupils during breaks for the preparation of healthy snacks. No 'tuck shops' were allowed. Dining room displays on healthy eating were provided, and the head teachers highlighted the theme in school assemblies.

(b) Curriculum. Relevant topics were incorporated into several subjects' curricula. No details on this were given.

(c) Family/community. Parents were involved in programme development, and their ongoing cooperation was sought. The school handbook described the changes made.

Provider of activities. Teachers and school meals staff participated.

Resources. No information was provided.

Results
The percentage of pupils choosing school meals was higher in the intervention school, both in the second-year sample and the whole school, but the difference was significant only in the latter. Pupils in the intervention school had significantly fewer and healthier snacks at school. Self-reported breakfast consumption was comparable, apart from higher consumption of full-fat milk by pupils from the intervention school. No differences were found in the consumption of confectionery or fizzy drinks outside school. The only significant differences in knowledge scores was the significantly higher scores among girls in one of the control schools; most of this variation was found in the responses to a question about fibre, which had been the subject of an assignment in that school prior to the study.

Social and psychological effects. No information was provided.

Effects on the organisation. No information was provided, other than changes described in the intervention.

Costs. No information was provided.

Comments
No baseline data were available from the intervention school prior to the implementation of the healthy eating programme, and the time between exposure to the intervention and collection of data was not clearly stated. Results were based largely on self-reported behaviour, with only a small amount of observation of pupils' food choices. The percentage of pupils having free school meals in all three schools was low compared to Scotland as a whole (3–4% compared to an average of 9.8%), which suggests that pupils may have come from relatively affluent backgrounds. The impact of the intervention on attitudes was not reported. The intervention was developed and implemented with school staff and pupils, parents and external agencies, and had a clear theoretical basis. The intervention appeared to be sustainable, but no information was given about costs and resources.

(5) Arbeit and co-workers (1992), USA[49]

Name of intervention. Heart Smart

Authors' objective. This was to present findings from $2\frac{1}{2}$ years of the Heart Smart intervention.

Study methodology
School selection. The area was selected for the mixed racial and socioeconomic distribution. No information was provided about whether all or some of the schools in that area were targeted.

Design. This was an RCT with two intervention and two control schools. The programme was implemented throughout the school, but data collected only from fourth and fifth grade children and young people.

Outcomes measured and tools used. The following were investigated: cardiovascular risk factors (serum lipids/lipoproteins, height, weight, skin fold measurements, waist circumference, blood

pressure), school lunch (self-reported lunch choices, school food analysed for nutrient content, plate waste studies to assess acceptability), physical fitness (run/walk performance assessed by Heart Smart-trained physical educators) and cardiovascular knowledge (unnamed test, analysed for measurement integrity).

Time between intervention and post-tests. Cardiovascular risk factor measurements were obtained at three intervals during the school year, and fitness and knowledge tests conducted in the autumn and spring. No details of the time-frame for school lunch measurements were provided.

Participants
These were children and young people from a mixture of ethnic groups, mainly from lower to upper-middle income families, in four elementary schools in a suburb of New Orleans, USA. Consent for cardiovascular measurements was obtained for 530 (61%) of the 870 eligible fourth and fifth graders. About 90% of the school population participated in the lunch programme.

Intervention
Health need addressed. This was cardiovascular health.

Setting. Elementary schools in New Orleans, USA, participated.

Programme development. The precede model[70] was used on programme planning and development. The purpose was to develop a programme targeting predisposing factors (e.g. knowledge and beliefs), enabling factors (resources and skills) and reinforcing factors (attitudes and behaviours of teachers and peers). A family programme was also developed. A health advisory committee was set up, to enhance school and family adoption of cardiovascular health principles, and involved parents, teachers, lunch personnel and Heart Smart staff.

Theory base. The intervention was based on social learning theory, and observations from the Bogalusa Heart Study.

Content. This was in three areas:

(a) Ethos/environment. Risk factor screening and after-class nutrition and exercise sessions were available for staff. A general programme philosophy of self-esteem and responsibility for health decisions was encouraged. A staff development programme was conducted to promote positive role modelling as well as optimal curriculum implementation. School lunches were modified. Whole-school activities such as fun runs were undertaken to reinforce the exercise programme.

(b) Curriculum. Cardiovascular health curriculum, including behaviour-oriented presentation of physiology, nutrition and exercise, with an emphasis on self-esteem, communication, assertiveness and decision-making, was set up. Physical education classes included fitness skills and personalised fitness activities.

(c) Family/community. Parents were involved in the health advisory committee. There was a parent volunteer programme and a newsletter. A 12 week programme promoted eating and exercise lifestyle changes in families of children and young people at high risk of cardiovascular disease.

Provider of activities. Teachers, PE instructors and school lunch personnel participated.

Intensity/duration. The whole programme lasted $2^1/_2$ years. The classroom curriculum consisted of 15–35 hours per year per grade. The exercise programme consisted of 12 lessons of 'Superkids – Superfit' plus a year-long fitness programme.

Resources. School cafeteria staff, PE instructors and classroom teachers all received special training. The staff development programme included a 2 day workshop, bimonthly booster sessions and optional after-class nutrition and exercise sessions.

Results
Fourth-grade children and young people participating in screening showed significantly higher knowledge gains than non-participants and control group children and young people, but generally knowledge gains were not significant. School lunches were successfully modified and children and young people choosing 'cardiovascular healthful' lunches showed the greatest cholesterol reduction. Physical fitness assessed by the 1 mile walk/run significantly improved in boys (non-significant improvement in girls). Those whose fitness improved showed significant reductions in blood pressure. Children and young people in the intervention schools had significantly increased high-density lipoprotein levels compared to controls.

Social and psychological effects. No information was provided.

Effects on the organisation. The whole-school approach was successfully implemented.

Costs. No information was provided.

Comments
This study evaluated a programme which fitted the definition of a health promoting schools approach. The intervention was judged to be feasible and appears to be sustainable, though no information was given about costs. The intervention was developed from a clear theoretical basis and with appropriate collaboration and training. No information was given about the level of parental participation. The authors describe the intervention in great detail and provide before and after data, discussing all outcomes. However, no details were given about what, if any, health promotion the control group received, and there was no discussion of attrition. No long-term follow-up was reported. The authors acknowledge the limitations of assigning schools to experimental conditions then analysing individual data.

(6) Luepker and co-workers (1996), USA[48]

Name of intervention. The Cardiovascular and Adolescent Trial for Cardiovascular Health.

Authors' objective. This was to assess the outcomes of health behaviour interventions, focusing on the elementary school environment, classroom curricula and home programmes, for the primary prevention of cardiovascular disease.

Study methodology
School selection. This was based on distance from one of the four field centres running the trial, their ethnic diversity, their food service's potential for intervention, and commitment to offering at least 90 minutes a week of PE and to participating in a 3 year study.

Design. This was an RCT, with 56 intervention and 40 control schools. Intervention schools were further randomised into two equal groups, to receive the school-based programme alone or plus a family-based programme. Most of the outcome data were collected by measurements on individuals, analysed by mixed-model analysis of covariance (ANCOVA) with the follow-up value as the dependent variable, the Cardiovascular and Adolescent Trial for Cardiovascular Health intervention group as the dependent variable and the baseline value as a covariate. The ANCOVA was controlled for sex, race, field site and the random effect of school within the site and intervention group. School-level measures analysed by repeated measures ANCOVA, with the Cardiovascular and Adolescent Trial for Cardiovascular Health intervention group as the independent variable.

Outcomes measured and tools used. At the school level, changes in the fat content of school lunches (recipe and menu analysis) and amount of moderate-to-vigorous exercise in the PE programmes (assessed by the System for Observing Fitness Instruction Time) were recorded. At the level of individuals, the serum cholesterol change was the primary end-point. Secondary end-points included blood pressure, body mass, aerobic fitness, psychosocial factors and eating and exercise patterns using recall measures, the Health Behaviour Questionnaire (reliability and validity assessed as adequate during the pilot phase) and the Self-administered Physical Activity Checklist (developed and validated during the Cardiovascular and Adolescent Trial for Cardiovascular Health).

Time between intervention and post-tests. Baseline measurements were recorded in autumn 1991, and the follow-up was in spring 1994. The Health Behaviour Questionnaire was administered each spring. Interim measurements of school lunches and the PE programme were taken.

Participants
A total of 5106 initially third-grade school children and young people (mean age 8.76 years) from ethnically diverse backgrounds in public schools in California, Louisiana, Minnesota and Texas, USA, who agreed to provide a blood sample at the baseline took part. Of the eligible population, 60.4% consented, and no significant differences were found among those who did and did not participate.

Intervention
Health need addressed. This was cardiovascular health.

Setting. Elementary schools in the USA participated.

Programme development. Standardised protocols were developed for use in all the intervention schools.

Theory base. This was not stated.

Content. The control groups received the usual health curricular, PE and food service programmes but none of the Cardiovascular and Adolescent Trial for Cardiovascular Health interventions. Three areas were considered:

(a) Ethos/environment. An 'Eat Smart' food service intervention was created to provide nutritious meals with a lower fat and salt content.

(b) Curriculum. The amount of moderate-to-vigorous physical activity was increased to 40% of the time spent in PE class. Classroom curricula included 'Adventures of Hearty Heart and Friends', 'Go for Health' and 'F.A.C.T.S for Five', addressing eating habits, physical activity and smoking through targeting specific psychosocial factors and developing skills.

(c) Family/community. Activity packets, complementing the classroom curricula, were sent home with students and required adult participation to complete. Score cards were used to reward and encourage family participation. Family members were invited to a 'family fun night' with dance performances, food booths with healthy snacks, distribution of recipes, and games.

Provider of activities. Classroom and PE teachers and food service personnel participated.

Intensity/duration. The intervention lasted 3 years.

Resources. Food service personnel attended a 1 day training session annually. Monthly follow-up visits to the schools and booster sessions provided ongoing information, help in planning and support. Classroom teachers and PE teachers had 1 to 1 1/2 days training annually. Standardised protocols were used at all sites.

Results
Intervention school students showed significant gains in dietary knowledge and intentions, self-reported food choices and perceived social reinforcement for healthy eating. Self-efficacy measures for diet and exercise significantly higher after 1 year but not at the follow-up. Self-reported positive social support for physical activity differed between the ends of the third and fourth grades only. Fat intake and dietary cholesterol were significantly reduced while salt intake marginally increased in intervention schools. No significant differences in blood cholesterol, aerobic fitness or measures of body size were noted. The school plus family intervention group had greater gains than the school intervention group only for dietary knowledge.

Social and psychological effects. No information apart from that given above was provided.

Effects on the organisation. The fat content of meals was significantly reduced compared to control schools, while the salt content rose in both; the student uptake of school lunches averaged 70–75% throughout. The intensity of physical activity in PE lessons significantly increased in intervention schools. All recruited schools maintained their participation in the trial. The staff training days were well attended and considered appropriate. All the schools held family fun nights and implemented over 90% of the specified activities.

Costs. These were not stated.

Comments
Only the school receiving the school meals, curricula and family-based programmes can be considered to have used a health promoting schools approach as defined in this review. This approach yielded additional gains only in dietary knowledge. The authors note that participation was high but that the programme was limited in its intensity. The content of both the intervention and control groups was discussed. The interventions were implemented according to standardised protocols; implementation fidelity was commented on and was rated as high. Attrition was reported and discussed. All schools remained in the trial throughout. Students leaving the district before the end of the trial were tracked (within a 100 mile radius) and underwent measurements to enable analysis according to the intention to treat principle. No significant baseline differences were found between participants and those lost to follow-up. Before and after intervention data were provided, and all outcomes reported. Schools were randomly assigned to the intervention or control group, but the analysis by individuals took account of this.

(7) Coates and co-workers (1985), USA[47]

Name of intervention. Great Sensations.

Authors' objectives. These were: to replicate the positive changes observed in previous tests of this programme; to determine the generalisability of this programme with a different population (black, inner-city high school students); and to permit a component analysis of class instruction, parent involvement and the school-wide media programme.

Study methodology
School selection. The two schools served immediately adjoining areas. No details of the method of selection were provided.

Design. This was an RCT with one treatment and one control school. Within the treatment school

there were two levels of the first factor (class instruction versus none) and two levels of the second factor (parental involvement versus none); eight classes were randomly assigned to the cells in the 2 × 2 design. Analysis of variance (ANOVA) was used to test the comparability of groups in food consumption at the baseline and the significance of differences among groups in snack consumption at subsequent assessments. The ANCOVA of change scores, using baseline measures as the covariate, was used to test the significance of changes observed between each assessment.

Outcomes measured and tools used. Salty snack consumption, healthy (target) snack consumption, food preferences, smoking and alcohol use, and physical activity were assessed by questionnaire (administered and monitored by research staff as part of classroom sessions).

Time between intervention and post-tests. Questionnaires were administered at the baseline, end of the classroom programme (six lessons, 4 weeks), end of the school year (1 month later) and after summer vacation at the beginning of the next school year (only for those still attending school). Follow-up rates for the final questionnaire were: classes/parental involvement, 52% (20/38); classes only, 70% (19/27); parental involvement only, 29% (39/129). An ANOVA was computed to test for baseline differences among those at school versus not in school at final follow-up; differences in consumption of all food groups were not significant.

Participants
There were 154 children in the treatment school and 130 in the control school from grades 10–12 participating in a mandatory one semester health education course. Socio-economic and racial data were not collected from the children, but 98.5% of all children in the treatment school and 86.6% in the control school were black. The classes randomised in the treatment school appeared to be 'roughly comparable' in socio-economic and racial composition.

Intervention
Health need addressed. This was cardiovascular health.

Setting. High schools in an inner-city area of Baltimore, USA, participated.

Programme development. The programme was based on social learning theory and followed principles of informative instruction, participatory classroom activities, personal goal setting, feedback and reinforcement.

Theory base. This was social learning theory.

Content. This was in three areas:

(a) Ethos/environment. A school-wide media programme was undertaken, comprising posters in hallways, school office and cafeteria, introducing the programme in week 1, listing high/low salt snacks in week 2, showing popular students eating low-salt snacks in week 3, and encouraged coupon redemption in week 4. Point-of-sale flyers suggesting low-salt snacks in cafeteria, cashiers trained to reinforce students purchasing low-salt snacks, announcements over public address system encouraged consumption of low-salt snacks.

(b) Curriculum. Classes were scheduled as part of the health education curriculum, and included information, goal-setting, problem solving (overcoming barriers to change), peer/ media/ family pressure, food label reading and foodtasting activities. The chief focus was on heart-healthy versus heart-unhealthy (especially salty) snacks. Overall, the programme and each lesson were designed to incorporate five strategies to encourage behaviour change: models of desired behaviour, behavioural rehearsal, goal specification, feedback, and reinforcement for positive change.

(c) Family/community. There was a parental involvement programme designed to inform parents and enlist support, to encourage them to make heart healthy snacks available at home and reduce the availability of high-salt snacks, and to teach them about label reading and comparative costs of heart healthy snacks. This comprised two 5 minute phone calls, 1 week apart, and three brochures.

Provider of activities. Classroom instructions were given by research staff (all white) while regular teachers were present. Four undergraduate students conducted telephone interviews with parents, following specific training.

Intensity/duration. The intervention comprised six 45 minute classes over 4 weeks, with parental programme and school-wide campaign taking place during same period.

Resources. Cafeteria staff and telephone interviewers received special instruction.

Results
Differences were significant between the control and treatment schools in the consumption of salty snacks ($p < 0.01$) and target snacks ($p < 0.05$) at immediate postintervention assessment. Significant differences were also found between the class and no-class intervention within the treatment school in the consumption of salty snacks at the first follow-up ($p < 0.05$), in target snacks at post-intervention and the first follow-up ($p < 0.05$), and in other (unhealthy) snacks postintervention ($p < 0.05$). There was a significant school effect at postintervention assessment and a significant class effect at the first follow-up, the programme being effective in producing an immediate significant reduction in salty snack consumption among all those in the treatment school. This continued only among those receiving classroom instruction, with those not receiving the classroom programme returning to baseline values by the first follow-up. By the second follow-up, those receiving classroom instruction had also returned to baseline values. At post-test, there were significant class and school effects on target snack consumption, with those in the treatment school showing a significant increase and those in the control school a decrease. There was a significant classroom instruction effect, maintained at both follow-ups, with those not receiving it remaining at baseline level. At the second follow-up, children in the parental involvement group reported eating significantly **fewer** target snack foods than those not in the parental involvement group. Children not receiving classroom instruction increased consumption of 'other', unhealthy snacks. The study also reports other health-related behaviours (consumption of alcohol and tobacco, physical activity) as predictors of treatment responses. No gender differences were found.

Social and psychological effects. No information was provided.

Effects on the organisation. No information was provided.

Costs. No information was provided.

Comments
The results are based solely on self-reported behaviour, which may be unreliable. The sample size was small, and no sample size or power calculations were presented. Only a proportion of the sample, those still attending school, were included in the final follow-up. The authors state that parents were successful in making desired changes, but no data were presented. No details were given about the content of the health education programme received by children in the control school. The baseline comparability of the groups was not formally assessed. The generalisability of the study findings may be limited, having been conducted in an inner-city population with a majority of black children in the USA.

(8) DuShaw (1984), USA[50]

Name of intervention. Project SHARP, Project CHEK, Project PGHCP/SHCP (now 'Growing Healthy').

Author's objective. This was to evaluate three comprehensive health education programmes.

Study methodology
School selection. Schools were selected according to where the programmes were being implemented. The method of selection was not stated.

Design. This was a matched controlled trial. There were two experimental and control groups for each programme.

Outcomes measured and tools used. The instruments used were the Modified Fourth Grade Health Test and the Seventh Grade Health Test (Michigan Educational Assessment Programme 1979), measuring performance in 10 health topic areas, level 1 for third graders and level 11 for sixth graders. The latter included an expanded nutrition section, which asked students to report their intake of foods high in/lacking in named nutrients. Total scores and scores for each topic area were analysed.

Time between intervention and post-tests. This was unclear.

Participants
Students in the third grade (experimental 247, control 130) and sixth grade (experimental 456, control 139) in six school districts in Michigan participated. Control students were selected from a comparable population on the basis of student scores in reading and mathematics tests.

Intervention
Health needs addressed. These were disease prevention, nutrition, personal health practices, growth and development, family health, emotional health, safety, substance use, consumer health and community health.

Programme development. Project CHEK is based on the Michigan Essential Performance Objectives (with which all three projects have been cross-referenced). Project PGHCP was developed between the Ameri-

can Lung Association and the US Bureau of Health Education. The three programmes have been recognised by the Michigan School Health Association as meeting the standards set for grades K to 6.

Theory base. No information was provided.

Content. This was in three areas:

(a) Ethos/environment. This was described as a 'healthful environment' (no details) for project CHEK. No details were provided for project SHARP or project PGHCP/SHCP;

(b) Curriculum. Project SHARP had six units (grades K to 6) focusing on healthy lifestyles, four weeks/unit, 20–40 min/day. Project CHEK had five units (grades K to 5), focusing on choices about personal health and lifestyle, 6–25 weeks/unit. Project PGHCP/SHCP had six units (grades K to 6), focusing on body systems, use of multimedia learning stations, 10–12 weeks/unit, 30–40 min/day. All three used a multimedia approach.

(c) Family/community. Project SHARP focused on coordinated health services and family health education handbooks for parents, project CHEK on health services and 'parental support' (no details), and no details were provided for project PGHCP/SHCP.

Provider of activities. Teachers participated.

Resources. The project SHARP programme was integrated into the existing curriculum after in-service meetings, and there was provision of health education resources and evaluation of health education knowledge. The project CHEK package included training and management manuals, before-and-after tests and curriculum guides. Project PGHCP/SHCP resources were provided by commercial and voluntary health organisations, and teachers underwent training.

Results
For third-grade students in all three programmes, experimental groups showed statistically significant gains in knowledge compared to control groups. For sixth-grade students little difference was found between groups; only one experimental group (project SHARP) showed an overall gain in knowledge. In the nutrition profiles, only project CHEK showed a statistically significant difference in favour of the experimental group.

Social and psychological effects. No information was provided.

Effects on the organisation. No information was provided.

Costs. The costs for 1984 were presented. Project PGHCP/SHCP is the most expensive model to introduce.

Comments
The results were not reported on one grade 3 CHEK group and one grade 6 PGHCP/SHCP group. Information was lacking on the method of school selection, allocation to groups and on the timing of data collection. Also detailed information on non-curricular elements of the programmes was absent. It is not clear that project SHARP and project PGHCP/SHCP use a health promoting schools approach. Nor is it clear how the health promoting school approach in project CHEK was implemented.

(9) Arora (1994), UK[51]

Name of intervention. Not named.

Author's objective. This was to evaluate the effectiveness of a whole-school anti-bullying policy.

Study methodology
School selection. A single secondary school with which author was working was selected.

Design. This was a before-and-after study, tested after 1 year with 1 year follow-up to establish levels of bullying in the school plus a cohort study of a year group over 2 years.

Outcomes measured and tools used. Bullying and aggression were assessed by the Life in School Checklist devised for study and completed by the young people.

Time between intervention and post-tests. This was between 1 and 2 years after the start of the intervention (which was ongoing).

Participants
Students at a secondary school in the UK participated.

Intervention
Health needs addressed. These were mental health and safety.

Programme development. The intervention was developed through the impetus of the head teacher and the senior management team.

Theory base. This was not stated.

Content. This was in three areas:

(a) Ethos/environment. There was increased supervision during breaks, a non-punitive sanctions policy, a staff development policy, and encouragement of supportive and co-operative values.

(b) Curriculum. Sections on bullying were incorporated into the pastoral care curriculum.

(c) Family/community. There was increased liaison with parents, and staff from support services worked with individuals and groups of young people who were bullied.

Provider of activities. School staff participated.

Resources. No information was provided.

Results
Overall, there was a significant reduction in reported experiences of general aggression and bullying over the 2 year study period.

A cohort study showed no initial change in general aggression but a significant reduction in the second year. It reported significantly increased incidents of bullying after 1 year but a return to the initial level in the second year.

Social and psychological effects. The intervention fostered a culture which sanctioned reporting of bullying by other pupils. The authors noted that this was not planned but emerged because of the trusting relationship that was built up between staff and pupils.

Effects on the organisation. The anti-bullying policy was developed in the context of developing the school as a caring community. The importance of good communication between staff and the full involvement of all those concerned, including pupils, staff, parents and governors, was acknowledged and addressed.

Costs. No information was provided.

Comments
The absence of a control group limits the extent to which changes can be attributed to the intervention. The cohort study is confounded by developmental factors. The authors discuss the findings of other studies which suggest an age-related 'hump' in bullying behaviour. Changes in the level of aggression and bullying in the school as a whole could be due to changes in the school population or external factors. Before and after intervention data are given and all outcomes discussed, but the number of participants is not stated. From the details provided, it appears that the intervention involved appropriate collaboration with pupils, parents, staff and other professionals and was tailored to the needs of the school. The intervention appeared to be sustainable but no information was given about resources or costs.

(10) Buller and co-workers (1994), USA[52]

Name of intervention. Sunshine and Skin Health.

Authors' objective. This was to determine the feasibility of administering a five-unit curriculum designed to positively influence the sun safety knowledge, attitudes and behaviours of fourth, fifth and sixth grade students.

Study methodology
School selection. This was a convenience sample based on the interests of both the school administration and teachers participating and the income and ethnicity similarity of two schools.

Design. Two schools were randomly allocated to be intervention or control schools.

Outcomes measured and tools used. Knowledge, attitudes and implementation of preventive behaviour were assessed using an 84-item quantitative self-administered questionnaire devised by the authors. Teachers' perceptions and suggestions about the curriculum were obtained through interviews.

Time between intervention and post-tests. An initial pretest took place, then a post-test immediately following intervention, with a second post-test 8 weeks later.

Participants
Initially, 160 students in two (grades 4 to 6) completed the pretests. However, only 139 complete data sets were obtained.

Intervention
Health need addressed. This was skin cancer prevention.

Setting. Arizona public schools participated.

Programme development. The curriculum was developed through collaboration of health curriculum experts, dermatologists, teachers and curriculum consultants.

Theory base. This was not stated but was academically oriented.

Content. This was in three areas:

(a) Ethos/environment. Suggestions for spreading the sun safety message around the school were presented.

(b) Curriculum. This comprised five multidisciplinary units (properties of the sun, composition of human skin, attitudes towards tanning, skin cancer and sunlight awareness strategies) containing lesson material, in-class activities and a glossary of terms.

(c) Family/community. 'Take home' activities and parent/student newsletters involved the families.

Provider of activities. Three trained teachers (2 hour training session provided) implemented the activities.

Intensity/duration of intervention. One unit of the curriculum was taught for 5 consecutive weeks during a weekly 50 minute health period.

Resources. Lesson plans, videotapes, and transparencies distributed during training were provided.

Results
The curriculum increased intervention students' knowledge and cultivated less favourable attitudes compared to control students. The curriculum also appeared to change behaviour, but this varied with age. All intervention students reported more winter sunscreen use both immediately and eight weeks after the intervention ($F(1, 121) = 3.25$, $p < 0.05$ and $F(1, 116) = 3.48$, $p < 0.05$); after 8 weeks all intervention students reported wearing protective clothing in summer ($F(1, 118) = 13.83$, $p < 0.05$). At immediate follow-up, intervention students reported lying out in the sun less often than control students ($F(1, 123) = 6.04$, $p < 0.05$) – but this was not sustained at 8 weeks.

Social and psychological effects. These were not stated.

Effects on the organisation. These were not stated.

Costs. These were not stated.

Comments
No details were given about any sun safety education in the control school or how the sun-safety message was spread throughout the intervention school. Although an RCT, this study involved only two schools. The numbers of children completing the tests were presented, but it is not evident how 139 complete data sets were obtained to be analysed. Assignment to condition was at the school level, while analysis was conducted at the individual level. The individual-level analysis does not take into account the potential variance contributed by within-group similarity among students (discussed by the authors). Because the study is based in Arizona, USA, the programme may not be suitable for the UK.

(11) Agerbaek and co-workers (1978), Denmark[53]

Name of intervention. Unnamed oral health programme.

Authors' objective. This was to evaluate the effect of an intensive motivation programme aimed at improving the oral health status of 11–13 year old school children.

Study methodology
School selection. No details were provided.

Design. Four classes were randomly allocated to intervention and control groups.

Outcomes measured and tools used. Knowledge and attitudes were assessed using multiple choice tests. Children also wrote essays. Clinical examinations to assess dental plaque and gingivitis and caries, including incipient lesions, recorded.

Time between intervention and post-tests. Clinical examinations and tests took place before the examination and 1 year later.

Participants
A total of 193 fifth- and sixth-grade school children (11–13 years old) in a Danish provincial town with a negligible amount of fluoride in the drinking water participated.

Intervention
Health need addressed. This was dental health.

Setting. This intervention was within a school setting.

Programme development. No details were provided.

Theory base. No details were provided.

Content. Both intervention and control groups received classroom instruction in tooth-brushing twice a year.

(a) Ethos/environment. Both experimental and control groups received fortnightly rinsing with 0.2% sodium fluoride during school months and free toothpaste.

(b) Curriculum. The intervention group received detailed instruction on tooth-brushing, aetiology

of dental caries, diet and fluoride. Practical aspects included supervised tooth-brushing, growing plaque cultures and dental flossing.

(c) Family/community. At the beginning of the programme, parents of children in the intervention group received written information emphasising the importance of continuous parental support.

Provider of activities. This was the dental hygienist.

Intensity/duration of intervention. This comprised a series of fortnightly 20 minute small group sessions.

Resources. No details were provided.

Results
No significant differences were found between the two groups in terms of number of caries, plaque index or gingival index. Few differences in knowledge were found.

Social and psychological effects. No details were provided.

Effects on the organisation. No details were provided.

Costs. No details were provided.

Comments
The main difference between the conditions lies in the more intensive curriculum and links with parents. This is a small study comprised of four classes only. There is a risk of contamination because the intervention and control groups were in same school. Randomisation took place at the class level whereas analysis was at the individual level – this was not discussed or taken into account. There was no discussion of attrition.

(12) Koo and co-workers (1994), USA[54,55]

Name of intervention. Denmark, South Carolina Pregnancy Prevention Programme.

Authors' objective. This was a re-evaluation of the Denmark School and Community Pregnancy Prevention Programme.[55]

Study methodology
School selection. It was not stated how intervention schools and community selected. Re-analysis matched these with six counties that in 1981 and 1982 had similar average pregnancy rates and another 17 socio-economic variables.

Design. This was a retrospective analysis of matched communities.

Outcomes measured and tools used. Adjusted pregnancy rates were calculated from birth and abortion rates among 14–18 year olds.

Time between intervention and post-tests. Pregnancy rates from 1981 to 1988 were used.

Participants
The participants were young women aged 14–17 years in seven US counties. (Denmark area, non-intervention portion of Bamberg county and six comparison counties.)

Intervention
Health need addressed. This was sexual health.

Setting. This was the school and community.

Programme development. This comprised the following: community recognition of a social problem; community and school assessments of needs and resources; advisory groups and community linkages leading to training and education of adult leaders (community agency professionals, teachers, religious leaders and parents); and educational programmes for youth and families in schools, churches and community agencies.

Theory base. The intervention was based on social learning theory and diffusion theory.

Content. This was in three areas:

(a) Ethos/environment. A school-based 'teen life centre' was established next to the school, where the school nurse provided counselling and contraceptive services.

(b) Curriculum. Educational objective had five sub-components: to increase decision-making skills; improve interpersonal communication skills; enhance self-esteem; align personal values; and increase knowledge of human reproduction and contraception.

(c) Family/community. Adults in the target community were educated. Also, there were community awareness activities such as newspaper and radio coverage.

Provider of activities. School district teachers provided with courses.

Intensity/duration of intervention. The intervention spanned 3 years.

Resources. A school-based comprehensive clinic with a nurse and teacher training were provided.

Results
The adjusted pregnancy rates in the Denmark area significantly decreased from an annual average of 77 pregnancies per 1000 during the preprogramme period (1981–1982) to 37 per 1000 during the intervention (1984–1986), and subsequently rose during late programme period (1987–1988) to 66 per 1000 after the discontinuation of important programme components and related non-programme services.

Social and psychological effects. These were not stated.

Effects on the organisation. Changes in legislation cancelled the contraceptive services given by the nurse. This coincided with a rise in pregnancy rates.

Costs. These were not stated.

Comments
This was a retrospective analysis and not an experimental design. The results were for the community as a whole and not just the school.

Chapter 5

Review of reviews of the effectiveness of health promotion in schools

Review questions

This chapter addresses the remaining primary and secondary questions:

(1) What is the available evidence of effectiveness of health promotion interventions in schools?
(2) How effective is each type of approach (e.g. curriculum) in promoting positive health outcomes in each area of health need (e.g. exercise)? Are some approaches effective across several areas and if so what do these approaches have in common?
(3) What are the effective components of these approaches and what are the theoretical bases of effective interventions?
(4) Which (if any) areas require further research, for example where there are suggestive results from poor evaluations or potentially effective interventions which have not yet been evaluated?

The nine areas of health promotion identified in Curriculum Guidance Five (environmental aspects of health, family life education, exercise, food and nutrition, personal hygiene, psychological aspects, safety, sex education, and substance use and misuse) were adopted as the framework for grouping the reviews.

Methods

Prior knowledge of the field, confirmed by initial searches, suggested that there were already a large number of recent reviews of health promotion in schools. To avoid duplication of existing work and to extend the coverage of the project, this review aimed to identify and critically appraise systematic reviews rather than primary studies. Systematic reviews provide invaluable summaries of the areas of interest as they are based on extensive literature searching and critical appraisal of the research design.

Searches

The following databases were searched for reviews, using the strategies given in appendix 1B: ERIC, PsycLIT, MEDLINE, CINAHL, Applied Social Science, BIDS and EMBASE. No time or language restrictions were applied. The following databases were searched for 'grey literature': SIGLE, DHSS Data and Dissertation Abstracts. The MEDLINE strategy was adapted for use with other databases. Relevant web pages were scanned, including those of the European Network of Health Promoting Schools.

Reference lists of retrieved papers were examined to identify further relevant studies. Requests for unpublished data were made to individuals and organisations in the field of health promotion (see appendix 2). In addition, authors of reviews published in scientific journals were contacted to obtain the full report, as these potentially contained fuller details of, for example, methodology.

Inclusion criteria

To be included, reviews had to meet the following criteria of relevance, design, and information provided.

(1) Relevance. The reviews had to include evaluations of the effectiveness of health promotion interventions in schools using a population approach. 'Schools' included all educational establishments for children and young people aged 5 to 16 years, including special schools, where all the children and young people might be considered to be high risk. Reviews which included studies of health promotion interventions in other settings were included only if it was possible to separate out the results of the school-based interventions. No restriction was placed on the types of outcomes reported.
(2) Design:
    (a) a systematic search was indicated
    (b) design of the included studies was assessed and at least one experimental (controlled or before-and-after) study included.

To ensure that a review was comprehensive, it had to be based on extensive literature searches. Information about the study design is important

when interpreting the findings. The inclusion of some experimental studies was considered to be important in looking for evidence of effectiveness.

(3) Information provided:
   (a) information about the content of the intervention was provided
   (b) the number of participants was reported for the majority of included studies
   (c) the results were reported for all studies.

It is essential to have some information about the content of interventions to allow meaningful conclusions about their effectiveness and for comparisons between interventions to be made. Knowledge of the number of participants is important when considering the findings.

Exclusion criteria

(1) Reviews of school health promotion interventions which were concerned solely with secondary or tertiary prevention or treatment of common health problems. So, for example, reviews of programmes to improve the mental health of children with behaviour problems, the diet of obese children or the health of pregnant teenagers were excluded.
(2) Reviews concerned solely with health promotion for high-risk groups; to be included, reviews needed to cover interventions provided for whole-school populations rather than be confined to groups who suffered from an added risk of health problems – for example, reviews of programmes for children of divorce were excluded.
(3) Reviews concerned solely with school medical examinations or other screening activities.
(4) Reviews of interventions addressing health needs particular to developing countries.
(5) Reviews of reviews.

Most school health promotion interventions adopt a population approach. High-risk and secondary preventive approaches are less common. The latter follow a medical model and are conceptually different from those adopting a health promoting schools framework. Although it is appropriate that such studies should be reviewed, they were considered sufficiently different from the other studies in this review to warrant a review of their own.

Within each review every study was documented and tabulated (see appendix 6) unless the study evaluated a secondary, tertiary or high-risk preventive programme. Studies were also not documented if they involved interventions for children in settings other than schools or were provided in schools for a target population which did not include school-aged children and young people.

Decision procedure

Titles (and where possible abstracts) of reviews identified from all sources were assessed for relevance independently by two reviewers (SKC and DL-S). If either reviewer considered the paper relevant, it was obtained. Obtained papers were independently 'prescreened' by the two reviewers against the inclusion and exclusion criteria, and any disagreements or queries resolved by discussion (if necessary by recourse to a third reviewer).

Data extraction

For each review, the authors' objectives, review methodology, number and types of studies, authors' assessments of study quality, participants details, information on the intervention content, results and authors' conclusions were extracted using a pro forma (see appendix 3). Data were extracted by one reviewer and checked by a second reviewer.

Review methodology

Details of the search, inclusion criteria and quality assessments reported in the reviews were abstracted.

Number and types of studies

The number of relevant studies of each study design in each review were abstracted. It was noted when the review contained studies (e.g. of high-risk interventions) which were not included.

Authors' assessments of study quality

The authors' assessment of the quality of included studies was noted. This sometimes covered studies (e.g. of adults) not included in this review of reviews.

Participant details

Details which could impact on the generalisability of the review were noted such as age, socio-economic status and geographical location.

Intervention content and implementation

All the relevant interventions in each review were listed by programme title. Where no title was given, the first author's name was used to identify the study. Full names have been used where these were given, but many interventions are known only by their acronyms or abbreviations, for example ALERT or SMART.

For each intervention, the domains used (curriculum, school ethos and environment,

and family and community links), the teaching methods used in the classroom (curricular components) and the personnel involved were all coded, based on the programme descriptions given in the review. Teaching methods were coded using the schema developed by Hansen in his systematic review of substance misuse programmes[71] (*Table 3*). This schema does not distinguish between different types of life skills programme, for example communication or negotiation skills, nor does it deal with the development of specific skills such as road crossing. Such programmes appeared relatively rarely in the reviews we identified, and the Hansen schema covered the majority of methods used in interventions in which classroom teaching played a major part.

These codes appear by the name of the intervention or author and the study's bibliographical reference number. In the individual review summaries, the intervention contents are given as reported in that review.

Results

The results for all outcomes reported in the reviews were summarised for all the included studies. These have been grouped, and the methodological quality of the studies, as assessed by the authors, has been noted.

Authors' conclusions

The authors' main conclusions are presented.

TABLE 3 *Curricular components*[71]

Code	Component	Description
1	Information	Focused primarily on biological, legal, chemical and historical information
2	Decisions	Teach a strategy for identifying problems, creating solutions and making choices among alternatives
3	Pledge	Development of personal commitment to abstain
4	Values clarification	Examine the relationship between individual's values and the consequences of their behaviour. May include activities to assist in identifying existing values or to select a set of positive attitudes
5	Goal setting	Teach skills for setting and attaining goals and encourage the adoption of an achievement orientation. There may be awards for achievement
6	Stress management	Teaching skills to cope with psychologically difficult situations. Often an emphasis on relaxation skills
7	Self-esteem	Focus on developing individuals feelings of self worth and values. Self-labelling is discouraged
8	Resistance skills	Teaches students to identify and assertively resist outside pressure and influences. Assertiveness training is included in this category
9	Life skills training	Teach broad social skills including communication skills, human relations and skills for solving interpersonal conflict. The primary emphasis is on the development of skills
10	Norm setting	Attempt to establish conservative norms by correcting erroneous perceptions of the prevalence and acceptability of behaviours
11	Assistance	Provide intervention and counselling often from peers
12	Alternatives	Provide experience of alternative activities

*The **domains** have been coded as: A, ethos and/or environment; B, curriculum; C, family and/or community*

*The curricular **components** have been coded as: 1, information; 2, decision making skills; 3, pledge; 4, values clarification; 5, goals setting; 6, stress management; 7, self-esteem; 8, resistance skills training; 9, life skills training; 10, norm setting; 11, assistance; 12, alternatives*

*The **personnel** used to deliver the interventions have been coded as: a, teacher led; b, peer led; c, outside expert*

For example, the intervention 'Go For Health' comprised changes to the school meals service and a curriculum based on information and goal setting, delivered by the class teacher. This is coded as AB1,5a. For the purpose of this review, an intervention with a coding ABC has been classified as using a health promoting schools approach

Review quality score

An overall quality score was calculated based on the breadth of the search, data extraction process, methodological quality assessment criteria, application of methodological quality assessment, details of participants, details of intervention content and implementation, and reporting of results. The scoring protocol is given in appendix 5. The overall scores are given in the review summaries and in the tables heading each topic synthesis.

Comments

The reviewers commented on the methodology, content and generalisability of the review.

Tables of studies included in reviews

For each study included in the reviews, the programme name (if given), its components, and some details of programme implementation (including programme length and personnel involved) have been tabulated (see appendix 6). These tables also illustrate which studies are common across the reviews and which interventions have been evaluated in more than one study. Because the reporting of study design, unit of randomisation and number of participants sometimes differed between reviews, these were entered separately according to the information presented in each review. Where studies were included in more than one review, the intervention content as given in this table combines information taken from those reviews.

Synthesis

For each topic area, a synthesis is presented based on the included reviews and relevant studies within them. The areas discussed are the coverage of the reviews, the quality of primary studies as judged by the authors, outcomes, the interventions (approaches used and components), implementation, theoretical bases, generalisability and costs and resources. The results of all the included studies as presented in the reviews are then brought together and presented for each outcome.

Steering group

As in the review of primary studies of the health promoting schools approach, the steering group (see appendix 4) provided input on the review of reviews.

Results

Two hundred and fifteen relevant reviews of the effectiveness of school health promotion were identified. Of these, one considered environmental aspects of health, one family life education, three exercise, seven food and nutrition, seven personal hygiene, 42 psychological aspects of health, 15 safety, 23 sex education and 82 substance use. The remainder looked at two or more areas.

The safety category was split into two, covering personal safety, which included sexual abuse and abduction prevention programmes, and accident prevention. Nutrition and exercise were grouped together, as were sex and family life education since these areas were combined both in reviews and in some of the included studies.

Of the identified reviews, 32 met the inclusion criteria. The numbers of identified and included reviews by subject area are given in *Table 4*. Thirty-one of the reviews were published in English, and one in French.

The reasons for exclusion of reviews are summarised in *Table 5* and shown in appendix 7. Most reviews were excluded for a combination of reasons, so there is overlap between categories. No review was excluded solely because it failed to include any experimental studies. Reviews could

TABLE 4 *Included and excluded reviews by subject area*

Subject area	Number of identified reviews	Number of included reviews
Substance use	82	9
Psychological aspects	42	2
Sex and family life	25	4
Nutrition and exercise	14	8
Accident prevention	15	3
Personal safety	6	3
Personal hygiene	7	2
Environment	2	1
Other combinations	22	0
Total	215	32

TABLE 5 *Reasons for exclusion of reviews*

Reasons for exclusion	Number of reviews
No systematic search	133
No study details (e.g. number of participants)	99
No details of intervention content	56
No study design assessment	95
No experimental studies included	20
No results presented	42

be excluded because relevant details were not reported rather than because they were inadequate reviews. Because of space restrictions on articles in journals this might in some cases be an artefact of journal publication.

The included reviews are grouped by subject area.

Substance use

A total of 82 reviews were identified, of which nine met the inclusion criteria (*Table 6*). In addition, three meta-analyses were found which listed the included studies but provided no details of interventions and so were excluded.[72–74] Summaries of each of the included reviews are given at the end of the main section. Tables of the individual studies included in the reviews are given in appendix 6.

The nine reviews had been undertaken for various reasons. Two covered all substance use, three alcohol alone, two drugs alone and one smoking alone. Two of the alcohol reviews had been undertaken to look at the effectiveness of two specific aspects of these programmes – social and resistance skills training.[77,78] One review was confined to studies of the effectiveness of a single programme – Drug Abuse Resistance Education.[81]

Synthesis of substance use reviews

Review coverage

In total, 146 primary studies were included in these reviews (of which 12 were cited as supporting papers, i.e. giving additional information). These studies reported evaluations of 125 different programmes; this includes studies in which the effectiveness of one programme was evaluated against another, studies in which the effectiveness of different methods of delivery of a single programme were evaluated – for example, delivery by teacher or psychologist. Of the included primary studies, one appeared in five reviews, four appeared in four reviews, 18 appeared in three, 27 appeared in two reviews and 96 in one only. These differences were due in part to the different foci and inclusion criteria of the reviews (*Table 6*). In addition, many of the studies have been subject to duplicate publication – alternative papers may have been selected to represent the same study.

Quality of primary studies

Methodological issues concerning the primary studies are discussed in most of the reviews. Recurring themes are lack of long-term follow-up and attrition rates. Although many studies are reported to have used random allocation to groups, there are inconsistencies between the reviews in describing the type of allocation. Some reviews also discuss the relationship between units of allocation and analysis.

Outcomes

The reported outcomes may reflect the reviewers' inclusion criteria rather than the full range of outcomes considered in the included studies. For example, some of the reviews report only behavioural outcomes;[71,77,78] these include substance use, drunkenness and problems associated with drinking. Other reviews[75,76,80–82] included a wider range. These noted knowledge, attitudes and intentions specific to substance use and more general outcomes such as self-esteem, self-efficacy, social anxiety and communication. Reviews focusing on one substance – for example alcohol – only reported the effectiveness of the intervention on that substance even though the intervention may have been aimed at all substances and the primary studies reported outcomes for

TABLE 6 *Substance use reviews included in the synthesis*

Authors	Primary focus	Number of studies	Review quality
Foxcroft and co-workers (1995), UK[75]	Alcohol	45	12
White and Pitts (1997), UK[76]	Drugs	53	11
Gorman (1995), USA[77]	Alcohol	19	11
Gorman (1996), USA[78]	Alcohol	18	11
Peters and Paulussen (1997), The Netherlands[79]	Alcohol	23	10
James and Fisher (1991), Australia[80]	Drugs	17	8
Hansen (1992), USA[71]	Drugs	45	8
Ennett and co-workers (1994), USA[81]	Drugs	8	8
Binyet and de Haller (1993), Switzerland[82]	Tobacco	21	7

all substances. The behavioural outcomes were measured by self-report questionnaires. The reviews acknowledge the validity problems associated with such methods. However, the reliability and validity of the other outcome measures and instruments used is not discussed.

Programme domains

Of the programmes covered in this review, 80% were single-domain programmes, and all but one of these were curriculum only, that is, they only involved classroom teaching. There was one single-domain programme (Life Education Centre)[83] which involved parents and community only. Eleven programmes involved two domains: two ethos/environment plus curriculum programmes (It's Your Decision[84] and Primary School Drug Education[85]). Nine were curriculum plus parents and community programmes (Kylie Mole,[86–88] Keep a Clear Mind,[89,90] Hansen A,[91] Biglan A,[92] PRIDE[93] and the Midwestern Prevention Project (also referred to as STAR).[94–96] There were also two programmes which appeared from the reviews to cover all three domains – ethos/environment, parents/community and curriculum (Seattle Social Development Project[58,59]) – but on appraisal of the papers reporting results of the primary studies, for inclusion in the review of studies of the health promoting school, this was found not to be the case.

Curricular components

No curriculum details were given for three programmes. Among the remainder nearly 80% had an information component, 52% involved development of resistance skills and 34% decision making skills. Life skills development was part of 21% of all programmes, values clarification in 18%, norm setting in 15%, both stress management and self-esteem development in 13%, alternatives in 11%, pledge in 10%, assistance in 7% and goal setting in 6%.

Sixteen of the programmes were reported to involve only one component – half of these were information only. Forty programmes had two components – most often information plus development of resistance skills. Nineteen programmes involved three components, 12 had four, seven had five, four had six, one had seven, two had eight and three had nine.

Implementation

Fifty-two programmes were teacher led, 25 involved peer leaders and 23 used outside experts – these ranged from researchers to uniformed police officers. Details about implementation were often very limited. One review[76] noted that frequently programmes were not delivered as planned.

Generalisability

The majority of primary studies included in the reviews were carried out in the USA. Reviewed interventions covered the age range 8–17 years, but the majority were for children and young people aged 10–13 years.

Theoretical bases

The reviews differed in their analysis of the theoretical bases of programmes. Foxcroft[75] recorded the theory bases stated in the primary studies and how well the programmes were grounded in that theory. However, about a third of the primary studies did not mention a theory. The majority of the rest were based on a wide variety of theories, mainly derived from social psychology (e.g. social learning theory and social influences) and health psychology (e.g. the health action model and health belief model). Problem behaviour theory was also cited. Other interventions were derived from other theories such as coping behaviour theory.

Some reviews grouped the interventions around a theoretical construct. Binyet[82] classified the interventions into four categories: (1) social influences – those based on social inoculation, persuasion and social learning; (2) general social skills; (3) stress and coping; and, finally; (4) cognitive and developmental (where the approach to prevention is anchored in the psychological evolution of the young person). The two reviews by Gorman looked at interventions based on the social influences model – those involving resistance skills training[77] and those involving broader personal and social skills training.[78]

Although one of White's[76] research hypotheses was that 'interventions which are "theory driven" will be more effective than *ad hoc* ones', the theoretical bases of the interventions are not discussed. In addition, neither James[80] nor Ennett[81] discussed the theory bases of their programmes.

Hansen[71] devised his own six constructs based on programme content. These were information/values clarification, affective education, social influence, comprehensive, alternatives and incomplete (i.e. those which did not fit into any other category).

Costs and resources

Information about costs and resources were not given in the reviews.

Synthesis of results: alcohol

Six reviews included outcomes specifically associated with alcohol programmes.[71,75,77–80] Overall, 63 distinct programmes were reported (including variations of programmes used in comparative studies). Two of the reviews[71,79] use codes to sum up the programmes. In the Hansen review[71] reported outcomes are coded as positive (+), neutral (0), negative (–) or unknown (?) when no behavioural outcomes was available. It is therefore impossible to report on the size of the impact achieved even when this proves statistically significant. Where there is disagreement between outcomes for, for example, subgroups, the span of outcomes is reported. In addition, for each programme, two outcome ratings are given – first the outcome reflecting adjustment for methodological weakness and then the 'raw' outcome (in parentheses). The Peters review[79] reports how many positive alcohol-related effects were noted in relation to the number of parameters measured.

In some cases when studies were included in more than one review, the reviews differed in their assessment of the effectiveness of the programmes. Possible explanations include using different published studies to evaluate programmes, giving different weight to methodological issues, reporting different outcome measures or reporting of subgroups.

Short-term effects on alcohol-related behaviour

Of the 63 programmes reporting alcohol results 25 programmes (19 evaluated in studies using random allocation to groups) were reported to have some short-term beneficial effects on alcohol consumption such as frequency of drinking. Thirty programmes were reported to have no effect on drinking in the short-term, and seven to have a negative effect. One gave unclear results. Of the studies where measures of alcohol misuse (as opposed to consumption within sensible drinking limits) were reported, only two (the Positive Youth Development Programme[97] and Booze[98]) were found to have positive effects.

Long-term effects on alcohol-related behaviour

Only three reviews explicitly reported long-term results of the interventions.[75,77,78] Fourteen programmes were followed up for at least 6 months. The programmes which had an effect on behaviour remained effective for up to 2 years, however of the two programmes with a follow-up after 5 years, only the high-fidelity implementation group using Botvin's Life Skills Training[99] showed significant differences between groups.

Knowledge, attitudes and intentions

Only two reviews reported programme effectiveness in terms of knowledge, attitudes or intentions.[75,80] Where reported, all programmes had positive effects on knowledge and intentions; less than half had a positive effect on attitudes. There were four studies of programmes involving peers for which attitudes change was reported in the reviews, and three improved alcohol related attitudes.

Impact of different components and approaches on behaviour

Against this background of relative ineffectiveness of alcohol prevention programmes on behaviour it is possible to demonstrate that some approaches were more effective than others. Of the 13 alcohol prevention programmes which included interventions by peers, 10 showed some effect on short-term behaviour, two showed no effect and one had a counterproductive effect. This contrasts with an overall effectiveness of 25 out of 63 programmes overall. Several reviewers commented that the inclusion of peers made programmes more effective. Programmes including resistance skills, stress management and/or norm setting were more likely to report beneficial effects on behaviour than those which did not include these components. One of the reviewers[77] whose review focused on programmes with resistance skills training, however, commented that these programmes were not universally effective. Another[79] concluded that norm setting made programmes more effective. There were four programmes covering alcohol prevention which included parents; three of these showed some impact on behaviour in the short-term, and the results of the other were unclear.

Synthesis of results: tobacco

Four reviews included outcomes specifically related to smoking or tobacco programmes.[71,76,80,82]

Tobacco use in the short-term

The following seven programmes, evaluated in controlled trials with random allocation to groups, were reported to have a desirable effect on smoking behaviour in the short-term: Life Skills Training,[100–102] ALERT,[103] Project SMART A and C,[104,105] and AAPT C and D.[106] All were curricular programmes with an information component, and the majority included norm setting. Resistance skills and decision making were also frequently included. Binyet reported that the SMART C programme also included an ethos/environment component. Smoking Prevention WA (teacher led)[107] had a positive effect on boys but none on girls.

The following 14 programmes were found effective in controlled studies with non-random allocation: STAR (also known as the Midwestern Prevention Programme),[94,96,108–110] Pentz,[111] Straight Talking,[112] Gilchrist,[113] Hansen A,[91] Health Development,[114] Hurd,[115] Miller B,[116] Perry (WHO),[117] Schinke,[118] Life Education Centre[83] and Vartiainen (both teacher led and peer plus expert).[119] In addition, Clarke (teacher led)[120] was effective for girls only. Again these used curriculum approaches with a strong emphasis on information. Most also included resistance skills training. Two programmes – Napa B[121,122] and Evans[123,124] – both curriculum programmes including information and resistance skills, were found partially effective in preventing the uptake of smoking. A controlled trial found that a community-based programme known as 'Kylie Mole'[86] resulted in an increase in tobacco use; SMART B[104] was also considered to have potentially harmful effects. Thirteen different programmes were considered to have no effect, and the results for 12 programmes were considered unclear.

Longer term smoking behaviour

Long-term follow-up was reported for three studies of smoking prevention evaluations. At 6 months, peer-led, expert-led and media versions of Murray, with information and resistance skills,[125] were found partially effective, but this was not sustained at 6 years. At 1 year, Life Skills Training[100,101] was found effective. Flay, an information and resistance skills programme that included a pledge not to smoke,[126] was found effective at 2 but not 6 years.

Other outcomes

Life Skills Training was reported to have positive effects on self-concept,[102] be partially effective in terms of communication[102] but to have no effect on social anxiety[102] or self-esteem.[100,101] The study by Beaulieu[127] was reported to have positive effects on refusal skills. No effect was found on assertiveness[128] or skills.[129]

Knowledge, attitudes and intentions

Only one review reported knowledge outcomes.[80] All studies where knowledge was reported produced gains. Attitudes were only reported in one review.[80] Two of the six studies where this was reported produced attitude improvement (in girls only in one case), three produced no change and one had a negative effect. Intentions to smoke were assessed in three studies, and all three reported positive effects[120,130,131] (both teacher and peer led). All were curricular interventions with an information component, and two also included resistance training.

Differences between reviews

Reporting of results of CLASP[132] and Smoking Prevention New South Wales (NSW) varied. Drug Abuse Resistance Education[133] was reported by White to have beneficial effects on tobacco use although Hansen reported the results to be unclear. Ennett's meta-analysis of eight evaluations of the Drug Abuse Resistance Education programme calculated a mean weighted effect size 0.08 (95% confidence interval (CI): 0.02–0.14) for tobacco use – a statistically significant finding.

Impact of different components and approaches on behaviour

Fifteen studies of interventions involving peers reported on short-term smoking outcomes; 13 showed some impact, one no impact and one a negative impact. As with alcohol prevention programmes, this compares favourably with the effectiveness of non-peer programmes. The majority of programmes which had an impact on short-term behaviour involved resistance skills training. Of the four programmes involving parents only, one showed an impact, two showed no impact and in one smoking rates increased.

Synthesis of results: drugs

Two reviews reported outcomes related to marijuana programmes and use,[71,76] one of which reported behavioural outcomes only.[71]

Marijuana use in the short-term

Controlled trials using random allocation to groups found the following four programmes effective: ALERT,[103,134–136] the Midwestern Prevention Programme,[96] Life Skills Training,[101,102,137] Pennsylvania[138] and the Bicultural Competence Skills Training Programme.[139] A further four were partially effective – SMART A[104,105] was effective for girls but not boys. Results for the Adolescent Alcohol Prevention trial (normative education and combined)[106] were mixed. A number of other controlled trials also found the Midwestern Prevention Programme effective.[94,95,108,110] These programmes all used curriculum-only approaches with information components. Most had normative education and resistance skills training – usually both.

Napa A, a curricular programme with values clarification and stress management, was found partially effective in controlled trials using random allocation to groups.[140,141] Controlled studies using random allocation found the SMART B[104] programme harmful, where the elements are a curricular approach and information component.

The results of 14 studies were unclear, and six studies found no programme effects. Ennett's meta-analysis of eight evaluations of the Drug Abuse Resistance Education programme calculated a mean weighted effect size of –0.01 (95% CI: –0.09 to 0.07) for marijuana use – not a statistically significant finding.

Marijuana use in the longer term

Longer term results were reported for four programmes. Controlled trials of the Midwestern Prevention Programme[108,110] and Assertiveness Training[142] found beneficial effects. Life Skills Training[102,137] was judged partially effective in an RCT, and no long-term effects were found for ALERT.[134–136]

Knowledge and attitudes in studies of marijuana prevention

Knowledge was only reported as an outcome for Life Skills Training – one trial found gains,[102,137] another found no effect. Drug Abuse Resistance Education[143] was reported to have a positive effect on attitudes about marijuana although Life Skills Training[101] was reported to have no effect.

Other outcomes in studies of marijuana prevention

Randomised controlled studies reported positive effects of Life Skills Training[102,137] on norm expectations, interpersonal and communication skills. Project ALERT had a positive effect on self-efficacy.[136]

Generic drug use in the short-term

Some programmes did not specify which drugs were targeted. These have been grouped together as generic drugs programmes. Two controlled studies using random allocation to groups reported positive programme effects on drug use.[144,145] Both were curriculum-only programmes involving resistance skills training. In addition, other controlled studies reported that the Seattle Social Development Project[58] had positive effects on behaviour. This was a parent and community programme which included information and resistance skills training components. The Seattle Social Development Project has also been evaluated with an added ethos/environment approach,[59] and was found to be partially effective. The programme involving exposure to teachers given affective training[146] was reported to increase boys' drug use but not that of girls. Eleven studies reported no programme effects on drug behaviour. No studies reported long-term outcomes.

Knowledge and attitudes in generic drug programmes

Increases in knowledge were reported in all studies where this was investigated, with the exception of the Refusal Skills Training programme[147] and the study by Malvin[148] – neither of which had an information component. Ennett's meta-analysis of the Drug Abuse Resistance Education programme found a mean weighted effect size of 0.42 (95% CI: 0.33–0.51) for knowledge, indicating significant gains. Three studies reported positive effects on attitudes.[87,149,150] One study reported negative effects on boys but no effect on girls[146] – this programme involved 3 years' exposure to teachers trained in effective methods. Six programmes reported no effects on attitudes, and the results of one were unclear. Ennett's meta-analysis of the Drug Abuse Resistance Education programme found a mean weighted effect size of 0.11 (95% CI: 0.07–0.15) on attitudes, indicating a small but significant effect. A positive programme effect was reported for the study by Wiener – a curriculum programme which also included drug-free student clubs and 'teen retreats'.[90] Drug Abuse Resistance Education[151] was reported to have partially beneficial effects on drug related beliefs. Napa A[121] was reported to have beneficial effects on girls' perceptions of drug use but no effect on boys' perceptions.

Other outcomes in studies of generic drug use

Self-esteem was reported as an outcome in several studies. One controlled study – Positive Alternatives for Youth – using random allocation to groups reported gains in self-esteem.[152] This programme included an explicit self-esteem development component. Three studies reported no programme effects. Results for Drug Abuse Resistance Education were mixed (three studies). Ennett's meta-analysis of the Drug Abuse Resistance Education programme found a mean weighted effect size of 0.06 (95% CI: 0.01–0.11) on self-esteem, a small but significant effect.

The Ennett meta-analysis of Drug Abuse Resistance Education also reported small but statistically significant effects for social skills with a weighted mean effect size of 0.19 (95% CI: 0.13–0.22) and attitudes towards the police: 0.13 (95% CI: 0.05–0.19). Other outcomes reported for single studies were decision making, family cohesion, locus of control, personal development, rebelliousness and self-efficacy. No programme effects were found on any of these outcomes.

Five controlled studies (three randomised) reported an impact on refusal skills. These

were Drug Abuse Resistance Education,[133] the study by Beaulieu,[127] Refusal Skills Training,[147] Refusal Skills[153] and the study by Wragg.[149] With the exception of the study by Beaulieu, all involved refusal skills training, and three involved elements of life skills training. A positive programme effect on assertiveness was also found for the study by Gaffney,[112] a programme also including resistance skills training.

Impact of components and approaches on marijuana and drug misuse programmes

Of the eight studies of programmes targeting drug misuse involving peers, five showed some impact on short-term behaviour, two had no effect and one had a negative effect. This compares favourably with the overall results for these programmes combined in which 14 had some impact, 17 had none and one had a negative effect. As with smoking and alcohol prevention programmes, successful programmes were likely to involve resistance skills training and normative data. All four of the drug misuse programmes involving parents appeared to have some impact on behaviour.

Conclusions

A large number of experimental studies of a range of different substance misuse programmes have been carried out, most of them in the USA, and a substantial number of reviews have attempted to synthesise the results of these studies. Both the reviews and the primary studies have varied in their methodological quality. Reviews sometimes differed in their evaluation of the effectiveness of programmes, and, consequently, some evaluations were deemed to have unclear effects in this review of reviews. A number of factors seemed to contribute to this; for example, duplicate publication resulted in reviewers sometimes relying on different reports of the same study, and some reviewers adjusted their conclusions to take methodological issues into account.

Against this background of methodological problems, however, some overall conclusions can be drawn. Between one-third and two-thirds of these studies – more for smoking and marijuana and less for alcohol and generic drug use – reported a positive impact on behaviour in the short-term. Although the results were reported as statistically significant, most reviews did not present data on the size of this effect, so the extent of the impact is unclear. Very few studies involved long-term follow-up, but among those that did, the success rates were consistent with those achieved for short-term outcomes. One alcohol and three drug misuse programmes appeared to have a long-term impact, but the two studies of smoking programmes which had been followed up for 6 years did not. These reviews demonstrate that it is possible to impact at least on the initiation of substance use and misuse, but that programmes cannot be relied upon to be successful. A small but significant number of programmes were reported to have an adverse effect on behaviour.

A very wide range of different curricula components have been studied in substance misuse programmes. In the reviews which looked at increases of knowledge, almost all the programmes were successful, whereas only half had a positive influence on attitudes.

Many programmes aimed to increase skills designed to help children and young people refuse substances (resistance skills or more general social skills). Although successful programmes were more likely to include resistance skills training and norm setting, two reviews[77,78] focusing specifically on the effectiveness of resistance and social skills training found that these approaches could not be guaranteed to be effective. From the information presented in the reviews, most of the programmes were based primarily on classroom teaching and, in half, the interventions were led by classroom teachers. Programmes in which peers were involved were more likely to be successful than those in which they were not, but peer involvement did not guarantee success. Because of limitations on reporting in the reviews, this review is limited in the conclusions it can draw about the way in which peers can be useful. A small minority of programmes were reported to aim at increasing more general aspects of mental well-being such as self-esteem and self-concept, communication and interpersonal skills, and some of these were successful.

Involvement of parents and wider community or changes to the school ethos or environment were rare in these substance misuse prevention programmes. The descriptions of the type and extent of parental involvement were limited, but in cases where it was described the involvement was low key. Although more than half of these programmes were successful, numbers are too small to comment on the effectiveness relative to programmes without parental involvement. There is a suggestion that they were more effective with regard to drug education and alcohol prevention than they were with smoking prevention, but this may have been related to the content

of the parental programme or the way in which it was implemented. The programmes involving parents and community appeared in general to be among the more sophisticated programmes and their apparent effect could be due to confounding influences. In almost all the programmes where it was reported, those which showed an effect on behaviour were those based on social psychological theory such as social learning theory.

These reviews focused primarily on behavioural outcomes and may have failed to report other effects on health that were reported in the primary studies. Lack of information on broader health outcomes such as mental well-being or psychological risk factors for substance misuse may reflect a lack of interest in these outcomes in the studies or lack of interest by the reviewers. The reviews were unable to give detailed information on the process of delivery of the programmes, on what information was provided or how the skill development programmes were run. In the past some school programmes have sensationalised the impact of drugs and other substances on health; others have taken a moralistic tone. Both of these could potentially reduce effectiveness. Systematic reviews are limited in the extent to which they are able to provide many insights into why the unsuccessful programmes failed to alter behaviour.

Substance use review summaries

Key to notes:

- The programme **domains** have been coded as: A, ethos and/or environment; B, curriculum; C, family and/or community.
- The curricular **components** have been coded as: 1, information; 2, decision-making skills; 3, pledge; 4, values clarification; 5, goals setting; 6, stress management; 7, self-esteem; 8, resistance skills training; 9, life skills training; 10, norm setting; 11, assistance; 12, alternatives.
- The **personnel** used to deliver the interventions have been coded as: a, teacher led; b, peer led; c, outside expert.
- An asterisk (*) denotes a study using random allocation.

(1) Foxcroft and co-workers (1995), UK[75]

Authors' objective

This was to review available evidence of the effectiveness of health promotion interventions aimed at alcohol misuse in young people.

Review methodology

Search. The Project CORK, PsycLIT, ERIC, ASSIA, MEDLINE, Family Resource, Health Periodical EMBASE, BIDS, Dissertation Abstracts, SIGLE, DRUG INFO, SOMED, Social Work Abstracts, NCADI, Mental Health Abstracts, DRUG INFO, DRUG and ETOH computerised databases were searched (strategies given). In addition, relevant journals were handsearched, and key organisations and individuals were contacted.

Inclusion criteria. Primary or secondary prevention of alcohol misuse, targeting children and young people aged 8–25 years. Outcomes of interest – drinking behaviour, attitudes and knowledge; controlled studies with pre- and postintervention measures.

Quality assessment. Design; length of follow-up; attrition rates.

Number and type of studies

Thirty-three studies reporting 22 discrete RCTs, 12 studies reporting eight discrete controlled trials and three studies of interventions not based in schools were reported. In addition, a 'subreview' reported on 20 studies carried out in the UK which failed to meet the initial inclusion criteria.

Study quality as assessed by authors

The design, length of follow-up and attrition rates were noted.

Participants

These were children and young people from a variety of backgrounds, in Canada, the UK, the USA, Sweden, Australia, Chile, Norway and Swaziland.

Intervention

DAPPER[154] B1,2,4,9a; Bagnall[155] B1,8a; Beaulieu[127] B1,2,9,11ab; ALERT[134–136,156] B1,8,10a,b,c; Life Skills Training[157] B1,2,5,6,8,9a,b[102,137] B6,7,8,9a; It's Your Decision[84] A?B1,5,12ad; HLAY 2[158] B9c; Positive Youth Development Programme[97] B1,2,6,7,8,9ac; Drug Abuse Resistance Education[143,159–162] B1,7, 8,9c; Positive Alternatives for Youth[152] B7,12ac; AMPS[163–165] B1,8ac; AAPT ICU B1,2c, resistance training (RT) B1,2,8c, normative education (NE) B1,2,10c and combined (C) B[1,2,8,10c106,166]; Durrant[167] B1,2,4,8a; Duryea[168–170] B1,8a; Skills Enhancement Programme[171] B1,2,8,10bc; Booze A1c and BB1a;[98] Goodstadt AB1 BB1,3 CB1,4;[172] SMART AB1,2, 8,10,12ab and BB1,2,3,5,6,7ab;[104] HLAY[173] B1,2, 4,7a; Napa A and B[174] B1,2,8c; Resisting Pressure to Drink and Drive[175] B1,10a; Midwestern Prevention Programme[94–96,108] BC1,8,9,10ab; WHO[117,176,177] B1,8,9,10a and b; Substance Abuse Awareness Programme Prevention Model[178] B1,2,4,10a; Alcohol Prevention Programmes[179] B1,4,6,10ab; Massachusetts programme[180] B1.

Results
The following programmes reported knowledge gains: Bagnall,[155] peer-led Life Skills Training[157]* and teacher-led Life Skills Training[102,137] (although the results for Botvin[157]* were unclear), AMPS, Duryea,* Goodstadt,* Resisting Pressure to Drink and Drive and Massachusetts*.

Desirable effects on attitudes were reported for peer-led Life Skills Training,* the Positive Youth Development Programme,* the Alcohol Prevention Programme and Massachusetts. The results for Drug Abuse Resistance Education were mixed – desirable effects on attitudes were reported by Clayton[159]* and Ringwalt,[143]* but no effects by Rosenbaum[161] or Ennett.[162] Similarly, positive effects were reported for teacher-led Life Skills Training by Botvin,[102,137] although the results of another study by Botvin[157]* were unclear. Bagnall and Goodstadt reported no effect.[155,172]

DAPPER* and the Positive Youth Development Programme were reported to have beneficial effects on intentions to drink. Booze and AAPT (NE and C)* were reported to have a positive effect on problems associated with drinking. ALERT* reported beneficial effects on initiation of drinking; however, no effect was reported for HLAY 2[158]* or Drug Abuse Resistance Education.[161,162] It's Your Decision was reported to have no effect on the perceived effects of drinking. Duryea* and Resisting Pressure to Drink and Drive were reported to have no effect on refusal skills. Neither Duryea nor Resisting Pressure to Drink and Drive were reported to have an effect on riding with drunk drivers. HLAY 2[173] had no effect on gain scores. Drug Abuse Resistance Education[161,162] had no effect on numbers stopping drinking.

Positive short-term effects on drinking were reported for Bagnall, peer-led Life Skills Training,* Duryea,* ALERT,* the Skills Enhancement Programme, Booze, SMART A, AAPT (NE and C),* the Midwestern Prevention Project and Alcohol Prevention Programmes*. Programmes reported as partially effective were the Positive Youth Development Programme,* WHO* (peer led) and Massachusetts*. No short-term effects on behaviour were reported for DAPPER,* Beaulieu,* teacher-led Life Skills Training,* It's Your Decision, Drug Abuse Resistance Education[159,*160,143,*] Positive Alternatives for Youth,* AMPS,* Durrant,* Goodstadt,* AAPT* (ICU and RT), Moskowitz,* Resisting Pressure to Drink and Drive* and WHO*(teacher led). The Substance Abuse Awareness Programme Prevention Model* was reported to have no effect for boys and negative effects for girls; HLAY 2 was reported to have partial negative effects, and SMART B* was reported to have negative effects on drinking.

Positive short-term effects on drunkenness were reported for AAPT (NE and C), and mixed results for Life Skills Training (Botvin[157]* found no effect but benefits were reported in other studies[102,137]). AAPT (ICU or RT skills) were reported to have no effect, and Duryea* to have negative effects on short-term drunkenness.

In the long-term, no effects were reported for Life Skills Training,[102,137] Drug Abuse Resistance Education,[161,162] AMPS,* ALERT* or the Midwestern Prevention Programme on drinking, but Life Skills Training[102,137] was reported to have positive long-term effects on drunkenness. In addition, those in the subgroup receiving 'high fidelity' Life Skills Training[99] maintained their behavioural gains.

Authors' conclusions
The result of the review is inconclusive. Around a third of the studies reported significant short-term benefits to behaviour but the size of the effects seemed small. With the exception of one programme there was no evidence of any longer term effect. No large negative effects of alcohol education were found.

Review quality score
12.

Comments
The searching was extremely thorough; however, most of the included studies came from the USA. The UK studies included in the subreview lacked sufficient rigour to be considered good-quality scientific evaluations.

The quality of the included studies and the effects of this on the results are not discussed.

One of the authors of the current reviews was a co-author of this review.

(2) White and Pitts (1997), UK[76]

Authors' objective
This was to assess the effectiveness of different interventions directed at the prevention or reduction of the use of substances by young people or directed at reducing the harm caused by continuing use.

Review methodology
Search. The MEDLINE, PsycLIT, ERIC, SciSearch, Social SciSearch, Health Periodicals, Dissertation Abstracts, Current Contents, AIDSLine, EMBASE and ISDD electronic databases were searched.

Inclusion criteria. Evaluations of primary or secondary prevention of substance use; young people aged 8 to 25 years; outcomes reported; control group; baseline and outcome measures.

Quality assessment. Outcome measure of drug use; follow-up of at least 1 year; assessment of programme fidelity; random allocation to groups; attrition reported and analysed; analysis of baseline differences; treatment of any resulting confounds.

Number and type of studies
Twenty-six RCTs, 26 controlled trials and one before-and-after study were included. A number of studies were subject to multiple publication, and several programmes investigated in more than one study. In addition, non-school-based studies were also reviewed.

Study quality
Of the included programmes, only two (both school based) met the six criteria (the Lite Skills Training and Midwestern Prevention Project), both of which demonstrate that programmes are frequently not delivered as planned, which can reduce their effectiveness. When the assessment for programme fidelity was dropped, an additional five programme evaluations were considered robust.

Participants
Children and young people aged 6 (one study) to 17 years but mainly 11–12 year olds participated. There was one UK study, one Israeli study and four Australian studies – the remainder took place in the USA.

Intervention
AAPT[106,181] RT B1,2,8c, NE B1,2,10c and C B1,2,8,10c; Adolescent Decision Making Programme[182] B1,2,8,9; ALERT[134–136] B1,8,10a,c; Assertiveness Training[142] B8, Bicultural Competence Skills Training Programme[139] B1,6,8,9,11; Beaulieu[127] B1,2,9,11ab; Church[183] B1a; Drug Abuse Resistance Education B1,2,3,6,7,8,9, 12c;[133,143,151,159,160,162,184,185] Wragg B1,2,3,8,9;[145,149] REAL[144] B8a,c; Eiser[150] B9a; Gonzalez[186] B8b; HLAY 2000[187] B1,8,9a; Hashish and Marijuana Programme[188] B8,9; Keep a Clear Mind[89] BC9; Krupka[87] BC1; Life Education[189] B1,8a; Life Skills Training B1,2,5,6,7,8,9,10,12a,b;[101,102,137,190] Malvin[146] B7,9a; Malvin[148] B11b; Matrix Drug and Alcohol Programme[191] B1,2,7,9a; Napa[121,122,192] BB1,2,4,5,8, CB9,11,12, DB9,11; Positive Alternatives for Youth[152] B7,12ac; PRIDE[93] BC1,2,7,8,9a; Refusal Skills[153] B8a; Refusal Skills Training[147] B8a; Sarvela;[193] Sexter[59] A?BCb; Smart[194] b; SMART[105] B1,2,3,5,6,7,8,10; Seattle Social Development Project[58] ABC2,8a; Midwestern Prevention Project BC1,2,3,8,10,12ab;[95,96,108,110] Wiener[90] BC1,2.

Results
Of the programmes investigated in 'methodologically superior studies', the Midwestern Prevention Project* was found effective in the long-term and ALERT* in the short-term in terms of drug behaviour; AAPT D* and Life Skills Training* were found minimally effective. Positive Alternatives for Youth* produced increases in self-esteem. Of the remainder, Beaulieu,* Church,* Smart and Krupka resulted in knowledge gains; Eiser, Gonzalez, the Hashish and Marijuana Programme and Keep a Clear Mind had an effect on drug attitudes; Drug Abuse Resistance Education had some positive effects on self-esteem and assertiveness training*; SMART and Napa (girls only) had positive effects on behaviour; the Seattle Social Development Project, Bicultural Competence Skills Training,* Sexter and SMART* were found minimally effective. Wragg, the Adolescent Decision Making Programme, HLAY 2000, Malvin,[148] Sarvela, Drug Abuse Resistance Education and Refusal Skills Training were found ineffective in terms of behaviour, and Malvin[146] and Life Education were counterproductive.

Authors' conclusions
The majority of studies were evaluations of interventions introduced in schools and targeting 'gateway drugs'. These studies tend to be methodologically stronger than interventions targeting other drugs and implemented outside school. Few studies examine longer term programme effectiveness. Those that do suggest that programme gains (if any) dissipate rapidly.

Review quality score
11.

Comments
Only searches of electronic databases were reported. This could have resulted in articles in journals not covered by the databases, poorly referenced articles and unpublished material being missed. In addition, there is no mention of the foreign language literature. This has implications for the comprehensiveness of the review. The majority of the programmes

reviewed targeted secondary school children and young people. Only one of the included school-based studies took place in the UK – this rather limits the generalisabilty of the findings.

(3) Gorman (1995), USA[77]

Author's objective
This was to review the effectiveness of all published evaluations of school-based resistance training in preventing alcohol misuse programmes.

Review methodology
Search. Database of the Centre for Alcohol Studies searched; personal contacts.

Inclusion criteria. Studies using resistance skills training to combat alcohol misuse; comparison group; outcomes in terms of alcohol use.

Quality assessment. Type and unit of allocation to groups; length of follow-up.

Number and type of studies
Sixteen RCTs reporting 13 studies and 3 controlled trials were included.

Study quality as assessed by author
Methodological weaknesses were discussed.

Participants
These were school children and young people aged 10–18 years.

Intervention
Bagnall[155] B1,8a; Beaulieu[127] B1,2,9,11ab; Casswell[195,196] B1,2,8; AMPS[163,164] B1,8a; Dupont[197] B1,4,8,10,12; Duryea[198] B1,8; ALERT[134] B1,8, 10a,c;[199] B1,2,8,10,11; Adolescent Decision Making Programme[182,200] B1,2,8,9; Hansen[106] B1,2,8,10c; SMART[104] B1,2,8,10,12ab; Drug Resistance Programme[144] B8a; Horan[142] B1,8; McAlister[132] B1,3,8; Resisting Pressure to Drink Drive[175] B1,10a; WHO[176] B1,3,8,10a,b.

Results
Of the programmes reporting alcohol use, ALERT* and McAlister were considered effective in reducing drinking in the short-term; Bagnall,* SMART* and WHO were partially effective. Casswell,* AMPS,* Duryea,* Hansen,* the Drug Resistance Programme,* Horan and Resisting Pressure to Drink Drive were reported to have no effect, and Farrow and the Adolescent Decision Making Programme* had negative effects. ALERT was reported to have no effect on long-term alcohol use; the Adolescent Decision Making Programme* was reported to have negative effects in the long-term.

Casswell* had no effect on problems associated with drinking. Duryea* was reported to have negative effects on long-term excess drinking. Beaulieu* and Dupont* were reported to have no effect on drug use. Farrow was reported to have negative effects on drink driving.

Author's conclusions
Resistance skills training programmes are not universally effective. The majority of the studies reviewed showed that such programmes, while not detrimental, have little or no impact upon participants. In those studies where there is a positive effect, this is limited to subgroups of the target population.

Review quality score
11.

Comments
This review has a narrow focus – resistance skills training used to prevent alcohol misuse. The search is limited and potentially biased towards North American studies.

(4) Gorman (1996), USA[78]

Author's objective
This was to review the effectiveness of school-based social skills training programmes in reducing alcohol misuse.

Review methodology
Search. The Centre for Alcohol Studies database searched; personal contacts (personal communication).

Inclusion criteria. Controlled studies with both baseline and post-test assessment; behavioural outcomes; delivered by personnel other than law enforcement officers.

Quality assessment. Method and unit of allocation to groups; length of follow-up; percentage of participants followed up.

Number and type of studies
Fifteen RCTs reporting 10 studies and three controlled trials reporting two studies were included.

Study quality
The effects of methodological weaknesses on the studies' results were discussed.

Participants
Young people aged 11–13 participated. Two studies involved Native Americans.

Intervention
Social Skills Training[201] B1,7,8,11c; Life Skills Training[101,102,137,157,202] B1,2,,6,7,8,9ab; Skills Enhancement Programme[171] B1,2,4,5,7,8,10bc; TAPP[203] B1,2,3,4,5,6,8,10a; PRIDE[93] BC2,4,7,8,9a; NAPA[121,122,174] B1,2,5,8,11c; Bicultural Competence Skills Training[139] B1,6,8,9,11; E-AMPS[204] B1,2,8,10; PYDD[97] B1,2,6,7,8,9ac.

Results
The following programmes were reported to have desirable effects on alcohol use: Life Skills Training,*[202] the Skills Enhancement Programme* and Bicultural Competence Skills Training*. These programmes were reported to have no effect: Social Skills Training, Life Skills Training (Botvin[101,157]* and Botvin[102,137]*), TAPP,* PRIDE,* Napa,* AMPS-E* and PYDD.

Life Skills Training[102,137]* and PYDD were reported to have a beneficial effect on alcohol misuse; E-AMPS was partially effective.

Author's conclusions
To date, the evidence supporting the use of schools based social skills training for alcohol use prevention among adolescents, is at best, sparse.

Review quality score
11.

Comments
This review has a narrow focus – the effectiveness of school-based social skills training programmes in reducing alcohol misuse. It is questionable how comprehensive a search, limited to one North American organisation's database and personal contacts is. All the included studies come from the USA.

(5) Peters and Paulussen (1997), The Netherlands[79]

Authors' objective
This was an examination of the international scientific literature on effectiveness of school health promotion with regard to alcohol use as a behavioural cause of cancer.

Review methodology
Search. Computer searches of PsycLIT, ERIC, MEDLINE, CHID, NIGZ-DB for the period 1990–1996.

Inclusion criteria. Subjects aged 10–18 years; primary prevention only; specific alcohol data to be reported; studies solely focusing on drink driving excluded; studies had to include a comparison group, report effects on behaviour and statistically determine intervention effects.

Quality assessment. Type of comparison group; assignment to groups; unit of assignment; equivalence of groups; unit of analysis.

Number and type of studies
Eighteen RCTs and five controlled trials (also one study not based in school) were included.

Study quality as assessed by authors
'In contrast with comments in previous meta-analyses and literature reviews … the studies in the present review seem to have a methodology of reasonable to good quality.'

Participants
Children and young people aged 10–18 participated. All but one study involved children and young people aged 14 years or less. Only two programmes were of European origin.

Intervention
Life Skills Training[102] B1,2,5,6,7,8,9,10a; Life Skills Training CFI[99] B2,5,6,7,8,9,10bc; AMPS[165,205] B1,8a, E-AMPS+[204] B1,2,8,10a; AAPT RT B1,3,8c, NE B1,3,10c and C B1,3,8,10c;[106,181] Drug Abuse Resistance Education B1,2,35,6,7,8,9,12c;[143,160–162,206] Bagnall[155] B1,2,8a; Collins[207] B1,8,12c; SMART A social B1,3,8,10,12c and SMART B affect B1,2,3,4,5, 6,7,10,12c;[105] DRS[144] B8c; Midwestern Prevention Programme[96] BC1,2,3,8,10; RPDD[175] B1,8a; Northland[88] BC1,3,8,9,10ab; STARS[208] B1,3,5,8bc; Wilhelmsen[179] B1,8,10,12ab; ALERT[134] B1,8,10bc.

Results
Positive alcohol effects (behaviour) were found for the following programmes: Life Skills Training,* AMPS,* E-AMPS+,* AAPT (NE),* AAPT (C),* Drug Abuse Resistance Education (Harmon[160] only), Bagnall, SMART A (social),* SMART B (affect),* Northland,* STARS* and Wilhemsen*.

The norm setting was the only significantly effective component. The effectiveness of programmes was not related to the number of programme sessions or time interval between intervention delivery and post-testing.

Authors' conclusions
Programmes employing a norm setting strategy produced favourable results relatively often.

Focusing the programme on alcohol only, instead of multiple substances, proved to increase effectiveness but interpretation of this result is yet unclear. Using peers, and to a lesser degree health professionals, as instructors contributes to effectiveness, but including peers in programme delivery was not found to increase effectiveness. Lastly, implementing a curriculum in schools only was found to be more effective than including home or community components. There are indications that this result is caused by an interaction with norm setting and therefore may be considered spurious.

Review quality score
10.

Comments
This review explicitly concentrates only on literature published since 1990. Although the review is Dutch, only two papers were European in origin. Hansen's criteria are used to assess programme content. Chi-square tests were used to examine whether programme characteristics contribute to effectiveness. In addition, logistic regression procedures were used.

(6) James and Fisher (1991), Australia[80]

Authors' objective
This was to review the formal evaluations of school-based drug education between 1978 and 1990 carried out in Australia.

Review methodology
Search. The Australian Medical Index, Australian Education Index, Australian Public Affairs Information Service, Australian National Bibliography computerised databases were searched using the key words provided. Researchers and practitioners in field were also contacted.

Inclusion criteria. School-based drug education dealing with alcohol and/or tobacco in years 5–12; conducted between 1978 and 1990 in Australia; outcome measures to include knowledge, attitudes, intentions and/or behaviours; control or comparison group; published article or formally documented report.

Quality assessment. None.

Number and type of studies
Four RCTs (including one follow-up) and 13 controlled trials (including one follow-up) covering 15 programmes were included.

Study quality
This was not discussed.

Participants
Year 5–12 school students participated.

Intervention
Content and implementation. Alcohol Education, Queensland (Qns)[209] aB1a[209] bB1,2,4; Health Development, NSW[114] Ba; Smoking Prevention, Western Australia (WA)[107] B2,8ab; Smoking Prevention, NSW[210] B1,4a; Drama for Drug Education B1,2,4,8,9[149] and BC1,2,4,8,9[145]; Smoking Prevention, Qns[130] B1,3,4a; Life Education Centre[83] C1c; Skylark Puppet Show[129] B1,9ac; Alcohol Support for Aboriginal Children and Young People[211] B1,4,8a; Peer Support, NSW[212] B8,9,11b; WHO Alcohol Education[176] AB2,8,9a and Perry (1989)[176] bB2,8,9b; Primary School Drug Education[85] ABac; Kylie Mole[86] BCa; Straight Talking[112] B6,7,8a; PASS[213] B1,9a.

Results
The following programmes had beneficial effects on knowledge: Alcohol Education Qns, Alcohol Education NSW, Smoking Prevention NSW,* Smoking Prevention WA, Smoking Prevention Qns, Life Education Centre, SkyLark Puppet Show, the Alcohol Programme for Aboriginal Children and Young People, WHO (peer led), Primary School Drug Education and the Drink Drive Programme. The results for the teacher-led WHO programme were unclear.

These programmes reported desirable effects on attitudes: Alcohol Education NSW, Smoking Prevention WA and the Drink Drive Programme. These had no effects: Alcohol Education Qns, Smoking Prevention NSW, Smoking Prevention Qns, the Life Education Centre, Skylark Puppet Show, the Alcohol Programme for Aboriginal Children and Young People, Peer Support NSW, WHO (peer led) and Primary School Drug Education. Kylie Mole had a negative effect on attitudes.

Smoking Prevention Qns and the Drink Drive Programme had a positive effect on behavioural intentions. Peer Support NSW was reported to have no effect on personal development, and Primary School Drug Education was reported to have no effect on self-esteem.

The results for Drama for Drug Education for substance use in general were mixed; Smoking Prevention Qns, the Life Education Centre, Peer Support NSW, Primary School Drug Education were reported to have no effect.

WHO Alcohol Education NSW, the Life Education Centre and Straight Talking NSW were reported to

have the desired effect on smoking behaviour; Smoking Prevention NSW had no effect. Smoking Prevention WA had a positive effect on boys but not on girls. Kylie Mole had a negative effect.

WHO Alcohol Education NSW (peer led) and Straight Talking NSW were reported to have a positive effect on drinking; the Life Education Centre and the Alcohol Programme for Aboriginal Children and Young People had no effect. Straight Talking NSW was also reported to have a positive effect on drunkenness and marijuana use and assertiveness. PASS was reported to have a beneficial effect on drink driving.

Authors' conclusions
There were enormous differences in programme intensity, teacher preparation, quality control and evaluation research methodology. Programme effects varied depending on the participant's age, gender and experience with drugs. The effects on outcomes were also inconsistent; knowledge almost always increased while attitudes and behaviours were more difficult to change.

Review quality score
8.

Comments
A thorough review of Australian studies. Only controlled studies were included; however, there is no further quality assessment nor discussion of how the process of evaluation impinges on the results of the review.

Although the backgrounds of individual studies were described, there is little detail of programme components.

(7) Hansen (1992), USA[71]

Author's objectives
This was to summarise the research on the effectiveness of substance abuse prevention programmes, specifically the effectiveness of different strategies.

Review methodology
Search. Computer searches (unspecified); previous reviews; review of commonly referenced journals since 1980.

Inclusion criteria. Published since 1980; school grades 4 to 12; studies targeting tobacco only are excluded.

Quality assessment. Selection bias (estimated by (a) numbers per condition, unit and method of assignment, (b) pretest equivalence and (c) use of statistical methods to control threats to validity) and the statistical power of the included studies investigated. Overall bias assessed by averaging the three bias indicators (possible range 0 (no bias) to 2.00 (clear bias)). Results given before and after making adjustments for methodological weaknesses.

Number and type of studies
Forty-five papers describing 18 RCTs and 15 controlled trials were included.

Study quality as assessed by author
Fourteen studies had bias scores of 0.67 or less, nine had bias scores of 1 and eight studies had scores exceeding 1.33. Power analyses indicate that several studies reporting few effects may not have had sufficient power to detect statistically significant differences.

Participants
School children and young people in grades 4 to 12 participated.

Intervention
Content and implementation. Programmes were grouped according to content:

(a) Information/values clarification: AAPT A[106] B1,3; Booze[98] AB1 and BB1; HBM[214] B1; Penn[138] B1,4, Toronto[172] B B1 and D B1,4; Waterloo[215] A B1 and B B1,4.
(b) Affective education: CESA #8[216] B1,2,7; HLAY[173] B1,2,6,7; Napa A[140,141] B1,2,4,6,12; Nebraska B[217] B1,2 and C[218] B1,2; Ombudsman[219] B1,2,4,9,11,12, SMART B[104,105] B1,2,3,5,6,7; Toronto A[220] B1,2,4 and C[172] B1,2; Waterloo C[215] B1,2,3,4.
(c) Social influence: AAPT[106] AB1,3,8 and DB1,3,8,10; ALERT[103,134] B1,8,10; AMPS[163,164] B1,8; AT[142] A B8 and B B1,8; CLASP[132] B3,8; De Paul A[197] B1,4,8,10,12; Nebraska A[168,170,198,221] B1,8; RADD[199] B1,3,8,10,11; SMART A[104,105] B1,3,8,10,12; WHO[176] B1,3,8,10.
(d) Comprehensive: Drug Abuse Resistance Education[222] B1,2,3,6,7,8,9,12; Life Skills Training[101,102,157,223] B1,2,5,6,7,8,9,10,12; Napa B[121,122,174] B1,2,4,5,8; PRIDE[93] B1,2, 7,8,9; SMART C[105] B1,2,3,5,6,7,8,10,12; STAR[94,96,108–110] B1,2,3,8,10; TAPP[203] B1,2,3,4,5,6,8,10.
(e) Alternatives: NAPA[122] C B9,11,12 and D B[9,12].
(f) Incomplete: AAPT C[106] B1,3,10; De Paul B[197] B1,4,10,12.

Few details about implementation are given.

Results
After adjustment for methodological weakness, the following programmes were found to have positive effects on alcohol use: Waterloo A,* AAPT C* and D,* SMART A* and C,* and STAR. These programmes were partially effective: Pennsylvania, Napa A,*, WHO and Life Skills Training*. These had no effects: AAPT A* and B,* Toronto B, Waterloo B* and C,* HLAY, Toronto C, ALERT,* AMPS, Drug Abuse Resistance Education and TAPP. Negative effects were reported for HBM,* Toronto D and SMART B*. The results of Booze A and B,* Nebraska B and C, Toronto A, AT A* and B,* CLASP, De Paul A and B,* Nebraska A, RADD, Napa B,* C* and D* and PRIDE were unclear.

After adjustment for methodological weakness, the following programmes were found to have positive effects on marijuana use: AAPT C* and D,* ALERT,* SMART A* and STAR. These were partially effective: Napa A and Life Skills Training*. No effects were reported for AAPT A,* SMART C* and TAPP. Negative effects were reported for SMART B* and AAPT B. Findings for Pennsylvania were mixed, and for CESA #8, Nebraska B, Ombudsman, AT A* and B,* CLASP, De Paul A* and B,* RADD, Drug Abuse Resistance Education,* Napa B,* C* and D* PRIDE were unclear.

After adjustment for methodological weakness, the following programmes were found to have positive effects on tobacco use: AAPT C* and D,* ALERT,* SMART A* and C* and STAR. Partially effective programmes were Life Skills Training* and Napa B*. Negative effects were reported for SMART B* and Pennsylvania. The findings for AAPT A* and B,* Napa A, C* and D,* De Paul A* and B,* RADD, Drug Abuse Resistance Education* and PRIDE were unclear.

No results presented for SMART A, B or C,[105] ALERT,[134,198] or Duryea.[168]

Author's conclusions
Social influence and 'comprehensive' programmes are most consistently effective at reducing substance abuse among students exposed to these programmes. The effectiveness of programmes cannot be guaranteed. Numerous intervening characteristics must be considered, including the training and background of teachers, the fidelity of presentation and the target population.

Review quality score
8.

Comments
The search was limited to published studies and no details were given of the databases searched. All the included studies took place in North America. Few details about the presentation and implementation of the programmes were given.

(8) Ennett and co-workers (1994), USA[81]

Authors' objective
This was to evaluate the short-term effectiveness of the core curriculum of Drug Abuse Resistance Education by using meta-analytic techniques to integrate the evaluation findings of several studies.

Review methodology
Search. A survey of Drug Abuse Resistance Education's five Regional Training centres; computerised searches of published and unpublished literature; telephone interviews with individuals known to be involved with Drug Abuse Resistance Education.

Inclusion criteria. Control or comparison group; before-and-after design or post-test only with random assignment; reliably operationalised quantitative outcome measures. Quasi-experimental studies were excluded if they did not control for pre-existing differences.

Quality assessment. Correspondence between unit of assignment and analysis examined; use of a panel design; matching of schools and attrition rates.

Number and type of studies
Eight studies were included: three RCTs and five controlled trials.

Study quality as assessed by authors
Because there were relatively few sampling units across studies it is unlikely that equivalence between groups was obtained without prior matching or blocking of schools even with randomisation. Outcome measures used in the Drug Abuse Resistance Education evaluations were based on responses to self-administered questionnaires. Most studies (75%) did not use data analysis strategies appropriate to the unit of assignment.

Participants
Five of the eight studies had primarily white subjects (no information provided on the remaining three). Six of the studies took place in mainland USA, one in Hawaii and one in Canada.

Intervention
Drug Abuse Resistance Education 1,2,7,8c; Clayton;[159,222] Ennett;[162] Faine;[224,225] Harmon;[160] Manos;[226] Ringwalt;[143] Walker;[227] McCormick.[228]

Results
The effect sizes for the studies reporting knowledge were Walker, 0.68; Faine, 0.58; McCormick, 0.19. The mean weighted effect size was 0.42 (95% CI: 0.33–0.51).

The effect sizes for attitudes about drugs were: Walker, 0.0; Manos, 0.07; Ennett, 0.03; Clayton, 0.10; Faine, 0.19; McCormick, 0.06; Ringwalt, 0.19; Harmon, 0.32. The mean weighted effect size was 0.11 (95% CI: 0.07–0.15).

The effect sizes for social skills: Manos, 0.34; Ennett, 0.15; Clayton, 0.10; Faine, 0.30; McCormick, 0.08; Ringwalt, 0.17; Harmon, 0.19. The mean weighted effect size was 0.19 (95% CI: 0.13–0.22).

The effect sizes for self-esteem: Ennett: 0.15, Clayton: 0.07, Faine: 0.14, McCormick, –0.03; Ringwalt, 0.0; Harmon, 0.6. The mean weighted effect size was 0.06 (95% CI: 0.01–0.11).

The effect sizes for attitudes toward police: Ennett, 0.12; Faine, 0.27; McCormick, 0.05; Harmon, 0.08. The mean weighted effect size was 0.13 (95% CI: 0.05–0.19).

The effect sizes for drug use: Walker, 0.02; Ennett, 0.05; Clayton, 0.00; Ringwalt, 0.11; Harmon, 0.10. The mean weighted effect size was: alcohol use, 0.06 (95% CI: 0.00–0.12); tobacco use, 0.08 (95% CI: 0.02–0.14); marijuana use, –0.01(95% CI: -0.09 to 0.07).

Author's conclusions
The results of this meta-analysis suggest that Drug Abuse Resistance Education's core curriculum effect on drug use relative to whatever drug education (if any) was offered in the control schools is slight and, except for tobacco use, is not statistically significant. Drug Abuse Resistance Education's limited influence on adolescent drug use behaviour contrasts with the programme's popularity and prevalence.

Review quality score
8.

Comments
This is a meta-analysis based on a single intervention. There are no details of the databases searched, so it is not clear how comprehensive this review is. Although some non- randomised studies have been included in the meta-analysis, covariance adjusted means have been used. However, there do not appear to have been any corrections for the units of analysis used, although these were discussed. In addition, there are no tests for heterogeneity, so it is not clear whether the pooling was appropriate. Only American studies have been included.

(9) Binyet and de Haller (1993), Switzerland[82]

Authors' objectives
This was to determine which approach to smoking prevention in young people is most effective and cost-effective. This review was published in French.

Review methodology
Search. MEDLINE, ERIC and PsycLIT databases searched (years not specified).

Inclusion criteria. Published after 1980; describes different types of intervention; evaluates results with sufficiently rigorous methodology to allow generalisations to be made.

Quality assessment. Design and length of follow-up noted; methodological limitations discussed.

Number and type of studies
Three RCTs, 15 controlled trials and three before-and-after studies were included. The review also included three reviews and four studies which were reported in insufficient detail to include here.

Study quality as assessed by authors
Methodological strengths and weaknesses were discussed. A number of studies included long-term follow-up. High attrition rates weakened some studies.

Participants
School children and young people aged 10–16 years (18 years in one study), mostly in the USA, participated.

Intervention
Content and implementation (by author if untitled). Biglan A and B C1,8a and B B1,8a;[92] Life Skills Training;[100,101] B1,2,4,7,8,9,10a/b;[102] Clarke A B1,8a, B B1,8b and CB1,8c;[120] Del Greco[128] B1,8,9; Evans[123,124] B1,3,4,8,10a; Flay[126] B1,2,3,8c; Hansen A and B C1,8c and B B1,8a;[91] Hirschman[131] B1,8b; Hurd[115] B1,3,4,8,10b; Johnson A B1,8bc and B B1,8c;[229] Lloyd[210] B1,4a; Mathey[230] B1,8b; McAlister[132] B1,8b; Miller A B1,8a and B B1,8b;[116] Murray A B1,8b/c, B B1,8 and C B1,3,8;[125]

Pentz[231] A B1ab; Perry[117] B1,8a/b; Schinke A B1 and B B1,2,6,8,9b;[118] Vartiainen A B1,8bc and B B1,8a;[119] Decision Skills Curriculum[232] B1,2,4,6,8,9ac.

Results
Clarke (both teacher and peer led) and Hirschman were reported to have positive effects on intentions. Positive effects on smoking behaviour were reported for Botvin 1 (at 4 months and 1 year), Botvin 2, Gilchrist, Hansen (expert led), Hurd, McAlister, Miller (peer led), Pentz (school policy), Perry, Schinke and Vartiainen. Evans, Lloyd,* Murray (teacher, peer and media versions) and Wills were reported to be partially effective. Clarke (teacher led) was reported to be effective for girls but not boys. Flay* was reported to have positive effects after 2 years; Evans, however, was not sustained. No effect was found after 6 years for Flay or Murray (any implementation). Biglan, Clarke (peer and expert led), Del Greco, Hansen (teacher led), Hirschman and Johnson (expert and peer plus expert) were reported to have no effect. Hirschman, however, was reported to reduce the number of cigarettes smoked. The results for Miller (teacher led) were unclear.

Neither Botvin 1 nor 2 were reported to have an effect on self-esteem; in addition, no effect was found on self-efficacy or social anxiety for Botvin 2. This study did, however, report positive results for communication and self-concept. Del Greco reported no programme effects on assertiveness.

Authors' conclusions
Preventive methods should start at age 12 years and continue to age 18 years. Programmes should include resistance skills training and take account of the psychological development of the adolescent. The key element is the teaching of behaviour change techniques by a well-trained teacher. There is a need to evaluate immediate results (to see if the teaching programme was effective) and then intermediate term, to see the goals obtained, and long-term, to see if smoking behaviour changes.

Review quality score
7.

Comments
Most of the studies were from the USA (plus one from Australia and one from Finland). No data on costs were given. Where more than one intervention was compared to a control, results for each were not always given.

Nutrition and exercise

Synthesis of food and nutrition and health-related exercise reviews

These two areas of health promotion activity are considered together, as many interventions focus on both diet and exercise with the aim of changing the patterns of risk for heart disease and stroke as well as other diet- and exercise-related diseases. Summaries of each of the included reviews are given at the end of the main section. Tables of the individual studies included in the reviews are given in appendix 6.

Review coverage

A total of 14 reviews were identified, of which eight met the inclusion criteria (*Table 7*). These were primarily concerned with healthy eating; one focused on exercise. Altogether these reviews covered 107 relevant primary studies, of which 30 were included in more than one review. One review[233] was of high quality. The others employed more limited searches and provided fewer details about the studies or the interventions evaluated. One review was carried out in 1980, and therefore

TABLE 7 *Nutrition and exercise reviews included in the synthesis*

Authors	Primary focus	Number of studies	Review quality
Roe and co-workers (1997), UK[233]	Diet	23	16
Willemse and co-workers (1997)[234]	Diet	16	8
Contento (1995), USA[235]	Diet, exercise	41	9
Resnicow and co-workers (1993), USA[236]	Diet, exercise, smoking	8	6
Resnicow (1993)[237]	Diet	9	5
Contento and co-workers (1992), USA[238]	Diet	18	5
Levy and co-workers (1980), USA[239]	Diet	18	4
Keays (1993), Canada[240]	Exercise	21	4

focuses on earlier interventions. One focused on the prevention of obesity and one on fitness promotion.

Quality of primary studies as judged by authors

Both the earliest[239] and one of the most recent[233] reviews highlighted a lack of good-quality evaluations in this area. In many cases, the quality of the study design has marred the attempt to assess the quality of the intervention. A common limitation of the studies was the failure to use validated and reliable instruments to measure outcomes. Researchers may face a real dilemma in designing their studies between selecting valid and reliable measures which do not quite capture the outcomes they are looking for and selecting appropriate measures which have not yet been validated. Other limitations noted by reviewers included high attrition rates, selection bias, inadequate follow-up and a lack of information about methodological features or the interventions evaluated.

Outcomes

The majority of outcomes reported in the studies were specific to healthy eating or exercise. These included diet in general (33 studies) as well as consumption of specific foods, knowledge (55 studies), attitudes (29 studies) and exercise patterns (two studies). Where information was provided about the instruments used to measure outcomes there was considerable variety, making comparisons difficult. Validated methods included food frequency questionnaires, 24 hour recall or diet records. Diet was also assessed by observing snack consumption or plate waste in schools, and by analysing the nutritional content of lunches. A range of physiological measures were evaluated, including blood pressure (18 studies), heart rate (three studies) and indicators of body fat such as body mass index (20 studies) and skin fold thickness (13 studies). Some studies reported more general outcomes such as classroom behaviour (four studies), self-efficacy (seven studies), locus of control (two studies), self-esteem (one study), creativity (one study), attitudes (14 studies) and academic performance (one study).

Programme domains

The interventions ranged from physical fitness programmes to those focusing on diet, either alone or in combination with exercise, changes to the school meals service, and after-school programmes for children and young people, and their families. Parental involvement was also invited through newsletters, committees or home activities for the whole family, sometimes with rewards for participation. Some interventions included a screening element for children and for a few staff and parents. The combination of either parental involvement **or** school-wide initiatives combined with changes to the curriculum was common. Four interventions, Great Sensations, Heart Smart, The Cardiovascular and Adolescent Trial for Cardiovascular Health, and Young,[46] employed a health promoting schools approach, targeting all three domains (these studies were included in the health promoting schools review). The Know Your Body programme has the potential to be applied in all three domains, but schools are encouraged to customise the programme, and in none of the evaluations included in the reviews did it appear to have been implemented in more than two domains.

Curricular components

The great majority of interventions included changes to classroom-based curriculum, and some of these were single-domain interventions. Fifteen of these were reported to include goal setting as well as knowledge, eight decision-making or problem-solving skills development, six resistance skills training, one values clarification and one self-esteem development. It is possible that the variety of components in these programmes have been under-reported here due to lack of detail in the reviews. There were 15 studies of interventions of school fitness programmes in which pupils took part in regular physical activity.

Implementation

Interventions were most often described as being implemented by the classroom teachers, sometimes after special training. Others by researchers or health professionals. Only two interventions appear to have used peer leaders. Programmes varied considerably in intensity and duration. Details about the implementation of the programmes were not always given.

Theoretical bases

Of those interventions for which the theoretical basis was given, social learning theory was the most common.

Generalisability

The studies covered interventions for children and young people aged 5–15 years from a range of ethnic and socio-economic groups, with more studies of younger children. The great majority of studies were conducted in the USA.

Costs and resources

Cost and resource implications were rarely reported.

Synthesis of results: diet

Hypothetical food choices

Most of the studies reporting hypothetical food choices found positive programme effects on foods selected. Fourteen found positive effects, including all seven studies evaluating diet following interventions comprising a curriculum and a parental component. The involvement of parents and families was reported to be particularly successful in an RCT of an untitled intervention[241] and in two controlled trials of Hearty Heart and Home Team.[242,243] Other studies also reporting dietary gains following this approach were an RCT of the after-school Family Heart Project[244] and controlled trials of another after-school scheme (the Family Health Project[245]), Know Your Body[246] and Hearty Heart.[247] No dietary gains were found in four studies of the intervention Nutrition in a Changing World, in which lunchroom activities played a part.[248–251]

Fruit and vegetable intake

Of the seven studies assessing fruit and vegetable intake, increases in intake were reported in four controlled trials – one of a curricular intervention[252] and three programmes involving families, Hearty Heart and Stowaway to Planet Strongheart.[247,253,254]

Complex carbohydrate consumption

The three studies that reported consumption of complex carbohydrates as an outcome all reported a partial effect. A randomised trial of Hearty Heart reported a short-term improvement in the consumption of complex carbohydrates when home activities were combined with the curriculum but not following the curriculum alone.[243] The combination of interventions in the curricular and parental domains was also used in Know Your Body, which when evaluated in an RCT reported gains in carbohydrate intake among white middle income groups but not ethnic minority lower income groups.[255,256] A controlled evaluation of a computer package plus health tips sheet also reported an increase in complex carbohydrate intake.[257]

Salt use

Salt use was reported to be reduced in all five evaluations where it was assessed: Hearty Heart,[247] the Family Heart Project,[244] a controlled trial of Go For Health, which involved a nutrition curriculum and modification of school lunches,[258] an RCT of the Slice of Life curriculum,[259] and a controlled trial targeting school activities and modifications to canteen lunches.[60]

Fibre intake

Fibre intake was found to be increased in two out of the four studies in which it was assessed. It was increased following an intervention using a computer package and health tips sheets evaluated in a controlled trial,[257] but not in an RCT of Know Your Body.[255,256,260,261] Gains were also reported in an RCT of an intervention where family activity packs were offered in addition to the curriculum.[262] Offering family activities only, or the curriculum alone, were not found to be effective approaches.

Sugar consumption

Sugar consumption was reported as an outcome in five different interventions evaluated in two trials; one showed no effect, two an effect in boys only and two a positive impact. A reduction was found in two studies of Hearty Heart, a controlled trial of the curriculum combined with family activities[247] and a before-and-after study of the home activity component alone.[253] An intervention evaluated in an RCT was found to reduce sugar consumption in boys only, following curriculum changes and when combined with family activities.[262] Family activities without the curriculum had no effect. A controlled trial of a class programme was found to reduce sugar consumption.[263]

Dairy products and fat consumption

Twenty-six studies reported consumption of dairy and/or high-fat foods as an outcome, of which 15 reported a reduction in the consumption of these foods. Know Your Body was found to be effective at reducing dairy/high-fat food consumption in one of the evaluations, a controlled trial, with the reduction maintained at a 3 year follow-up.[264] In an RCT,[262] fat intake was found to be positively affected only in girls when curricular and family approaches were combined or in the latter alone. Hearty Heart had short-term benefits when family activities were implemented in addition to the curriculum, but not following the curriculum only without the family component.[243,247] An RCT of the Family Heart Project after-school programme reported a reduction in the consumption of dairy/high-fat foods in the parents of white children but not Mexican-Americans.[244] Benefits were also reported in controlled trials of the family programme Stowaway to Planet Strongheart[253] and a computer package,[257] in a before-and-after study of a school meals intervention[265] and an RCT of the Cardiovascular and Adolescent Trial for Cardiovascular Health, which used a health

promoting schools approach.[48] A controlled trial of a classroom programme was not effective in reducing fat intake.[263] Some of these studies examined the added benefit of parental involvement, two were able to demonstrate additional benefits to knowledge but not diet.[48,266] The other two showed a positive effect in the short-term[243] or a positive effect in one sex only.[262]

'Heart healthy' foods and healthy snacks

A positive effect on the consumption of 'heart healthy' foods (such as fruit and vegetables) was reported in three of five studies (all controlled studies, one with random allocation). These were Great Sensations,[47] Know Your Body[264] and, for girls only, Slice of Life.[259] Consumption of 'healthy snacks' was reported in nine studies. Short-term gains were found in Great Sensations[47] only when an addition to the curriculum was added to an environmental or a family approach, neither of which were beneficial alone or together. Other effective programmes were Gimme 5, targeting fruit and vegetable consumption through goal setting, problem solving and a newsletter for parents, evaluated in a controlled study,[267] Nutrition Education and Training, also evaluated in a controlled study,[268] and Adolescent Heart Health (a small effect only), reported in a randomised trial.[269]

Synthesis of results: school meals

All studies reporting changes to school meals reported gains. Changes in the content of school meals, evaluated in three before-and-after studies[265,270,271] and an RCT of the Cardiovascular and Adolescent Trial for Cardiovascular Health,[48] which included changes to school lunches, resulted in a reduction in the fat content of school meals. The promotion of low-fat meals on school menus reported in an RCT[272] showed an increase of 3% in low-fat meals selected as a main course. One RCT showed increased participation in school lunches (by 18% in intervention schools compared to 5% in control schools) and increased consumption of school lunch food. However, the study did not assess the content of the school lunches being offered.[273]

Synthesis of results: physiological measures and physical fitness

Blood pressure

Seven out of 11 studies considering blood pressure reduction as an outcome reported that blood pressure was reduced. Successful programmes were Know Your Body (blood pressure reduction maintained at the 3 but not 5 year follow-up) evaluated in RCTs[255,256,260,261,274,275]) and a controlled trial,[264] two physical fitness programmes evaluated in a controlled trial[276] and a before-and-after study,[277] and the Family Heart Project.[244]

Body fat

Positive effects on weight or body mass index were reported in five of the 20 studies where it was measured: two randomised trials of the Adolescent Heart Health curriculum,[269,278] a controlled trial of a curriculum plus parents programme[279] and controlled studies of Know Your Body in Greece[246] and Israel.[280] These last two studies found no effect on weight. The evaluations of Know Your Body in the USA did not find positive effects on body mass. A before-and-after study of a running programme[281] and a controlled trial of a computer package[257] reported weight reduction in overweight people. Body fat was reduced in obese girls only in a before-and-after study of a physical fitness programme[281] and by a running programme for boys.[282] Skin fold thickness was measured in 13 studies, with gains reported from Adolescent Heart Health[269,278] and in controlled trials of a curriculum with screening[283] and three physical fitness programmes.[276,284,285]

Blood cholesterol

A reduction in total cholesterol was reported in five of nine evaluations which considered this outcome. These were an RCT (reported across four papers[255,256,260,261]) and three controlled trials[246,264,280] of Know Your Body, and an intervention with curricular and family components.[286] A further RCT of the family heart project[244] reported effects for white parents but no effects on children or Hispanic adults. Of the eight evaluations measuring high-density lipoprotein (HDL) cholesterol, increases were reported in five – Know Your Body evaluated in an RCT in the USA[274,287,288] and a controlled trial in Israel,[280] and a controlled trial of an intervention with curricular and family components.[283] Two exercise programmes, evaluated in a controlled trial[289] and a before-and-after study,[290] reported short-term increases in HDL cholesterol.

Heart rate

The three studies reporting heart rate as an outcome all reported improvements. These were an RCT of the Adolescent Heart Health curriculum[269] and two controlled trials evaluating exercise programmes.[284,291]

Exercise habits

Intervention effects on exercise habits were reported in two studies. Adolescent Heart Health was judged to have had a positive effect,[269] as was a physical fitness programme evaluated in

a controlled trial,[291] but the results were not clearly reported.

Exercise performance

Aerobic capacity was assessed in five controlled trials of physical activity programmes.[276,292–295] Gains were reported in all five, although one study found no improvement in a subgroup of girls aged 12–14 years.[293] Gains following physical activity programmes were reported in all the studies (all controlled trials) assessing endurance,[295–297] flexibility,[297] strength,[297] activity skill,[298] running performance[284,299] and ability to do sit-ups.[299]

Synthesis of results: behaviour, attitudes, knowledge and self-esteem

Classroom performance and behaviour

Creativity was assessed following a physical activity programme, and was judged to have improved, but no effect was shown on behaviour.[284] Four studies evaluated classroom behaviour, and improved behaviour was reported in two controlled trials of exercise programmes,[276,297] but it is unclear how this was measured. The first of these also assessed academic performance, finding no gains but no loss of performance despite reduced classroom time through daily exercise.

Attitudes

The majority of the 26 studies evaluating attitudes reported no benefit or mixed results. An RCT of the Chicago Heart Health Curriculum,[300] which included information and values clarification, reported a beneficial effect on attitudes but found no additional gains by involving parents. Food, Your Choice, an information-based curriculum, evaluated in a controlled trial[301] and a before-and-after study,[302] was reported to positively influence children and young people's attitudes to fruit and vegetables. Gains were also reported in a survey evaluating the Nutrition for Life curriculum.[303] A controlled trial of a classroom programme reported positive effects on attitudes.[263]

Knowledge

Of the 56 studies evaluating the effect of the interventions on knowledge, all but three reported knowledge gains.

Self-esteem, self-efficacy, locus of control

An RCT of Know Your Body, reported in three papers, found no effect on self-esteem nor on locus of control.[274,287,288] A positive effect on locus of control but not self-efficacy was reported in a controlled trial of Know Your Body.[304] Four other controlled trials assessed self-efficacy, with gains reported in the evaluation of Go For Health.[258]

Conclusions

These reviews cover studies of a wide range of interventions of very different levels of intensity and activity. Both the studies and the reviews varied in methodological quality. Taken together, however, they show that school-based healthy eating programmes which target school lunches can be relied upon to improve their content, and school-based fitness programmes to increase pupils level of fitness. Knowledge gains were found in all studies where it was reported. Although the results are not so clear cut, the reviews provide reasonable evidence that it is possible to change dietary intake and improve physiological measures of cardiovascular health, but also that school programmes cannot be relied upon to achieve these goals. Experimental studies have shown a positive impact on fruit and vegetable, complex carbohydrate, salt, dairy products and high-fat food consumption. School-based programmes have also reduced blood pressure and heart rate.

Healthy eating and exercise promotion interventions appear to have employed a more restricted range of classroom approaches – decision making, goal setting and resistance skill development – than substance misuse programmes, and the involvement of peers was rare. In contrast, the involvement of parents and changes to the school environment were common. All the studies of interventions involving parents showed a positive impact on at least one outcome, and almost all had an impact on reported dietary intake. In the five studies in which the effectiveness of adding parental involvement to a classroom programme was tested, three demonstrated that parental involvement had a beneficial impact on dietary intake. The other two showed an additional impact on knowledge but not on diet. Although the extent of involvement varied from one programme to another, and there is therefore room for further research on the optimum method, these results strongly suggest that the involvement of parents in school healthy eating programmes is important. All programmes which combined a classroom component with environmental change by modifying school lunches and promoting healthier options achieved these goals, and several were able to demonstrate an impact on dietary intake. In contrast, the programmes involving lunchroom activities were not so successful. There is some indication that longer and more frequent intervention was associated with more sustained benefits, but this was not rigorously evaluated, and many studies included only short-term follow-up. Lack of detail in the reviews about the process of programme implementation makes it impossible

to assess whether this had an influence on effectiveness. For example, although children at school are vulnerable to coercion it was impossible to tell whether programmes offered them a genuine choice about whether they participated in exercise programmes or in their selection of school meals. Interventions which were successful while providing a choice are more likely to have a long-term impact on dietary intake and fitness.

Nutrition and exercise review summaries

Key to notes:

- The programme **domains** have been coded as: A, ethos and/or environment; B, curriculum; C, family and/or community.
- The curricular **components** have been coded as: 1, information; 2, decision making skills; 3, pledge; 4, values clarification; 5, goals setting; 6, stress management; 7, self-esteem; 8, resistance skills training; 9, life skills training; 10, norm setting; 1, assistance; 12, alternatives.
- The **personnel** used to deliver the interventions have been coded as: a, teacher led; b, peer led; c, outside expert.
- An asterisk (*) denotes an RCT.

(1) Roe and co-workers (1997), UK[233]

Authors' objectives

These were to identify evaluations of the effectiveness of interventions to promote healthy eating in school-aged children and young people and adults and to critically assess the reliability of the evidence and its implications for future practice.

Review methodology

Search. Computer searches of MEDLINE, EMBASE, PsycLIT, SciSearch, Biological Abstracts, CINAHL, Social Science Citation Index, ERIC, Unicorn (HEA) and Index to Scientific and Technical Proceedings; unpublished evaluations sought from key organisations; reference lists of retrieved articles; foreign language studies considered if summary in English.

Inclusion criteria. Controlled studies of interventions that focused on healthy eating, evaluated outcome measures of dietary behaviour or diet-related physiological measures, dating from 1985 to 1996.

Quality assessment. Studies categorised as good, moderate or poor quality on the basis of their design (method of allocation to groups, baseline equivalence, attrition), validity of outcome measures (validated methods assessing whole diet were considered most reliable), and appropriateness of outcome analysis (statistical methodology assessed and whether whole population was included).

Number and type of studies

Eleven RCTs, nine controlled trials, three before-and-after studies were included. The review also included studies of non-school-based interventions.

Study quality as assessed by authors

Seven studies were judged as good quality. Limitations of the remaining studies included no assessment of dietary behaviour change or the use of inadequate measures, high attrition rates, selection bias and little or no follow-up. There was a lack of well-designed evaluations among adolescents.

Participants

The participants were school children and young people mostly aged 8–12 years, from a variety of socio-economic and ethnic backgrounds in schools, the majority in the USA (none from the UK).

Intervention

Content and implementation (by author if untitled).

These are grouped according to quality:

(a) Good-quality studies: Ellison[265] A; Whitaker[272] AC1; Gimme 5[267] BC1,2,5a; Know Your Body[246,255] BC1a; Cardiovascular and Adolescent Trial for Cardiovascular Health[48] A BC1a; Family Health Project[245] C1,2,5.

(b) Moderate-quality studies: Lunchpower![270] AC; Whitaker[271] A; Alexandrov[283] BC1c; Know Your Body[264,287] A?BC128a; Adolescent Heart Health[269] B1,2,5c; Slice of Life[259] B1,5a/b/c; Hearty Heart[243] BC1,5a; SEGEV (based on Know Your Body)[280] BC1,2a; Vandongen[262] B1a and BC1a.

(c) Poor-quality studies: Heart Smart[49] ABC1a; Student Health Behaviour Survey[257] B1c; Hopper[266] BC1a; Adolescent Heart Health[305] B1c, Go For Health[258,306] AB1,5a.

Results

Of the good-quality studies, a reduction in fat intake was found in the Cardiovascular and Adolescent Trial for Cardiovascular Health* and in middle-income groups only in Know Your Body[255]* but not in a controlled trial of the latter programme[246] or Family Health Project. Gimme 5 targeted fruit and vegetable intake, and showed

gains in stated preference for fruit and vegetable snacks but not for fruit and vegetable intake overall. A reduction in blood cholesterol was found in Know Your Body[246,255] but not Cardiovascular and Adolescent Trial for Cardiovascular Health* or Family Health Project. Moderate and poor quality studies used inadequate dietary assessment measures and rarely measured blood cholesterol. The addition of a home activity component in The Cardiovascular and Adolescent Trial for Cardiovascular Health* and Hopper* had an effect on knowledge but no effect on long-term dietary behaviour or cholesterol levels. In both Hearty Heart* and Vandongen,* parental involvement showed some short-term gains. Parental involvement was a characteristic of many effective interventions. Changes in the school meals offered in Ellison, Whitaker[271] and Lunchpower resulted in a reduction in the fat content of school lunches, and promotion of low-fat meals on school menus in Whitaker[272]* showed an increase of 3% in the proportion of low-fat main courses chosen. Longer lasting and more frequent intervention was associated with a more sustained effect, but no study tested the intensity of interventions in a controlled manner. No particular theoretical model was associated with better outcomes.

Authors' conclusions
About half of the school-based healthy eating interventions were effective in impacting on dietary intake or cholesterol levels. School-based healthy eating interventions should integrate long-term behavioural programmes into the curriculum and support dietary changes by modifications in the school environment, including the school meals service.

Review quality score
16.

Comments
This is an excellent review. The interventions are described in detail and their quality considered. Full details are given for each study, and study quality is comprehensively assessed. The appropriateness of the methods used to evaluate outcomes are discussed. The review considers evidence of effectiveness of common components across different interventions. The search was broad, and included unpublished and foreign language papers. None of the studies came from the UK. Two interventions, the Cardiovascular and Adolescent Trial for Cardiovascular Health and Heart Smart, used a health promoting schools approach.

(2) Willemse and co-workers (1997), The Netherlands[234]

Authors' objective
This was to gain insight into the way education can most effectively promote healthy nutrition habits among young people.

Review methodology
Search. Searches of PsycLIT, ERIC, MEDLINE, CHID (Combined Health Information Database) and NIGZ-DB (database of the Netherlands Institute for Health Promotion and Disease Prevention).

Inclusion criteria. Published between January 1985 and September 1995, written in English or Dutch, and relatively easy to obtain; subjects aged 5–18 years at the start of the intervention; if part of a broader target group, effects must be described for the young people specifically; when the intervention targets specific groups (e.g. girls only) these must be included in the analysis; the intervention must be aimed at primary prevention, be based on educational aspects, and must be 'unique' – so nutrition interventions which were part of a multicomponent programme targeting multiple risk behaviours were excluded; behavioural effects must be included; both the intervention and study design described in the publication; interventions with in-school and out-of-school activities only, as well as combination, included in analysis; studies targeting malnutrition excluded; controlled studies and time-series (pre- and post-test) studies included; effects of intervention must be statistically determined.

Quality assessment. Methodological aspects of each study discussed.

Number and type of studies
Six RCTs and 10 controlled trials were included, with three publications describing the results of the same study (19 papers in all).

Study quality as assessed by authors
The authors noted that, although they took into consideration a number of important methodological aspects in discussing the studies, they could not take into account all potentially disruptive factors, such as the reliability and validity of measurement instruments used. They do not summarise the quality of the studies overall.

Participants
Children at elementary and secondary schools in the USA, Norway, Denmark and Scotland participated.

Intervention
Content and implementation (by author if untitled).
Nutrition in a Changing World[251] ABa; Byrd-Bredbenner[307] Ba; Nutrition for Life;[303] Kirks[308] B versus BC; Jensen[273] AC; Whitaker[272] AC; Luepker,[309] Perry,[310] Perry[243] B versus C versus BC – all one study; Domel[267] BC; La Porte[311] BC versus B; McKay[60] ABC; Young[46] ABC; Lewis[302] B; Kleppp[254] BCab; Holund[263] BCab; White[312] BC; King[305] BC; Coates[47] ABC.

All interventions targeted knowledge, with three studies emphasising this[302,303,307] and one study emphasising knowledge and social influences.[272] The majority of interventions targeted attitude change,[47,60,243,251,254,263,267,273,302,305,309–312] with three emphasising it.[251,263,273] Fourteen interventions targeted changes in social influence,[46,47,60,243,2541,263,267,272,273,305,308–311] with 10 emphasising it.[47,60,243,254,263,272,308–311]

Twelve interventions targeted self-efficacy (including problem solving and/or goal setting),[47,60,243,254,267,272,303,305,309–312] with all but two[272,303] emphasising it.

Results
The authors reported a positive effect if the intervention achieved positive results compared to the control or reference group with $p < 0.05$ or if the intervention with singular time-series studies (no control group) had a significant effect with $p < 0.05$; otherwise no effect was noted.

Positive behavioural effects were found in 14 studies,[46,47,60,254,263,267,272,273,303,305,308,310–312] and no effect in Nutrition in a Changing World[251,307] and two other studies.[302,309] Positive effects on self-efficacy were reported in the three publications relating to one intervention[243,309,310] and no effect in two others.[263,305] Positive effects on attitudes were reported in the study Nutrition in a Changing World with 15–18 year olds[307] and four other studies.[263,267,302,303] The study Nutrition in a Changing World for 7–11 year olds[251] found no positive effects on attitudes, and nor did two others.[305,312] Most studies reported knowledge as an outcome, and all found positive effects except for one.[46]

Authors' conclusions
Nutrition interventions do have the potential to realise changes in knowledge, attitude, social influence, self-efficacy and behaviour. To be effective, nutrition education must emphasise social influences on nutrition behaviour and teaching of nutrition-related skills in addition to the transfer of knowledge and attitude change. Providing facilities such as increasing the availability of low-fat foods in school canteens and informing students of these facilities is also effective, but because motivational factors are not addressed, effects of such interventions are not likely to influence dietary habits outside the school environment.

Review quality score
8.

Comments
Only searches of electronic databases were reported, and one of the predetermined inclusion criteria was that studies should be relatively easy to obtain. It was not possible to code the components, as the review does not provide enough detail to assess whether, for example, problem solving was included.

(3) Contento, USA[235]

Author's objectives
The objective was to review nutrition education research to establish whether it works. If it does work, the successful elements across interventions, and the implications for program design, implementation, policy and research, were to be established.

Review methodology
Search. Computer searches of Agricola, CRIS, MEDLINE, ERIC, HNRIMS, PsycINFO, Psychological Abstracts, NHLBI, Food Science and Technology Abstracts, PsycLIT, AgeLine; handsearches of key journals; bibliographies of retrieved articles; contact with relevant organisations and individuals.

Inclusion criteria. Conducted since 1980; focused on dietary change; mostly experimental or strong quasi-experimental design, although other studies included if reasonable evidence of methodological soundness or illustrated promising approaches; some evidence of instrument reliability and validity.

Quality assessment. Methodological limitations noted in some cases.

Participants
Children from a mixture of ethnic groups in grades 1 to 11 in schools in the USA participated.

Intervention
Content and implementation (by author if untitled).
Heart Health Education Program[313] B1a; Heart Smart[49] ABC1,7a; Student Health Behavior

Survey[257] B1c; Heart Healthy[314] BC1,5; Great Sensations[47] AB/C1a; Nutrition for Life[303] B1a; Gimme 5[267] A?,B1,2a; German[315] B1a; Green[316] B1a; Stowaway to Planet Strongheart[253] C1,5; Secrets of Success[317] B1,2,5a; Class of 89[318] BC1,8?,b; Adolescent Heart Health[269,305] B1,2,5,8c; Killen[319] B1,8?,a; Kirks[241,308] B/C1a; Food … Your Choice[301,302] B1a; Lindholm[320] B1b; Minnesota Home Team[242] C; Family Heart Project[244] BC1,2,8a; Go For Health[258] AB1,5a; Slice of Life* B1,5b; Chicago Heart Health Curriculum Body Power Nutrition module[300] B/C1,4ad; White[312] B1,5c; Know Your Body[287] BC1,2,8?; Marcus[321] B1a; Resnicow[304] B1a; Resnicow[264]AB1a; Walter[261] BC1,2,8?,a; Hearty Heart[253] C1; Perry[242,243,247] BC1,5a; Luepker[309] BC1a.

Nutrition in a Changing World was evaluated in five studies, including one RCT, but the results for each study were not given:[248,250,251,307,322] AB1a.

Nutrition Education and Training – Gillespie:[268,323] AB1a.

Number and type of studies
Eighteen RCTs, 17 controlled trials, five PPs and one survey were included. The review also included three studies in non-school settings.

Study quality
Most of the studies had experimental designs. About half of the studies provided information on reliability, and one-fifth on the validity of the assessment instruments.

Results
Knowledge gains were reported in most studies, but in Heart Smart* there was no significant difference between groups. Dietary improvements were found in Kirks,* Adolescent Heart Health,[269]* Student Health Behavior Survey,* Chicago Heart Health, Heart Healthy, Food … Your Choice, Secrets of Success, Know Your Body;[261,264,287]* Hearty Heart,[253] Stowaway to Planet Strongheart, Great Sensations (short-term only), White,[312] Family Heart Project* and Hearty Heart.[242,243] Nutrition Education and Training,[268,323] Nutrition for Life, Minnesota Home Team, Class of 89, Go For Health, Gimme 5,* Adolescent Heart Health[305]* had mixed results, and Nutrition in a Changing World, German, Lindholm, Know Your Body[321] and Killen* no effect. Gains in attitude were found in Nutrition Education and Training,[268] Food …Your Choice and Chicago Heart Health; mixed results were noted for Nutrition in a Changing World and Nutrition for Life, and there was no effect for the Heart Health Education Program,* German, Green,* White* and Adolescent Heart Health.[305]* No additional effect was found by adding a parental component in Chicago Heart Health, but this was beneficial in Kirks* and Great Sensations.

Authors' conclusions
Elements of effective programmes are: a focus on behavioural change; a relevant educational strategy, based on social learning theory; experiential/hands-on instructional methods, which create supportive school and community environments; longer and more intensive programmes with more components; and family involvement for young children.

Review quality score
9.

Comments
The studies were conducted in the USA, limiting the generalisability of findings to the UK. There is little information about study quality. The results of several studies of an intervention were not always reported separately. Two interventions, Great Sensations and Heart Smart, used a health promoting schools approach.

(4) Resnicow and co-workers (1993), USA[236]

Authors' objectives
This was to review the three major evaluations of Know Your Body and suggest future avenues of research.

Review methodology
Search. Personal contact and involvement in the projects.

Inclusion criteria. None specified.

Quality assessment. Methodological limitations discussed.

Number and type of studies
Two RCTs and one controlled trial published in eight papers were included.[255,256,260,261,264,274,287,288]

Study quality as assessed by authors
Attrition rates were high, limiting the generalisability of findings as well as the ability to detect significant treatment effects, although those lost to follow-up were similar at the baseline. The issue of whether there was differential loss of subjects between intervention and comparison conditions was not adequately addressed. For several outcomes, the low validity and reliability of the measures may have increased the likelihood of obtaining null results.

Participants
School children and young people from a variety of ethnic and socio-economic groups in grades 1 to 9 in the USA participated.

Intervention
Content and implementation. Know Your Body is a package which schools are encouraged to customise. It may include any combination of the following:

- school environment initiatives, for example cafeteria changes, school-wide campaigns and competitions
- health education curriculum addressing multiple topics, using a variety of techniques to influence health behaviour, including assertiveness training, values clarification and goal setting
- parental involvement in, for example, home activities, workshops, committees and newsletters
- health screening, to include children and young people, parents and staff.

In the three trials reported here, children and young people received the curriculum, screening and extracurricular activities, but no further details were given.

Results
The three evaluations showed consistent positive effects for health knowledge, and these gains were maintained at the 5 year follow-up. For the remainder, including diet, attitudes, self-esteem and locus of control results were mixed or null.

Authors' conclusions
Consistent positive results were achieved in knowledge and smoking. More research is needed to determine the effect of the programme on a broader range of outcomes, the effect of increased intensity of intervention and the impact of the programme components.

Review quality score
6.

Comments
The studies were all conducted in the USA, and the focus of the review was very narrow. The lack of reported detail about how the Know Your Body programme was customised in the participating schools limits the conclusions which can be drawn about the effectiveness of different approaches.

(5) Resnicow (1993), USA[237]

Author's objective
This was to review the literature on school-based obesity prevention programmes.

Review methodology
Search. MEDLINE (dates not given); bibliographies of retrieved studies; personal contacts.

Inclusion criteria. More than 25 subjects; reported changes in at least one measure of body fat.

Quality assessment. Methodological limitations discussed.

Number and type of studies
Nine studies of school-wide interventions were included: four RCTs (schools randomly assigned), four controlled trials and one before-and-after study with no control group.

Study quality as assessed by author
In half of the studies, schools were not randomly assigned. Attrition rates were high (between 26 and 79% in four studies). The assessment techniques used were indirect and imperfect measures of adiposity. It is possible that measurement error may have masked treatment effects. Data on obese children and young people receiving school-wide programmes were not analysed separately.

Participants
Children and young people aged 6–15 years participated.

Intervention
Content and implementation (by author if untitled). Know Your Body[246,255,264,274,280] B/C1a; Angelico[324] BC1a; Alexandrov[283] BC1a; Tell[286] BC1a; Adolescent Heart Health[278] B1c.

Only Angelico and Adolescent Heart Health did not include a risk factor screening component.

Results
Significant positive effects for body mass index were reported in three of the nine studies: Adolescent Heart Health* and two evaluations of Know Your Body.[246] Significant positive effects for skin fold measures were found in Adolescent Heart Health* and Alexandrov, and there was no effect in two studies of Know Your Body[280,325] and Tell*. In the two studies assessing weight change,[286,325] no significant effects were reported.

Author's conclusions
Methodological limitations threaten the validity and generalisability of the studies. These programmes were broad in scope and may be less effective than interventions focusing on weight control.

Review quality score
5.

Comments
Few details were provided about the participants or the interventions. The reviewer noted that the programmes generally had skills training and behaviour modification components, but does not say which ones. It is not clear how broad the search was and whether unpublished or foreign language studies were considered for inclusion, but studies from outside the USA were included. Six studies of interventions for obese children and young people were reviewed, but, as secondary prevention, are not within the scope of this review and have not been reported here.

(6) Contento and co-workers (1992), USA[238]

Authors' objectives
These were to evaluate the current state of knowledge on school-based nutrition interventions, examine methodological issues, and identify implications for research and practice.

Review methodology
Search. Computer searches of ERIC and MEDLINE; handsearching of relevant professional journals.

Inclusion criteria. Conducted since 1980; published in peer-reviewed journals; classroom based; teacher or researcher delivered; had comparison groups; included behavioural outcomes; provided adequate measurement data to evaluate variables of interest.

Quality assessment. Research design and methodological issues discussed.

Number and type of studies
Nine general nutrition education studies were included: two RCTs, six controlled studies, and one before-and-after study with no control. Nine targeted behavioural change programmes were included: five RCTs and four controlled studies. Twenty-six other studies were also included for which there were no details.

Study quality as assessed by authors
Although the unit of assignment was usually the school or class, outcome data were generally analysed in terms of individuals, which could have biased the results towards finding significant intervention effects. Most studies lacked a follow-up assessment.

Participants
Children and young people from kindergarten to grade 10, from a mixture of ethnic groups, in schools across the USA participated.

Intervention
Content and implementation. Interventions were in two areas:

(a) General nutrition education programmes: Nutrition Education and Training Programme[268,323] AB1a; Nutrition in a Changing World,[249–251,307,322] AB1a/B1a; Food Your Choice[301,302] B1a.

(b) Targeted behavioural change programmes: Know Your Body[261,274,321] B1a/BC1a; Hearty Heart[247] B1,5a; Slice of Life[259] B1,5ab; Go For Health[258] AB1,5a; Great Sensations[47] ABC1,5c; Adolescent Heart Health[269] B1,2,5c; Children and young people's Active Physical Education[306] A/B1.

Results
General nutrition education programmes. Evaluations of Nutrition Education and Training (including one RCT), Nutrition in a Changing World (including one RCT) and Food Your Choice showed gains in knowledge. An RCT of Nutrition Education and Training[323] found improved snacking practices, increased preference for vegetables (younger children and young people) and increased willingness to try new foods (older children and young people), but no change in food wastage. Attitude changes were inconsistent in Nutrition Education and Training and Nutrition in a Changing World; both attitudes and consumption of healthy foods improved in Food Your Choice.

Targeted behavioural change programmes. Evaluations of Know Your Body showed gains in knowledge and physiological measures for curriculum-only and curriculum plus screening groups, and mixed results in food consumption; screening-only groups did not score higher than controls on any outcome measures. Gains in knowledge were found in Hearty Heart,[247]* Slice of Life,[259]* Go For Health[258] and Adolescent Heart Health.[269]* Improvements in

† Personal communication.

food choices were found in Hearty Heart, Great Sensations[47] (short-term gains only), Adolescent Heart Health (more consistent in girls) and Slice of Life (girls reported increased choice of healthy foods, boys modified salt use only). There were no significant gains in food choice in Go For Health but there were improvements in the school lunches.

Authors' conclusions
The methods that were modestly successful in bringing about behavioural change were those based on social learning theory, emphasising observing models, practising skills, self-monitoring, goal setting and provision of rewards. Longer and more intense programmes are needed to effect consistent behavioural change. Sequential, multiyear programmes are the most effective.

Review quality score
5.

Comments
The reviewers noted the problem of high attrition rates but did not give details for individual studies. All the included studies were from the USA. In addition, only peer-reviewed papers were included. One of the included studies evaluated a programme (Great Sensations) which used a health promoting schools approach.

(7) Levy and co-workers (1980), USA[239]

Authors' objectives
These were to evaluate and compare the impact of school nutrition education programmes on knowledge, attitudes and behaviour.

Review methodology
Search. Searches of five relevant journals.

Inclusion criteria. Published between 1969 and 1978.

Quality assessment. Study validity assessed as exemplary, adequate, not mentioned, invalid or uncertain on 12 criteria, including statistical power, selection bias and generalisability. No overall score given for each study. Quality issues discussed.

Number and type of studies
Ten controlled trials, three before-and-after studies and five studies of unclear design were included. The review also included three studies which were not school based.

Study quality as assessed by authors
Three studies[326–328] mentioned none of the 12 quality criteria. Four studies[329–332] were assessed as adequate on all the criteria.

Participants
School children and young people in the USA, from kindergarten to grade 10, participated.

Intervention
Content and implementation (by author if untitled).
Bell[252] B1; Baker[333] B1; Boysen[334] B1; Casper[335] B1; Chethik[326] B1ac; Clark[336] A; Cohn[327] A; Garrett[337] A; George[328] Ba; Head[329] B1; Lovett[338] B1; Picardi[330] B1; Roth[331] B1; Shoup[339] B1b; Wang[340] B1; untitled Iowa breakfast programme[341] A; Adapted Extension Services Youth Nutrition Lesson Series[342] AB1c; Mulligan Stew film[332] B1.

Results
The two evaluations of programmes in which children and young people fed rats[330,331] reported significant gains in knowledge, and that by Roth[331] also positive changes in food choices. Evaluations of classroom-based instruction reported significant gains in knowledge but not behaviour.[252,329,333,334,338] The Adapted Extension Services Series found that small-group work outside the classroom was more effective than classroom-based instruction at changing behaviour, while both showed gains in knowledge.[342] Knowledge gains were reported following two nutrition education films.[332,340] One study[336] found that the use of reward tokens in the lunchroom was associated with reduced plate waste, but another[337] that student input into school menu and food choice did not significantly affect plate waste or attitudes. Of the studies which did not include quantitative data, three[326–328] were said to have been positive experiences for the children and young people; teachers observed improvements in classroom behaviour following the breakfast programme;[341] and those using a peer-led curriculum thought that peer leaders could be effective.[339]

Authors' conclusions
These were unclear.

Review quality score
4.

Comments
The search was limited to published studies. All the included studies were from the USA. The reviewers appraised a group of the Iowa breakfast studies from the 1950s, which was outside their publication date criteria for the main search, and it is not clear how they were identified. One of these studies, involving seven participants only, was presented as representative of the group of studies. For most of the studies there is a lack of detail about the interventions, and particularly of

their implementation. Outcome data are very limited, and there is little information about the measurement tools used. For three studies, the number of participants is not given.

(8) Keays (1993), Canada[240]

Author's objective
This was to examine the effects of regular physical activity in schools on the fitness, physical and psychological development, academic performance, self-efficacy and self-esteem of children and young people in school.

Review methodology
Search. MEDLINE, Health Planning and Administration, ERIC and SciSearch databases were searched (years not given).

Inclusion criteria. Published since 1980 (but 'a few landmark studies preceding 1980 were included'), described school-based research on physical activity interventions that had been formally evaluated.

Quality assessment. Type of study design employed given.

Number and type of studies
One RCT, 16 controlled trials and four before-and-after studies were included. The review also included three studies that did not evaluate an intervention, and five reviews.

Study quality as assessed by author
Studies do not give details about the 'standard' school PE programmes which children and young people in control groups received. Studies lack details of factors that may affect results, including the method of allocation to groups and baseline comparability.

Participants
Children and young people in elementary and secondary education (most involved grades 5 to 9), mostly in Canada, participated.

Intervention
(Reporting of the interventions was not sufficiently detailed to allow coding.)

Daily fitness programmes: Body Owner's Programme;[285] Dwyer;[276] Gillam;[290] Wearring;[299] Sinclair;[295] Goode;[293] Johnson.[298]

Four times/week: MacConnie.[291]

Two to three times/week: Gillam;[290] Tuckman;[284] Lussier;[294] Wearring;[299] Johnson.[298]

Unspecified frequency: Savage;[289] Siegal;[343] Cooper;[296] Duncan;[297] Moody;[281] Gillam;[344] Adeniran;[282] Adeniran;[292] Children and Young People's Active Physical Education;[306] Know Your Body.[275,277]

Results
With four exceptions[260,277,285,306] these interventions were all school-based physical fitness programmes. Positive changes in blood pressure were reported in both evaluations of Know Your Body,[260] Dwyer and the Body Owner's Programme.[285] Serum lipid results were mixed, and gains, at best, short-term.[289,290] All 11 studies measuring aerobic fitness reported positive effects;[276,284,292–297,299,343] Johnson found greater gains in the higher frequency group. Positive changes in body composition were reported in four studies;[276,282,285,293,343] Gillam[344] found no significant differences; Moody reported significant weight loss in obese girls and no change in other girls. Effects on classroom behaviour and academic performance were mixed. MacConnie reported gains in school children and young people's physical activity patterns.

Author's conclusions
Moderate to vigorous physical activity appears to be a significant factor in the attainment of fitness and related objectives in schools, and there is flexibility in the way that this can be combined with standard PE programmes to provide significant results. The best results can be expected in children and young people aged 10–14 years.

Review quality score
4.

Comments
Only brief details were given about the study methodology, and the quality of the included studies was not assessed. For eight studies the number of participants was not reported. The geographical location of the majority of interventions was not given; there is a general statement that the schools were 'in Canadian centres and elsewhere'.

Sex and family life education

Synthesis of sex and family life education reviews

A total of 25 reviews were identified of which four met the inclusion criteria (*Table 8*). In addition, another review[348] was identified, but as it is subsumed by a later report[347] it is not included.

TABLE 8 *Sex and family life education reviews included in the synthesis*

Authors	Primary focus	Number of studies	Review quality
Dicenso (1995), Canada[345]	Sexual behaviour	16	15
Peersman and co-workers (1996), UK[346]	Sexual health	14	10
Oakley and Fullerton (1994), UK[67]	HIV	13	9
Kirby (1995), USA[347]	Sexual risk taking	26	6

Summaries of each of the included reviews are given at the end of the main section. Tables of the individual studies included in the reviews are given in appendix 6.

Review coverage

In total, 49 unique primary studies were included in these reviews (plus an additional 11, cited as supporting papers). Forty-four different programmes were reported. Of the included primary studies, none appeared in all four reviews, five appeared in three, 11 appeared in two reviews and 33 in one only. These differences may be due to the different foci of the reviews (see *Table 8*).

Quality of primary studies as assessed by authors

Two reviews[67,346] evaluated studies against a 'gold standard'; however, none of the studies attained this. These reviews reported the results only of studies judged 'methodologically sound' – they met the following minimum standard criteria: employing a comparable control group; provided pre-intervention and postintervention data for each group; and reported all outcomes. Kirby[347] comments on the varied quality of evaluations, many of which were 'quite limited methodologically'; Dicenso[345] rated 72% of the included studies 'weak', and found no 'strong' ones.

Outcomes

The majority of the outcomes reported in the reviews were specific to sexual health. These included knowledge, attitudes, intentions, abstinence, initiation of sexual activity, contraception, responsible sexual behaviour, frequency of sexual behaviour, number of partners and pregnancy. The following more general health outcomes were also reviewed: communication skills (two studies), self-efficacy (three studies), self-esteem (one study) and risk behaviour scores (one study).

Little information is given about the outcome measures used. These seem in the main to be self-reports, although pregnancy rates are sometimes reported. These self-reports are potentially inaccurate. There may also be sex differences in reporting biases.

Programme domains

Four of the primary studies reported in the reviews used solely ethos/environment approaches, such as school-based clinics. Twenty-two used a curricular approach only, and none solely involved parents and/or community. One primary study involved both ethos/environment and curricular approaches; 13 combined curricular approaches with those involving parents and/or community (e.g. setting homework to be completed at home with parents, involving some classes for parents or presentations at community events), two combined ethos/environment and parent and/or community approaches and one involved all three approaches (i.e. a health promoting schools approach). This study, which included classroom instruction, a school nurse who provided consultation, condoms and transportation to the family planning clinic and also community groups who implemented classes and special events, has been included in the health promoting schools study.

Curricular components

The majority (30) of the programmes involved an information component. Other frequently occurring components were resistance skills (17), life skills training (12), values clarification (10) and decision making (10). Self-esteem development was part of seven programmes, goal setting of five, norm setting of four, assistance of three and stress management and pledge programmes of one a piece. None of the programmes were reported to involve alternatives. Ten of the programmes were information only.

Implementation

The amount of information given about those delivering the intervention and implementation was patchy. Of the programmes where this was reported, 15 were led by teachers, 14 by outside experts, seven involved group work, three were peer led and three involved the media.

Theoretical bases

The theoretical bases (if any) of the programmes were rarely reported. When they were, the programmes were said to be derived from social psychological theories such as social learning theory, social influences theory, social inoculation theory and also theory of reasoned action and the health belief model, either alone or in combination. However, there is insufficient information to produce generalisations about the theoretical background.

Generalisability

The reviews included a wide range of participants. Low-income and minority groups were well represented, and both primary and secondary aged children and young people were included. Girls and boys were considered separately throughout one review. However, the majority of included studies were carried out in North America.

Costs and resources

The reviews did not provide information about the cost and resource implications of the programmes.

Synthesis of results

General 'sexual behaviour'

The impact of the programmes on general 'sexual behaviour' was reported in four studies. Two programmes were found to be partially effective. The first, AIDS Prevention for Adolescents in Schools,[349] was evaluated in a controlled study; the second, Bodytalk,[350] which used a play and workshop, was evaluated using a before-and-after design. An exhibition, supervised by school nurses,[351] had uncertain effects. A controlled study evaluating Success Express,[352] however, found the programme to have negative effects.

Abstinence from sexual activity

None of the three controlled studies (one randomised) which considered this outcome found any programme effect on abstinence.

Initiation of sexual activity

Of the 22 studies reporting initiation of sexual activity, three interventions, evaluated in controlled studies, were reported to have beneficial effects. These were the Reducing the Risk Curriculum[353] (an information and skills programme aimed at increasing abstinence), a school clinic[354] and the School and Community HIV/AIDS Education and Condom Availability Programme.[355] One of these used an ethos/environment approach only,[354] while another used ethos/environment in conjunction with a curricular approach.[355]

A controlled trial using random allocation found the McMaster Teen Programme[356] effective in delaying initiation for boys only – this programme utilised a curricular approach including life skills training. In addition, a controlled trial found Self Center[357] effective for girls. This intervention involved clinic staff providing consultations in the school health suite and providing regular presentations in 'home rooms'. A before-and-after study reported more girls engaging in sexual activity after taking part in Project Model Health,[358] a curriculum only programme.

Frequency of sexual activity

Frequency of sexual activity was reported in seven studies; three of which found reductions in sexual activity in RCTs. These were Be Proud, Be Responsible,[359] the Youth AIDS Prevention Project[360] (a curricular intervention which also involved parents in homework and meetings) and the Teen Incentive Model[361] (a curricular approach using group work and including a career mentorship programme).

Contraceptive use

Contraceptive use was reported to have been used as an outcome in 20 evaluations. When boys and girls were considered together, three curriculum-only programmes had a positive effect on reported contraceptive use. These were Be Proud, Be Responsible[359] (an RCT), AIDS Prevention for Adolescents in Schools[349] (a controlled study) and Get Real about AIDS[362] (a teacher-led curricular programme evaluated in a controlled study). There were no consistent features about the components.

A positive effect on contraceptive use among girls only was reported in a controlled study for Self Center.[357]

Responsible sexual behaviour

Of the six evaluations reporting responsible sexual behaviour as an outcome, the six school-based clinics[363] were found to have a beneficial effect – but with boys only. Responsible sexual behaviour was not defined.

Number of partners

Four evaluations considered the number of partners. Participants receiving the Be Proud, Be Responsible programme[359] (see above) had fewer coital partners than the control group.

Pregnancy

Pregnancy was used as an outcome in 15 evaluations. Self Center[357] (a controlled study of an

approach combining ethos, environment and curriculum, see above) was found effective, as were the St. Paul School-based Clinics,[364] evaluated using a before-and-after study. The remaining programmes had no effect on pregnancy rates.

Self-efficacy

Self-efficacy was considered in three studies, one of which evaluated use and refusal self-efficacy separately.[365] This RCT found the Youth AIDS Prevention Project (see above) had positive programme effects on use self-efficacy but uncertain results for refusal. Positive effects were also reported in a controlled study evaluating AIDS Prevention for Adolescents in Schools[349] (see above). These were curriculum-only programmes, all of which contained a refusal skills component. The results of the third evaluation were unclear.[366]

Self-esteem

Self-esteem was reported in one study, Success Express[352] (see above), and no programme effect was found.

Knowledge and attitudes towards sexual activity

Where this was evaluated, all studies found at least short-term knowledge gains, and 88% produced a desirable effect on attitudes. There were too few studies involving peers or parents in which attitudes were reported in the reviews to comment on the added benefit of these approaches. Of the five evaluations reporting behavioural intentions, two programmes were found to have beneficial effects. The first of these, Be Proud, Be Responsible,[359] used skills training and group discussion. The second[367] included video. Both these evaluations used random allocation to groups. An additional RCT found 'Ngoa', a peer- and professional-led programme incorporating art and drama,[368] partially effective.

Disagreements between reviews

The reviews did not agree on the effectiveness of all the included programmes. Teen Talk,[369] a curricular approach evaluated in a controlled study using random allocation, was reported to postpone sexual activity and increase contraceptive use among boys in one review[347] but to be ineffective in another.[345] Reducing the Risk,[370] a curriculum intervention evaluated in a controlled study, was reported to postpone sexual activity in the short-term in one review[347] but was found ineffective in another.[345] Postponing Sexual Involvement,[371] a peer-led curricula programme evaluated in a controlled study, was reported to have beneficial short-term effects on initiation in the Kirby review;[347] however, Dicenso[345] reported this programme to be ineffective for girls and to have negative effects on boys. Conversely, the six school-based clinics, evaluated in controlled studies,[363] were reported effective in postponing initiation and on contraceptive use for both boys and girls in one review[345] but not another.[347] The School and Community Programme for Sexual Risk Reduction Among Teens,[55] evaluated in a controlled study, was reported to reduce pregnancy in one review[347] but not another.[345]

Conclusions

The reviews covered studies of a wide range of interventions from classroom instruction and skill development through school-based clinics and involvement of parents alone and in various combinations. These interventions often combined both a variety of classroom approaches (like the substance misuse interventions) and multiple domains (like the nutrition and exercise interventions). Even so, the majority of interventions were classroom alone, and half of theses were delivered by outsiders rather than teachers. The use of peers in these programmes was rare.

As in other areas of health need, the quality of both reviews and primary studies was variable. A small number of the interventions studied were shown to have a positive impact on outcomes predictive of safe sexual behaviour (in terms of teenage pregnancy and sexually transmitted diseases), but the majority were shown to be ineffective. The effective interventions frequently included provision of services such as special clinics (i.e. an ethos/environment component) or specifically focused on AIDS. There were few studies of interventions involving parents or peers, but none that were able to demonstrate that these approaches increase effectiveness. Knowledge gains were reported in all studies where they were assessed together with desirable effects on attitudes in the majority of studies. There is insufficient information provided on the theoretical bases of the programmes to be able to comment on any underlying trends. Information on the process of implementation was also lacking. In this area it may be important to assess how comfortable teachers feel with the material they are required to teach. Teachers who do not feel comfortable talking about sex, model lack of easy communication, and this may contradict the taught curriculum.

Sexual health review summaries

Key to notes:

- The programme **domains** have been coded as: A, ethos and/or environment; B, curriculum; C, family and/or community.
- The curricular **components** have been coded as: 1, information; 2, decision making skills; 3, pledge; 4, values clarification; 5, goals setting; 6, stress management; 7, self-esteem; 8, resistance skills training; 9, life skills training; 10, norm setting; 11, assistance; 12, alternatives.
- The **personnel** used to deliver the interventions have been coded as: a, teacher led; b, peer led; c, outside expert.
- An asterisk (*) denotes an RCT.

(1) Dicenso (1995), Canada[345]

Author's objective

This was to provide a systematic overview of the available evidence regarding the effectiveness of primary prevention strategies in delaying sexual intercourse, in improving consistent birth control use, in improving responsible sexual behaviour and in reducing the incidence of pregnancy in the adolescent population.

Review methodology

Search. The following electronic databases were searched for the years 1970 to May 1993: CATLINE, CINAHL, Conference Papers Index, Dissertation Abstracts, EMBASE, ERIC, MEDLINE, NTIS, POPLINE, PsycINFO and Sociological Abstracts. Bibliographies of obtained articles were checked for citations, and seven journals were handsearched for the years 1992–1993. Experts were consulted. English and European language papers were included.

Inclusion criteria. Adolescents with a mean age of 18 years or less; goal of the intervention was primary prevention of adolescent pregnancy; impact evaluated in terms of initiation of sexual intercourse, birth control use and pregnancy; concurrent control group; exposure to intervention preceded measurement of outcome; quantitative measure of effect; reported between 1970 and May 1993; not in underdeveloped country.

Quality assessment. Method of allocation, respondent bias, control for possible confounds, data collection and completeness of follow-up assessed. The study was rated as weak if it met any individual criteria, or strong if it met all the criteria.

Synthesis. All analyses calculated separately by sex. Fixed and random effects odds ratios (ORs) were calculated, and tests of heterogeneity were performed.

Number and type of studies

Seven RCTs and nine cohort studies were included. The review also included studies carried out in other settings such as colleges.

Study quality as assessed by author

Overall, 72% of the studies were given a weak rating and 28% were given a borderline rating. No study was given a strong rating. Less than 50% of the studies used random allocation; 44% of studies either controlled for possible confounding in the analysis or had no evidence of confounding; 48% met all three data collection criteria, and 12% reported a follow-up rate of 90% or more at least 1 year or to the last data collection point.

Participants

Children and young people in grades 6 to 12 in the USA and Canada (two studies). Low income, minority and black groups were well represented. Some of the studies had only female participants.

Intervention

Abstinence programmes: Success Express[352] B1,4,5,7,8,9; Project Taking Charge[372] AC2.

Sex education programmes: HBM-SLT[369] B1,4,9; Frappier[373] B1; Teen Choice[374] B4,7,8; Peer Power Project[375] B1,2,5,7,9,11c; Postponing Sexual Involvement[371] B4,8b; Reducing the Risk[370] B8; Kirby[363] AB; Project Model Health[358] B1,3,8,10; Teen Outreach Programme[376] BC1,4,9; Youth Clinic[377] A; Life Outcomes Perceptions[378] B1; Teen Incentive Programme[361] AB1,2,7,8,9; McMaster Teen Programme[356] B1,2,8,9; Vincent[55] ABC1,2,7,9.

Results

Individual study ORs and 95% CIs: if the CIs include 1.00, the result is **not** statistically significant at the 5% level (*Table 9*).

Author's conclusions

Adolescent pregnancy prevention interventions evaluated to date have not had a significant positive or negative impact on the initiation of sexual intercourse, birth control use, responsible sexual behaviour and pregnancy in females or in males.

TABLE 9 *Results for Dicenso (1995), Canada*[345]

Study	Sexual intercourse		Birth control use		Responsible sexual behaviour		Reported pregnancy	
	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys
Success Express[352]	1.35 (0.17, 10.62)	1.82 (0.62, 5.35)						
HBM-SLT[369]*	1.11 (0.68, 1.81)	0.84 (0.5, 1.41)	0.56 (0.27, 1.19)	0.97 (0.49, 1.91)	0.83 (0.55, 1.25)	0.98 (0.63, 1.51)	0.7 (0.28, 1.74)	2.06 (0.59, 7.28)
Frappier[373]	0.65 (0.34, 1.24)	0.84 (0.46, 1.54)						
Teen Choice[374]	0.98 (0.23, 4.15)		2.46 (0.73, 8.28)		2.15 (0.99, 4.67)			
Peer Power Project[375]*	1.21 (0.33, 4.41)		0.16 (0.01, 1.83)		0.38 (0.08, 1.89)		0.60 (0.07, 4.89)	
Postponing Sexual Involvement[371]	0.54 (0.28, 1.04)	0.4 (0.19, 0.86)					1.10 (0.25, 4.85)	
Project Taking Charge[372]*	0.76 (0.17, 3.39)	0.15 (0.02, 1.20)						
Reducing the Risk[370]	0.71 (0.41, 1.23)	0.62 (0.34, 1.13)	1.62 (0.9, 2.88)	0.50 (0.27, 0.92)	2.08 (0.96, 4.52)	1.44 (0.62, 3.34)	1.5 (0.78, 2.85)	0.98 (0.49, 1.96)
Kirby[363]	1.21 (1.05, 1.38)	0.82 (0.67, 0.99)	1.34 (1.13, 1.59)	1.2 (1.02, 1.42)	1.10 (1.02, 1.40)	1.21 (1.03, 1.41)	0.56 (0.29, 1.06)	0.84 (0.67, 1.07)
Project Model Health[358]	0.21 (0.07, 0.62)	0.32 (0.10, 1.01)						
Teen Outreach Programme[376]*							1.60 (0.21, 12.4)	0.26 (0.01, 6.00)
Youth Clinic[377]							0.96 (0.7, 1.32)	
Life Outcomes Perceptions[378]*	0.63 (0.06, 6.64)		0.86 (0.38, 1.95)		1.05 (0.53, 2.09)			
Teen Incentive Programme[379]*	1.61 (0.27, 9.76)	0.06 (0.00, 2.08)	1.12 (0.31, 4.12)	2.71 (0.43, 17.2)	1.21 (0.48, 3.02)	5.03 (0.91, 27.6)		
McMaster Teen Programme[356]*	1.12 (0.9, 1.41)	1.70 (1.30, 2.21)	1.23 (0.95, 1.59)	0.88 (0.67, 1.61)	1.10 (0.90, 1.36)	0.70 (0.56, 0.87)	1.33 (0.98, 1.80)	
Vincent[55]							0.50 (0.25, 1.00)	

Review quality score
15.

Comments
This review is based on a thorough search of the literature. The summary ORs calculated by the author are not given here because they include non-school studies; however, the reported results do support the author's conclusions.

(2) Peersman and co-workers (1996), UK[346]

Authors' objectives
This was to assess the evidence of effectiveness of different interventions aimed at promoting the sexual health of young people.

Review methodology
Search. The bibliography of studies reviewed in previous report was extended by systematic

handsearches of 10 journals (issues from winter/spring 1994 to autumn 1995).

Inclusion criteria. Studies of sexual health interventions with young people.

Quality assessment. The studies were judged on eight quality criteria: aims; replicability; random allocation; numbers of participants; pre-intervention data; postintervention; attrition rates; reporting of all outcomes. Those meeting all eight classed as 'gold standard'; those meeting four considered sound.

Number and type of studies
Fourteen school-based studies (eight RCTS and six controlled trials) were included. An additional seven studies looked at other settings.

Study quality as assessed by authors
All the included trials were judged sound (i.e. controlled, pre- and postintervention data and reporting all outcomes).

Participants
Primary and secondary school children and young people in USA (nine studies), Peru (one study), Finland (one study), Tanzania (one study), The Netherlands (one study) and Canada (one study) participated. One US programme targeted low-income minority youth, another black males. Both rural and urban settings were included.

Intervention
A letter to Brian/Don't forget Sherry[380] B; Reducing Risk Curriculum[353,381] B1,8a; Caceres[366] BC1,8; Success Express[352] B1,4,5,7,8; DiClemente[382] B1; Hamalainen[383] B1; Family Life Education Programme[384] B1,5; Jemmott[359] B1?; Ngoa[368] BC1,8bc; Youth AIDS Prevention Project[365] BC1,8,9c; Get Real about AIDS[362] B1,8,9; Schaalma[367] B1,4,8,10a, McMaster Teen Programme[356] B1,2,8,9; APAS[349] B1,4,8,10a.

Results
The following interventions were reported to have a positive effect on knowledge: A letter to Brian*, the Reducing Risk Curriculum, DiClemente, the Family Life Education Programme, Jemmott*, Ngoa*, Schaalma* and APAS. The effect of Caceres was uncertain.

Desirable changes in attitudes were reported for DiClemente and Jemmott*. A letter to Brian* was partially effective in altering attitudes, and the findings for Caceres and the Family Life Education Programme[384] were unclear. The Family Life Education Programme,[368]* Hamalainen and Success Express were reported to have no effect on attitudes.

Jemmott,* the Family Life Education Programme[368]* and Schaalma* had a desired effect on behavioural intentions; the effect of Caceres was unclear. Success Express had a negative effect.

The Reducing Risk Curriculum was reported to have a positive effect on the initiation of sexual intercourse. Jemmott* was reported to have a positive effect on the frequency of sexual intercourse, number of partners and contraceptive use. The evaluation of Get Real about AIDS had unclear results for the last two outcomes, and the McMaster Teen Programme was reported to have no effect on contraceptive use or abstinence and unclear results for pregnancy.

APAS was reported to have positive effects on risk behaviour scores and self-efficacy, and the Youth AIDS Prevention Project* was partially effective in terms of self-efficacy; no effect was found for Caceres on this outcome. Success Express was reported to have no effect on self-esteem or communication.

Authors' conclusions
Only four soundly designed evaluations described interventions that were effective in changing young people's reported behaviour. Claims to effectiveness based on the flawed evaluations could result in misleading policy changes. Only methodologically sound studies were included in the review – this increases the validity of the findings but at the expense of the range of interventions evaluated.

Review quality score
10.

Comments
This review builds on an earlier review, so details reported here of the search are scant. The earlier review described a broad search. There were no details of how the data were extracted. The review contains an international set of studies, although none were from the UK.

(3) Oakley and Fullerton (1994), UK[67]

Authors' objective
This was to examine the impact of different intervention programmes on knowledge of risk and on behavioural outcomes relevant to the overall goal of HIV/AIDS prevention.

Review methodology
Search. BIDS, MEDLINE, PsycLIT, ERIC, the HEA Unicorn database and the National HIV/AIDS Prevention Information Service databases were searched. Handsearching, contacts with other researchers and checking of bibliographies were also occurred. Unpublished literature studies were included. Limited to English language.

Inclusion criteria. Not stated.

Quality assessment. The studies were judged on eight quality criteria: aims; replicability; random allocation; numbers of participants; pre-intervention data; postintervention; attrition rates; reporting of all outcomes. Those meeting all eight classed as 'gold standard'; those meeting four considered sound.

Number and type of studies
Thirteen studies were included: six RCTs, six controlled trials and one before-and-after study.

Study quality as assessed by authors
Eight of the studies were considered methodologically sound (i.e. controlled, pre- and postintervention data and reporting all outcomes).

Participants
Six studies from the USA, two from the UK, one each from Tanzania and Switzerland, and three that were unspecified were included.

Intervention
A letter to Brian/Don't forget Sherry[380] B; Brown[385] B1a; DiClemente[382] B1; Streetwize UK[386] B1a; Hamalainen[383] B1; AIDS:AIDS[387] B1; Jemmott[359] B1; Ngoa[368] BC1,8bc; Get Real about AIDS[362] B1; Bodytalk[350] B1; Michaud[351] B1c; Schaalma[367] B1,4,8,10a and APAS[349] B1,2,4,8,10a.

Results
Studies judged methodologically sound by authors. DiClemente, Jemmott,* Ngoa,* Schaalma* and APAS were reported to be effective in increasing knowledge; A letter to Brian* and Hamalainen* had positive short-term effects.

DiClemente, Jemmott* and Ngoa* had desirable effects on attitudes; Schaalma,* APAS and A letter to Brian* were partially effective. Hamalainen reported no effects on attitudes. Positive effects on behavioural intentions were reported for Schaalma*; Ngoa* was partially effective. Get Real about AIDS and APAS were partially effective on behaviour. APAS was effective on self-efficacy.

Studies judged methodologically flawed by authors. Brown, Streetwize UK and AIDS:AIDS were reported to have positive effects on knowledge; Bodytalk was partially effective and the results of Michaud were unclear.

AIDS:AIDS and Bodytalk had desirable effects on attitudes; Brown, Streetwize UK and Michaud were considered partially effective. Brown had no effect on behavioural intentions. Bodytalk was considered partially effective in terms of behaviour; the results of Michaud were unclear.

Authors' conclusions
The results of this review suggest that the most effective approach to HIV/AIDs risk reduction among young people is one that provides practical information and support in a non-didactic way and is based on an accurate, qualitative assessment of young people's needs. Two of the included studies came from the UK.

Review quality score
9.

Comments
This review had a broad search but was limited to English language studies, which potentially excludes relevant studies. Few details of the interventions or their implementation were given. Only general results were given.

(4) Kirby (1995), USA[347]

Author's objective
This was to review studies which have examined the behavioural impact of education programmes designed specifically to reduce sexual risk-taking behaviour among school-aged youth.

Review methodology
Search. All references in 'recent' articles were reviewed. The Aspen Corporation under the auspices of the Division of Adolescent and School health at CDC provided all the references for its meta-analysis. References circulated to experts to identify any gaps.

Inclusion criteria. Studies measuring behavioural outcomes; published in peer reviewed journals, etc. Studies with less than 80 participants and studies of programmes which primarily provide condoms, contraceptive or other medical services were excluded.

Quality assessment. Study design and analytic methods discussed in the tables of included studies.

Number and type of studies
Abstinence: one RCT and three controlled trials.

Sex education: three RCTs and five controlled trials.

Sex and community education by community organisations: three RCTs.

HIV/AIDS education: one RCT and two controlled trials.

School-based clinics: five controlled trials.

Comprehensive school health: two controlled trials.

General: two national surveys.

Study quality as assessed by author
The quality of these evaluations varied considerably. On the one hand, a few studies employed rigorous designs and produced valid results. On the other hand, many studies were quite limited methodologically. Some studies had inherently weak designs that did not adequately control for other community programmes or differences; some studies had relatively poor comparison groups; many had small sample sizes; many measured only short-term effects of programmes; and some failed to take their cluster design into account in the analysis.

Participants
All but two studies took place in the USA, the remainder were Canadian. The programmes involved children and young people in grades 6 to 12 in a wide variety of settings.

Intervention
Abstinence programmes: Project Taking Charge[388] BC1,4,5,9a; Living Smart[389] B1,2,4,5,7,9a; Success Express[352] B1,3,4,5,8, and Roosa[390] BC1,3,4,5,8.

Sex education: Skills for Healthy Relationships[391] B1,8,9ab; McMaster Teen Programme[356] B1,2,8a; Reducing the Risk[370] B1,8?; Postponing Sexual Involvement[371] B8b; Human Sexuality[371] B1,2; Project Model Health[358] B1,3,8?10c; various[392] B; Teen Talk[369] B1,2,4,9?c; STEP[393] BC2,9,11c.

Sex and HIV programmes taught by community and Youth Serving Agencies: Teen Incentive Model[361] B2,7,9,11c; ARREST[394] B1,2,8bd; Be Proud, Be Responsible[359] B1?.

HIV/AIDS education: Youth Aids Prevention Project[360] B1,2,8ac; Get Real About AIDS[362] B1,8,10a; AIDS Prevention for Adolescents in Schools[349] B1,4,8,10a.

School-based/linked clinics: Kisker[354] A; Kirby 1[395] A; Kirby 2[363] A; Self Center[357] AB1; Edwards[364] A.

Comprehensive school health: School and Community HIV/AIDS Education and Condom Availability Programme[355] BC; School and Community Programme for Sexual Risk Reduction among Teens[55] ABC1,2.

Results
School-based clinic – Kisker had positive effects on initiation of sexual activity, and Reducing the Risk and Postponing Sexual Involvement were reported to have desirable short-term effects. Self Center had positive effects for girls, and the School and Community HIV/AIDS Education and Condom Availability Programme had positive effects for boys. Teen Talk* had no effect for girls but a desirable effect for boys. None of the following programmes were reported to have an effect on initiation of sexual intercourse: Project Taking Charge,* Success Express[352] and the study by Roosa,[390] Skills for Healthy Relationships, the McMaster Teen Programme,* various,[392] the Youth AIDS Prevention Project, School-based clinic and Kirby 1.

Living Smart was reported to be effective for reducing sexual activity. Be Proud, Be Responsible* was reported to have a positive effect on the number of partners; ARREST* and the Youth AIDS Prevention Project had no effect. AIDS Prevention for Adolescents in Schools and Project Model Health were reported to have no effect on abstinence.

Be Proud, Be Responsible* was reported to have a positive effect on the frequency of sex; Reducing the Risk and Postponing Sexual Involvement, the Teen Incentive Model,* ARREST,* the Youth AIDS Prevention Project, Get Real About AIDS, School-based clinic – Kirby 1 and the School and the Community HIV/AIDS Education and Condom Availability Programme were reported to have no effect.

Be Proud, Be Responsible,* AIDS Prevention for Adolescents in Schools and Get Real about AIDS were reported to have beneficial effects on contraceptive use. Self Center was effective for girls. Teen Talk* had a beneficial effect on boys but not girls. Skills for Healthy Relationships, the

McMaster Teen Programme,* Reducing the Risk, Postponing Sexual Involvement, various,[392] STEP,* the Teen Incentive Model,* ARREST,* the Youth AIDS Prevention Project, School-based clinic – Kisker, School-based clinic – Kirby 1 and the School and Community HIV/AIDS Education and Condom Availability Programme were reported to have no effect on contraceptive use.

Of the school-based clinics, Edwards and the School and Community Programme for Sexual Risk Reduction among Teens were reported to have effect on reported pregnancy, but Kisker, Kirby 1 and Kirby 2 had none. Self Center was reported to be effective for girls. The McMaster Teen Programme,* Reducing the Risk, various[392] and STEP* had no effect on pregnancy rates.

Author's conclusions
These studies demonstrate that not all sex and AIDS education programmes designed for youth are effective but that some programmes probably are. If these effective programmes are implemented more broadly they can have a modest but significant impact upon reducing sexual risk taking behaviour.

Review quality score
6.

Comments
Electronic databases do not appear to have been used to aid the search, so it is difficult to tell how comprehensive this review is. It seems to cover broadly the same papers as the earlier included review by the same author. The quality assessment is not made explicit although quality issues are discussed. All the included studies come from North America, so the generalisabilty to the UK is limited.

Personal safety

Synthesis of personal safety reviews

Six reviews were identified, and three met the inclusion criteria (*Table 10*). All three evaluated personal safety interventions, focusing on the prevention of sexual abuse and abduction. Summaries of each of the included reviews are given at the end of the main section. Tables of the individual studies included in the reviews are given in appendix 6.

Review coverage

Only one study concerned with the prevention of physical abuse in the relevant age group was included. Altogether 18 studies were reviewed, with six appearing in at least more than one review. All the included studies were from the USA or Canada.

Quality of primary studies as assessed by authors

Reviewers indicated a number of limitations in the primary studies, all of which were controlled trials, with or without randomisation. MacMillan[396] assessed the validity of each study, and found a range of scores from 7 to 21 out of a maximum of 25 points, with a mean of 17. Lack of long-term follow-up and the use of instruments which had not been assessed for validity and reliability were common weaknesses.

Outcomes

Programme effectiveness was usually assessed by proxy measures such as knowledge and simulated prevention skills rather than a direct measure such as actual or reported sexual abuse. Four studies by two research teams attempted to collect data on disclosure of sexual abuse. Adverse effects of the intervention were also considered in three of those studies.

Programme domains

Apart from one intervention which involved families through a home activities package, all of the interventions evaluated were confined to the classroom.

Curricular components. Programmes focused on imparting knowledge only or knowledge in addition to resistance skills. Common aims were to improve the children and young people's ability to recognise dangerous situations or inappropriate behaviour and to develop skills to enable them to respond, including immediate action to avert the

TABLE 10 *Personal safety reviews included in the synthesis*

Authors	Primary focus	Number of studies	Review quality
MacMillan and co-workers (1994), Canada[396]	Sexual abuse	13	14
Daro (1994), USA[397]	Sexual abuse	12	9
Miltenberger and Olsen (1996), USA[398]	Sexual abuse	2	2

danger and how to enlist adult help. This was done through discussion, role play, songs, puppet shows, film and the use of photographs.

Implementation
The programmes were implemented by a variety of personnel including medical students, volunteers, police officers, health professionals and, in the minority, regular teachers. Most interventions consisted of one to three sessions of an hour or less. Talking About Touching was an exception, being delivered for 15 minutes every day for 3 weeks.

Theoretical bases
Information about the theoretical bases of the interventions was not given in the reviews.

Generalisability
All the studies were from the USA or Canada. All the reviews focused on programmes implemented with primary school children and young people.

Costs and resources
Cost and resource implications were not discussed.

Synthesis of results
Prevention skills
Of the nine studies reporting prevention skills as an outcome, gains were found in seven.[399–405]

Disclosure of sexual abuse
The findings of the studies which collected data on disclosure of abuse were inconclusive.

Knowledge and attitudes
All but two interventions were successful in increasing children and young people's knowledge, but possibly only in the short-term. The only study which evaluated attitudes reported no benefit.

Adverse effects
The two RCTs[401,406] and one controlled trial[407] which looked for adverse effects of the programmes did not find any.

Conclusions
Interventions were generally successful in teaching prevention skills and increasing knowledge about personal safety. The included reviews reported classroom-based interventions which, from the information provided, looked very similar. Daro[397] concluded that behavioural skills training is a feature of the most promising programmes, along with curricula tailored to the age group and the use of a variety of material for young children and young people. No patterns emerge about the relative effectiveness of the different personnel delivering the interventions.

These reviews suggest that a fairly narrow range of approaches has been used in schools to promote children and young people's personal safety. There are indications that these curricula can increase children and young people's knowledge and skills under experimental conditions, but the reviews do not provide evidence about whether they can reduce child abuse.

Personal safety review summaries
Key to notes:

- The programme **domains** have been coded as: A, ethos and/or environment; B, curriculum; C, family and/or community.
- The curricular **components** have been coded as: 1, information; 2, decision making skills; 3, pledge; 4, values clarification; 5, goals setting; 6, stress management; 7, self-esteem; 8, resistance skills training; 9, life skills training; 10, norm setting; 11, assistance; 12, alternatives.
- The **personnel** used to deliver the interventions have been coded as: a, teacher led; b, peer led; c, outside expert.
- An asterisk (*) denotes an RCT.

(1) MacMillan and co-workers (1994), Canada[396]
Authors' objectives
This was to assess the effectiveness of interventions aimed at the primary prevention of child sexual abuse.

Review methodology
Search. The following databases were searched: MEDLINE, ERIC, PsycLIT, Criminal Justice Periodical Index, Child Abuse, and Neglect.

Inclusion criteria. Published in English language journals between January 1979 and May 1993; involve children and young people aged 18 years or under; evaluate a primary prevention programme; describe outcomes associated with maltreatment; describe a prospective controlled trial.

Quality assessment. Studies evaluated on five criteria: method of sample allocation; baseline equivalence; inclusion/exclusion criteria; follow-up; and outcome assessment. Studies assigned a total validity assessment score with a maximum score of 25.

Number and type of studies
Eight RCTs and five controlled trials were included. The review also included 16 studies of babies and

preschool children and young people and one of teachers only.

Study quality as assessed by authors
Validity assessment scores ranged from 7 to 21 (mean 17). No studies examined whether an intervention prevented the direct outcome of sexual abuse.

Participants
School children and young people from kindergarten to age 11 years in the USA and Canada participated.

Interventions
Content and implementation. This was in three areas:

(a) Abduction prevention: Fryer[399] B1,8; Poche.[405] Three interventions: behavioural skills training B1,8a; abduction video B1, and standard safety programme B1c.

(b) Sexual abuse prevention: Conte[408] B1,8c; Feeling Yes Feeling No[406] B1,8a/c; Harvey[400] B1,8c; Kolko[409] B1c; Kolko[407] B1c; Krazier[404] B1,8; Touch[403] B1c; Tutty[410] B1; Wurtele[411] B1c and B1,8c; You're In Charge[412] B1,8c.

(c) Physical and sexual abuse prevention: Nibert[413] B1,8c.

Results
The interventions were reported to be effective in improving children's and young people's knowledge, with the exception of Nibert. Improved prevention skills were reported in Touch,* Harvey,* Krazier and on one of two dimensions of a vignette measure in Feeling Yes Feeling No*. Gains were not significant in Nibert nor in either intervention evaluated in Wurtele*. Fryer* and Poche* (abduction video and behavioural skills training programmes) found gains in children and young people's responses in simulated abduction situations and follow-up assessments suggest that these gains were maintained up to a year later. No differences in response were found following the standard safety programme evaluated by Poche*. The findings of three studies that collected data on disclosure of abuse were inconclusive. Feeling Yes Feeling No* and the study by Kolko assessed anxiety and adverse reactions respectively and did not find negative effects associated with the intervention.

Authors' conclusions
It was not possible to compare effectiveness of different interventions across studies, but there is evidence that education programmes aimed at preventing sexual abuse can improve children and young people's knowledge and prevention skills under experimental conditions. It is unknown whether they result in an actual reduction of sexual abuse.

Review quality score
14.

Comments
The search was limited to studies published in journals in English, so relevant studies may have been missed. All of the studies were conducted in the USA or Canada. The validity assessment given for each study is useful, and good information is given about the study methodology and the interventions.

(2) Daro (1994), USA[397]

Author's objective
This was to review the evidence regarding the efficacy of child sexual abuse prevention programmes.

Review methodology
Search. Database at the National Committee for Prevention of Child Abuse (compiled 1985, updated 1988) searched; contact with researchers in the field and relevant organisations; handsearches of relevant journals (unspecified). The search included unpublished studies.

Inclusion criteria. Not clear.

Quality assessment. The methodological limitations of the studies overall are discussed.

Number and type of studies
Twelve RCTs were included. The review also included five studies of preschool children and young people, and 21 non-randomised studies for which no study details were given.

Study quality as assessed by author
Only two studies included follow-up after 3 months or longer. Only one of the instruments developed to assess these programmes has been rigorously examined for reliability and validity.

Participants
School children and young people from kindergarten to grade 6 in the USA participated.

Intervention
Content and implementation. Role-play programme[414] B1,8; Child Abuse Primary Prevention

Programme[414] B1,8; Conte[408] B1,8c; Good Touch-Bad Touch[400] B1,8c; Feeling Yes Feeling No[401,406] B1,8a/c; You're In Charge[415] B1,8c; Touch[403] B1c; Talking About Touching[416] BC1,2,8; Spiderman book[416] B1; Fryer[399] B1,8; Wurtele[411] B1,8c and B1c; Wurtele;[417] B1,8.

Results
All studies assessing knowledge, except the evaluation of the Spiderman book,* reported gains. Improved skills were reported in Fryer,* Good Touch-Bad Touch* and Feeling Yes Feeling No* (short-term gains). You're In Charge* showed no effect on attitudes. The findings of the two studies by Hazzard*, which collected data on disclosure were inconclusive. These studies also found that the interventions did not appear to be associated with adverse effects.

Author's conclusions
The most promising programmes include behavioural rehearsal of prevention strategies, curricula tailored to the age group, a variety of material for young children and young people, concepts such as assertiveness skills which can be used in everyday situations, emphasis on the need for children and young people to tell if someone touches them in a way that makes them feel uneasy, and longer programmes integrated into school curricula.

Review quality score
9.

Comments
The author's conclusions were based on a wider literature than the 12 RCTs reported here, but lack of detail about the other studies precluded their inclusion. All the studies were from the USA. There is no assessment of the quality of individual studies. Details are provided of programme components.

(3) Miltenberger and Olsen (1996), USA[398]

Authors' objectives
To review the research literature evaluating procedures for teaching abduction prevention skills to children and young people.

Review methodology
Search. PsycLIT database and reference lists of recent relevant studies searched.

Inclusion criteria. Not stated.

Quality assessment. Type of study design given.

Number and type of studies
Two controlled trials were included. The review also included four studies of preschool children and young people, two of adults with learning difficulties and two studies of individual training of school-age children and young people which did not appear to be school based.

Study quality as assessed by authors
For the study by Fryer, no information is given about the size of the control group, the method of allocation or data either at the baseline or postintervention. Reviewers reported that there was no follow-up. For the study comparing three programmes, no details are given about the method of allocation to groups or the number of participants in each intervention group, and there are no data for the control group. This study is reported to have had post-test data only. Those who had shown the desired responses immediately after the intervention were followed up at one month.

Participants
Children and young people from kindergarten to age 7 years participated.

Intervention
Content and implementation. Fryer[399] B1,8; Poche[405] three interventions – behavioural skills training B1,8a, abduction video B1, and standard safety programme B1c.

Results
In the evaluation by Fryer, 18 of 23 children and young people showed the correct responses to a simulated abduction situation one day after the intervention. In the evaluations by Poche, all the participants were reported to have responded correctly after the abduction video, 68% after behavioural skills training and the video and 6% after the standard safety programme. These skills were maintained at 1 month follow-up.

Authors' conclusions
Children and young people can learn abduction prevention skills through behavioural skills training procedures conducted individually or in groups.

Review quality score
2.

Comments
Only two studies in the review were relevant to health promotion in schools, and too few details were reported to be able to draw any conclusions about effectiveness.

Accident prevention

Synthesis of accident prevention reviews

Three reviews were included which focused on the prevention of accidents (*Table 11*). Summaries of each of the included reviews are given at the end of the main section. Tables of the individual studies included in the reviews are given in appendix 6.

Review coverage

A total of 54 studies were reviewed, four of which appeared in all of the reviews and nine in two reviews. The reviews covered a wide range of interventions. The most common focus was road safety (driver, pedestrian and cycle safety), but there were also programmes targeting burn prevention and sports safety.

Quality of primary studies as assessed by authors

The majority of studies in the review by Towner[419] were judged to be at least of reasonable quality. The reviewers highlighted inadequate follow-up, the choice of outcomes measures and heterogeneity as weakening some studies.

Outcomes

A variety of outcomes were considered, ranging from incidence and severity of injuries to knowledge and the use of cycle helmets. Observed behaviour, such as crossing a road, was a frequently used outcome, sometimes in simulated conditions.

Programme domains

Interventions were identified which used environmental, curricular and parent or community approaches, either alone or in combination. Environmental approaches ranged from engineering measures to improved road safety, such as the erection of barriers, to incentives such as bicycle helmet discount schemes. Curricula approaches comprised instruction in the classroom, sometimes supplemented by training in road safety skills using real or simulated roads. Community involvement took the form of mass media campaigns. A few interventions included information for parents or invited parental involvement in activities.

Four interventions were evaluated which included environmental, curricular and family or community approaches, while a fifth involved environmental and curricular activities initiated in response to problems identified by the community. However, these interventions differed from those using a health promoting schools approach identified in other topic areas because they were not school-based. Schools appeared to be involved as part of a wider community-based initiative. The distinction between interventions which have been developed by the school across the three areas and those for which the impetus, and indeed the development of the intervention, has come from external bodies may be an important one.

Curriculum components

No components other than information and skill development were reported in any of the reviews.

Implementation

There was a lack of information about the delivery of the majority of interventions. Where this was specified, some took the form of a single lecture or film while others involved activities over the course of a year. In the few instances where this was reported, interventions were most frequently delivered by experts such as road safety officers or members of the fire services.

Theoretical bases

No information was provided about the theoretical bases underpinning the interventions.

Generalisability

Although the majority of studies were from the USA, the inclusion of studies from a wide range of countries make the findings more generalisable to the UK. The interventions involved children and young people aged from 5 to 17 years.

Costs and resources

No details of costs and resources were included in the reviews.

TABLE 11 *Accident prevention reviews included in the synthesis*

Authors	Primary focus	Number of studies	Review quality
Klassen (1995), Canada[418]	Injury	15	11
Towner and co-workers (1995), UK[419]	Safety	38	10
Speller and co-workers (1995) UK[420]	Safety	22	5

Synthesis of results

Environmental interventions

Three interventions involving the road environment around schools were reviewed by Towner.[419] A controlled trial[421] comparing staffed and unstaffed road crossings at schools found a reduction in accident rates. A before-and-after study investigating collaborative work with schools, parents and also engineering measures in Denmark found an 85% reduction in accidents.[62] Courtesy Promote Safety, a programme involving schools, public education, engineering measures and police enforcement, evaluated in a before-and-after study,[61] was judged partially effective, with evidence of improved driver and pedestrian behaviour but little effect on pedestrian casualties.

Pedestrian skills

All three reviews contained studies of interventions to improve pedestrian skills. These generally involved teaching road crossing behaviours. Of the nine studies using observed outcomes, two controlled studies, the Willy Whistle Campaign[422] and And Keep Looking,[423] were found to be effective. These both involved school and mass media campaigns. This was supported by state reports of accidents. Three other interventions were found effective in before-and-after studies: Rivara,[424] part of a community wide programme; Yeaton,[425] which involved training by school crossing patrols; and Fortenberry,[426] a curriculum-only programme. Two controlled studies, both involving classroom and practical training, Let's Decide Walk Wise[427] and Streets Ahead,[428] were considered partially effective, as were two programmes involving training to cross a pretend road, evaluated in before-and-after studies.[429,430] Of five studies, evaluated in terms of self-reported pedestrian behaviour (e.g. finding safe places to cross), three interventions were found partially effective. These involved group training to cross the road.[431–433]

Two interventions – the Children and Young People's Traffic Club[434] and The Think First Programmes[435] – were judged ineffective or possibly harmful on the basis of self-reported unsafe behaviour.

A meta-analysis[418] based on four studies[423,424,426,431] concluded that educational interventions increased pedestrian skills (OR = 0.67 (95% CI: 0.5–0.8)). However, the test for heterogeneity was statistically significant, suggesting that the studies were too different to combine.

Bicycle helmet campaigns

Five studies looked at bicycle helmet campaigns. A school-based education programme and helmet discount scheme was found effective in a controlled trial using random allocation to groups.[436] Similarly, a school and community programme with helmet discount scheme was found effective for some age groups in a controlled study[437] and another similar scheme was partially effective.[63] A controlled study found an education only programme effective for high income but not low-income children and young people.[438] Results of one other study were unclear.[439]

A meta-analysis[418] based on five studies[63,436,438–441] found that educational interventions increased cycle helmet use (OR = 0.57 (95% CI: 0.5– 0.7)). However, the test for heterogeneity was statistically significant.

Burn prevention

With one exception, where mortality and morbidity rates were used, burn prevention programmes were evaluated in terms of knowledge. Of six programmes, all which appeared to be information only, half produced knowledge gains. A controlled study found a community-based school intervention had no effect on burn injuries.[442]

Conclusions

A high proportion of these interventions included changes to the school or community environment. Those involving environmental change were more likely to be effective in changing behaviour or reducing injury. The classroom components, as reported in these reviews, were unsophisticated relative to substance misuse or sex education programmes. Behaving in a way which distinguishes young people from their peers is likely to require a similar level of personal autonomy and self-esteem, whether the behaviour is substance misuse or wearing of cycle helmets. School-based accident prevention interventions might benefit from including resistance skills or self-efficacy development components.

The majority of road safety interventions were judged effective or partially effective. Programmes involving changes to the road environment were successful in reducing injuries. Seat belt campaigns were effective and offering subsidised helmets increased the effectiveness of cycle helmet education on helmet wearing behaviour. Pedestrian and driver skill development programmes had variable results; while most were positive, some had potentially harmful effects, and many were

ineffective. Road safety studies did not report knowledge outcomes and there were mixed results in terms of knowledge for burn prevention programmes. The latter were all curriculum only interventions. The reviews provide insufficient detail about the programme content or delivery to enable distinctions to be made between features of effective and ineffective programmes. A relatively small number involved parents. One review[419] concluded that although the endorsement of a message by outside 'experts' has shown no positive results, the involvement of parents or peers is useful, and that programmes where children and young people are actively involved and which concentrate on one or two specific messages rather than many are more effective.

Safety review summaries

Key to notes:

- The programme **domains** have been coded as: A, ethos and/or environment; B, curriculum; C, family and/or community.
- The curricular **components** have been coded as: 1, information; 2, decision making skills; 3, pledge; 4, values clarification; 5, goals setting; 6, stress management; 7, self-esteem; 8, resistance skills training; 9, life skills training; 10, norm setting; 11, assistance; 12, alternatives.
- The **personnel** used to deliver the interventions have been coded as: a, teacher led; b, peer led; c, outside expert.
- An asterisk (*) denotes an RCT.

(1) Klassen (1995), Canada[418]

Author's objective

This was to conduct a systematic review of research on school-based injury control interventions to determine their effectiveness in changing pedestrian safety behaviours, increasing the use of cycle helmets and of safety seat restraints and crash rates among adolescent drivers.

Review methodology

Search. Computer searches of MEDLINE, ERIC, NTIS, PsycINFO, EMBASE; bibliographies of retrieved papers; contact with authors; three journals handsearched from 1970 to 1993.

Inclusion criteria. School-based intervention for children and young people/adolescents; outcomes included incidence and severity of injuries, mortality rates or behavioural change; study used a control group (concurrent or historical); English language.

Quality assessment. Studies assessed for selection bias and exclusion bias. For RCTs, documented whether assessment was 'blind'.

Synthesis. ORs and 95% CI calculated.

Number and type of studies

Three RCTs, eight controlled trials, four before-and-after studies were included. The review also included studies of preschool children and young people and non-school-based interventions.

Study quality as assessed by author

There was significant heterogeneity between studies within each topic area. In one study, follow-up was greater than 80%, in five studies less than 80% and for the remainder the proportion of follow-up could not be ascertained.

Participants

School children and young people from kindergarten through to high school participated. The location was not always stated, but most of the interventions were in Canada or the USA. The review also included studies of preschool children and young people and non-school-based interventions.

Intervention

(a) Road safety: Rivara[424] BC1; Nishioka[431] B1; And Keep Looking[423] B1; Fortenberry[426] B1.

(b) Seatbelt use: Morrow[443] B1; Lonero[444] B1; Neuwelt[445] B1.

(c) Cycle safety: Be Bike Smart[438] AB1; Basics of Bicycling[440] B1; Dannenberg[441] BC1; Morris[436] B1; Pendergrast[439] BC1; Puczynski[63] BC1.

(d) Driver education: Robertson[446] B; Lund[447] B1+.

Results

The educational intervention increased cycle helmet use: OR = 0.57 (95% CI: 0.5 to 0.7) – heterogeneity test significant.

Educational intervention increased pedestrian skills: OR = 0.67 (95% CI: 0.5 to 0.8) – heterogeneity test significant.

Driver education increased crash rates among adolescents: OR = 1.28 (95% CI: 1.2 to 1.4) – heterogeneity test significant.

Educational intervention increased use of safety seats: OR = 0.73 (95% CI: 0.6 to 0.9) – heterogeneity test significant.

Author's conclusions
This review has shown that educational interventions within the school setting targeted at young children and young people are effective in improving safety behaviour and in some cases actually injury rates. This supports the use of safety programmes in schools.

Review quality score
11.

Comments
The search was limited to the English language: relevant studies may hence have been missed. The number of participants was not given for several studies. There was insufficient detail about the implementation or content of the interventions to allow conclusions to be drawn about the effectiveness of particular approaches. Although an attempt was made to account for heterogeneity, the differences between the studies both in terms of interventions and outcomes suggests that quantitative pooling is not appropriate.

(2) Towner and co-workers (1995), UK[419]

Authors' objective
This was to extend and update an earlier review to evaluate the effectiveness of health promotion interventions in preventing unintentional injuries in childhood and young adolescence.

Review methodology
Search. Electronic searches of BIDS, medline, excerpta medica, DHSS database, social science research index – search strategies given. Reference lists of other reviews, books and articles scanned and experts contacted. Also handsearching.

Inclusion criteria. Related solely or in part to the prevention of unintentional injuries; children and young people aged 0–14 years; primary or secondary prevention; injury prevention intervention evaluated and some outcome measure described. Violence prevention studies are not included.

Quality assessment. Studies categorized as good, good/reasonable, reasonable, reasonable/weak and weak, based on a hierarchy of evidence (see results).

Number and type of studies
Five RCTs, 18 controlled trials and 15 before-and-after studies were included. The review also included studies of preschool children and young people and non-school-based interventions and results of reviews.

Study quality
In general, more robust experimental design was limited to single-measure interventions (e.g. cycle helmets) and closed systems such as schools. Twenty-two studies were identified where the quality of evidence was considered good. See below for authors' quality ratings of included studies.

Participants
Children and young people of up to 14 years of age from a wide range of countries participated.

Intervention
(a) Transport policies: Boxall[421] A.

(b) Area-wide engineering measures: Nielson[62] ABC.

(c) Road safety education for drivers: Courtesy Promote Safety[61] ABC.

(d) Experimental road safety programmes: Yeaton[425] Bc; Young[429] B; Nishioska[431] B; Rivara[424] BC; Ampofo-Boateng[432] B; Demetre[430] B1; Thomson[433] B1.

(e) Operational road safety programmes (traffic clubs): Antaki[448] B1c; Children and young people's Traffic Club[434] BC1. Other operational road safety programmes: Willy Whistle[422] BC1; And Keep Looking[423] BC1; Let's Decide Walk Wise[427] B1ac; Streets Ahead[428] BC; Safe Routes to School[449] AB; van Schagen[450] B1; Think First Programme[435] B1.

(f) Bicycle helmet education campaigns: DiGuiseppi[437] ABC1; Morris[436] AB; Pendergrast[439] AB; Puczynski[63] ABC; Parkin[438] Bc.

(g) Seat belt campaigns: Roberts[451] BC; May is Buckle Up Month[443] BC; Neuwalt[445] Bc.

(h) Prevention of burns and scalds: Linares[452] B; Project Burn Prevention[442,453] BC; Eckelt[454] B1; Varas[455] Bc; Learn not to Burn Programme[456,457] Bc; Thompson[458] B1.

(i) Sports and Leisure: Morton[459] A.

Results
(Study quality: G, good; GR, good/reasonable; R, reasonable; RW, reasonable/weak; W, weak.)

(a) Transport policies: Boxall (R) reduced accident rates at staffed sites.

(b) Area-wide engineering measures: Nielson (W) considered effective in reducing accident rates.

(c) Road safety education for drivers: Courtesy Promote Safety considered partially effective.

(d) Experimental road safety programmes: Yeaton (W) considered effective, and Ampofo-Boateng* (GR), Young (R), Nishioska (R), Rivara (R), Demetre (R), Thomson* (R) partially effective.

(e) Operational road safety programmes: Antaki (G) considered ineffective/inconclusive, and Children and young people's Traffic Club (R) considered ineffective/possibly harmful. Other operational road safety programmes: Willy Whistle (R) considered effective; Streets Ahead (G), Let's Decide Walk Wise (GR) and And Keep Looking (R) partially effective; van Schagen* (GR) partially effective/inconclusive; and Safe Routes to School (R) inconclusive; and the Think First Programme (R) was ineffective/possibly harmful.

(f) Bicycle helmet education campaigns: Morris* (R) considered effective; DiGuiseppi (R) and Parkin (R) effective for some groups; Puczynski (RW) partially effective; and Pendergrast (R) inconclusive.

(g) Seat belt campaigns: May is Belt Up Month (RW) considered effective, and Roberts (R) effective during the intervention; Neuwalt (R) was inconclusive.

(h) Prevention of burns and scalds: Varas (R), Eckelt (RW) and Linares (RW) considered effective, and Project Burn Prevention (R) partially effective/inconclusive; Learn not to Burn *GR and Thompson (W) were ineffective.

(i) Sports and leisure: Morton (R) considered effective.

Authors' conclusions
The synergistic effect of educational, environmental and legislative approaches needs to be stressed. Healthy alliances have the potential to allow a variety of approaches to be developed and for these to complement and reinforce each other. The involvement of parents and peers is useful.

Educational interventions need to be suited to the target group: the target groups need to be involved in the planning process. Participative rather than didactic approaches appear to have more success. One or two specific messages are preferable to a large number of messages and the inclusion of other specific groups such as parents or peers are useful. 'Expert' endorsement of a message by a doctor or health visitor for example has shown no positive results.

Review quality score
10.

Comments
A very thorough review. The databases searched need to be checked. The international range of the included studies makes the findings more generalisable to the UK.

(3) Speller and co-workers (1995), UK[420]

Authors' objectives
These were to provide a systematic review of the literature on child accident prevention to identify effective interventions to prevent injury to children and young people, and to recommend ways in which these could be integrated into purchasing to assist with the achievement of Health of the Nation targets.

Review methodology
Search. Computer searches of MEDLINE, Health Plan, Data Star and DHSS databases from 1982 to 1994; bibliographies of retrieved articles. The searches retrieved non-peer-reviewed articles. Unpublished literature was not reviewed.

Inclusion criteria. Studies of injury prevention including children and young people.

Quality assessment. Interventions classified as effective, of theoretical benefit but/or subject to limited or conflicting evidence, or of little/no effectiveness, using criteria for assessing study quality adapted from the US Preventive Task Force. The study design, outcome measures used and clarity of results were taken into account.

Number and type of studies
Two RCTs, five controlled trials, six before-and-after studies and one case–control study were included. Also, nine studies, all dealing with driver education, were taken from a previous review. The review also included studies of non-school-based interventions.

Study quality as assessed by authors
The studies across all topics ranged from one top-rated RCT, through well-designed controlled trials to 'evidence from multiple time series'. Taking into account the outcome measures, most studies were classified in group 2 – interventions of theoretical benefit but/or subject to conflicting evidence.

Participants
School children and young people up to age 17 years in schools in the USA, Canada and the UK (one study only) participated.

Intervention
Content and implementation (by author if untitled).
Interventions were in the following areas:

(a) Alcohol and driving: McKnight[460] B1b, Robertson[446] B.

(b) Road safety: Tufty Club[448] B1c; Rivara[424] BC1.

(c) Cycle helmet promotion: Be Bike Smart[438] AB1; Morris[436] AB1; Pendergrast[439] BC1; Puczynski[63] ABC1.

(d) Burns prevention: Eckelt[454] B1; Grant[456] B1; Varas[455] B1.

Results
Eckelt and Varas reported gains in knowledge on burns prevention but Grant found no difference. Cycle helmet education combined with helmet subsidy was found to increase helmet use in Morris,* Puczynski and in high-income groups in Be Bike Smart. Information alone did not increase helmet use in Morris* or Pendergrast. The Tufty Club showed no gains in knowledge, while Rivara showed short-term improvements in road crossing behaviour. All the alcohol studies which assessed knowledge reported gains; McKnight* found equivalent gains in intervention and control groups for knowledge and behaviour, but only the intervention group maintained improved behaviour at long-term follow-up. Attitudes did not change in McKnight*. Robertson found no decrease in fatal crash involvement.

Authors' conclusions
The majority of studies were in the group that classified interventions as of theoretical benefit but/or subject to limited or conflicting evidence, which emphasises the lack of evidence on which much current practice is based. School-based promotion of cycle helmets has met with some success.

Review quality score
5.

Comments
Unpublished literature was not reviewed, so relevant studies may have been missed. Some of the alcohol studies were not fully referenced, and appear to have been taken from another review. For several studies the number of participants was not stated, and for most no details were given about the length or delivery of the intervention and little or no information about the interventions themselves. This severely limits the extent to which conclusions can be drawn about the effectiveness of particular approaches. All but one study came from the USA or Canada, limiting the generalisability of findings to the UK context.

Psychological aspects of health

Synthesis of psychological aspects of health reviews

Two reviews of the psychological aspects of health met the inclusion criteria (*Table 12*). Summaries of each of the included reviews are given at the end of the main section. Tables of the individual studies included in the reviews are given in appendix 6.

Review coverage

Only two out of a total of 42 identified reviews met the criteria for inclusion in the review of mental health. Between them these reviews covered 17 relevant studies, 15 of which were controlled, with one study appearing in both reviews. The reviews were of similar quality but differed significantly in their focus, one investigating suicide prevention programmes[462] and the other a wide range of interventions to promote mental health.[461]

Quality of primary studies as assessed by the authors

The reviewers highlighted a number of methodological shortcomings of the included studies. All the studies in the suicide prevention review[462] were rated as weak when assessed on five quality criteria, and seven failed all five criteria. Both reviews noted the lack of long-term follow-up in most studies.

TABLE 12 *Psychological aspects of health reviews included in the synthesis*

Authors	Primary focus	Number of studies	Review quality
Tilford and co-workers (1997), UK[461]	Mental health	8	12
Ploeg and co-workers (1996), Canada[462]	Suicide	9	11

Outcomes
A wide range of outcomes were evaluated including knowledge, attitudes, anxiety, anger and self-esteem. The evaluations of suicide prevention programmes, with one exception, used proxy measures such as those to assess programme effectiveness rather than the incidence of attempted or completed suicide. A large variety of measures were used; these included instruments for which references were cited, those devised by the authors and self-reports. Examples of instruments used are: the Adolescent Stress Symptomology Scale; the Culture Free Self-esteem Inventory; the Hare Self-esteem Scale; McDaniel-Piers; the Behaviour Scale of the Youth Self-Report; the Risk Behaviour Questionnaire, Suicide Knowledge Test; the Hopelessness Scale for Children and Young People; Attitudes toward Suicide; Kidcope; the Israeli Index of Potential Suicide; the Adolescents Ego Identity Scale; the Self-control Schedule; Beck's Hopelessness Scale; the UCLA Loneliness Scale; the Index of Empathy for Children and Young People; and Nelson's Suicide Prevention Questionnaire. Instruments; where references were given in the reviews, these are noted in the results.

Programme domains
The interventions were mostly confined to the classroom, with one involving community agencies and another inviting parental participation. None included activities affecting the school ethos or environment.

Curricular components
Of the suicide prevention programmes, five offered information only, and one information programme also sought to develop decision-making skills. The effectiveness of counselling following the occurrence of a suicide was also evaluated, as was a stress management course. Of the nine relevant programmes in the Tilford review, five included information, five included stress management life skills, two included resistance skills, three included decision making skills, three included self-esteem building, one included goal setting and one counselling. The one study common to both reviews involved information, stress management and life skills.

Implementation
The use of classroom teachers to deliver the programmes was much less common than the use of counsellors, psychologists or psychiatrists, and only one programme employed peer leaders. The duration of some interventions was as little as a few hours, but the majority involved a session of around one hour per week for up to fifteen weeks. The techniques used in the classroom included group work, drama and discussion.

Theoretical bases
There was little information about the theoretical bases from which the interventions were developed.

Generalisability
All but three of the studies were conducted in the USA, and none in the UK. The age range covered by the interventions is not clear; while the review by Ploeg[462] involved high school students, mostly grades 9 and 10, the review by Tilford[461] covered interventions with 'children and young people' of unspecified ages.

Costs and resources
No cost or resource information was given.

Synthesis of results
Suicide
Three studies reported suicide-related outcomes. Two of these were controlled studies of curriculum programmes with stress management and used the Israeli Index of Potential Suicide. The trial using random allocation to groups had mixed results;[463] the other study reported a beneficial effect on suicidal tendencies.[464] The other controlled study of a postintervention counselling group found no effect.[465]

Substance use
Neither of the studies which focused on substance use found an impact on this outcome.

Coping skills
Two controlled studies,[464,466] one with random allocation,[466] found positive effects on coping skills based on the Self Control Schedule and an unnamed stress and coping questionnaire. Both these studies included a stress management component. A controlled study of the Samaritans of Rhode Island Curriculum found that this knowledge-based programme was beneficial for girls but detrimental for boys in terms of maladaptive coping (based on the Kidscope instrument).[467] Another controlled evaluation of this programme, again using Kidscope, found no effect.[468]

Empathy
The Psychological Education Programme, evaluated in a controlled trial with random allocation to groups, had positive effects on girls' empathy but none on that of boys (Index of Empathy for Children and Young People).

This programme had information, stress management and resistance skills components.

Hopelessness

Of the three studies reporting hopelessness as an outcome, only the Samaritans of Rhode Island Curriculum[467] (see above) produced positive results on the Hopelessness Scale for Children and Young People – but only for girls. This information-only programme had negative effects on boys.

Self-esteem

Of the four studies reporting self-esteem, two reported positive effects. The Cognitive Stress Reduction Programme, evaluated in an RCT, found short-term-only gains in self-esteem (Cooper Smith Self-esteem Inventory). These were not sustained. A before-and-after study of Developing Understanding of Self and Others,[469] a programme which emphasised learning through active participation by the child, parent and teacher, found gains using the Culture Free Self-esteem Inventory. However, no statistical data were given.

Locus of control

Of the two studies reporting locus of control as an outcome, only the randomised controlled study of the Stress Management Programme[466] showed a benefit (Intellectual Achievement Responsibility Questionnaire). This programme included stress management, resistance skills and life skills training.

Self-concept

Both the studies reporting self-concept, Stress Management Programme[466] and Developing Understanding of Self and Others,[469] found positive programme effects. These programmes had life skills training in common.

Knowledge and attitudes

Both reviews reported that the majority of studies found knowledge gains and desirable attitude changes.

Conclusions

The interventions reviewed here were almost entirely confined to the classroom, led by mental health professionals rather than teachers, and none aimed to influence the hidden curriculum or school ethos. They were therefore isolated interventions designed to increase knowledge and life skills related to mental health and were unlikely to have a significant influence on the schools as a whole. The health promoting school initiative, in which the development of self-esteem is central, recognises that self-esteem development is likely to require a whole-school approach together with the active participation of all teachers.

In spite of the absence of extra-curricula activities, roughly half of these programmes showed a positive impact on outcomes relevant to mental well-being. Gains in knowledge were found in all programmes where knowledge was an outcome of interest and positive attitude change was also reported. Programmes which included stress management were effective in improving coping skills, anger management, anxiety and self-esteem. There is a lack of evidence on whether these gains were maintained over time. Positive programme effects were also found for self-concept. Where gender differences were reported, girls responded more positively than boys. Programmes specifically targeted at suicide prevention were the only ones where the results show the potential for harmful effects. None of the studies reported on long-term outcomes.

The influence of the intensity and duration of the programmes, and of the personnel used to deliver them, cannot be determined from the evidence presented in the two reviews. Similarly, it is not possible to comment on the theoretical bases of the programmes.

Psychological aspects of health review summaries

Key to notes:

- The programme **domains** have been coded as: A, ethos and/or environment; B, curriculum; C, family and/or community.
- The curricular **components** have been coded as: 1, information; 2, decision making skills; 3, pledge; 4, values clarification; 5, goals setting; 6, stress management; 7, self-esteem; 8, resistance skills training; 9, life skills training; 10, norm setting; 11, assistance; 12, alternatives.
- The **personnel** used to deliver the interventions have been coded as: a, teacher led; b, peer led; c, outside expert.
- An asterisk (*) denotes an RCT.

(1) Tilford and co-workers (1997), UK[461]

Authors' objectives

These were to assess available research findings on the effectiveness of a full range of interventions designed to promote mental health, and to identify those interventions most likely to have the greatest impact in terms of mental health promotion and prevention of mental disorders.

Review methodology
Search. MEDLINE, PsycLIT, CINAHL, ASSIA, ERIC and Caredata searched for English language papers (1980–1995). Handsearching, checking of bibliographies and contact with practitioners and academics was also undertaken.

Inclusion criteria. 'Full range of interventions' targeting both general populations and at risk population. Exclusion criteria included psychiatric in-patients, patients in secondary treatment settings, mental health issues related to alcohol misuse, drug treatments, workplace settings, mental illness services, interventions for particular chronic physical health problems and interventions which include relevant outcome as subsidiary goal.

Quality assessment. Not specified.

Number and type of studies
Six RCTs, one controlled trial and one before-and-after study were included. In addition there were 11 studies of 'at-risk children and young people', four studies of 'at risk' young people and one study of young people on Outward Bound. Forty-seven studies involving adults were also reviewed.

Study quality as assessed by authors
Common omissions were justification of sample sizes and attrition details. The collection of qualitative data was invariably secondary. Process data were also under emphasised. Long-term follow-up was not included in many studies.

Participants
Children and young people in USA schools participated. The review also included one study of young people participating in Outward Bound courses, studies of at-risk groups and adults.

Intervention
Mental Health Awareness Week Programme[470] B1c; Bonaguro[471] BC7,9ac; I Can Do[472] B1,2,6; Personal Empowerment Programme[473] B1,2,5,6,8,9; Cognitive Stress Reduction Programme[474] B6; Stress Management Programme[466] B6,8,9c; Klingman[463] B1,6c; Developing Understanding of Self and Others[469] B1,2,9a; Nelson[475] B1,7,9,11ab.

Results
Developing Understanding of Self and Others was reported to enhance self-esteem and self-concept (no statistics).

The Stress Management Programme* enhanced self-concept, locus of control and coping strategies. I Can Do* improved efficacy and problem-solving scores but had no effect on social support network size.

Participants in the Mental Health Awareness Week group had more positive attitudes to seeking psychiatric help. The Personal Empowerment Programme* had little impact on psychological variables, and no intervention effects were found for Bonaguro or Nelson.

The Cognitive Stress Reduction Programme* had a positive effect on trait anxiety, anger and self-esteem; Klingman* had a positive impact on suicide risk and knowledge and empathy (sex differences found).

Authors' conclusions
The evidence of effectiveness of interventions in classroom settings on self-concept, self-esteem and coping skills provide some endorsement of what is routinely recommended for incorporation in school health education programmes. The development of coping skills in readiness for stress situations in the context of the school curriculum is supported by the available evidence.

Review quality score
12.

Comments
This was a comprehensive review of mental health promotion, a small part of which was relevant to this review. The results for 'at-risk' children and young people are not reported here. The restriction to English language papers potentially limits the comprehensiveness of the review. All the studies took place in the USA, which could limit the generalisabilty to the UK.

(2) Ploeg and co-workers (1996), Canada[462]

Authors' objectives
This was to summarise evidence about the effectiveness of school-based adolescent suicide prevention programmes.

Review methodology
Search. MEDLINE, CINAHL, PsycLIT, Social Sciences Index databases searched (1980–1995); 18 journals handsearched back 5 years; reference lists of retrieved articles.

Inclusion criteria. Evaluate an intervention; provide information on client-focused outcomes and/or cost; describe a prospective study; have a control group (includes before/after studies).

Quality assessment. Studies rated according to five criteria: method of allocation to groups; level of agreement to participate in study control for confounders; method of data collection; percentage of participants available for follow-up.

Number and type of studies
Nine controlled trials were included. Two other studies not relevant to this review were also included.

Study quality as assessed by authors
All 11 studies were judged to be 'weak', failing at least one of the quality criteria. Seven studies failed all five quality criteria. Most studies had short follow-up periods.

Participants
High school students, mostly in grades 9 and 10, in the USA (eight studies), Israel (two studies) and Australia (one study) participated.

Intervention
Content and implementation. Ciffone[476] B1ac; Kalafat[477] B1a; Nelson[478] BC1; Shaffer[479] B1,2ac; Orbach[464] B6c; Samaritans of Rhode Island Curriculum[467,468] B1a; Postvention Group Counselling[465] B11c; Psychological Education Curriculum[463] B6,9c.

Results
Evaluations of the Psychological Education Curriculum, Kalafat, Nelson, Shaffer and the Samaritans of Rhode Island Curriculum found gains in knowledge relating to suicide. Effects on attitude were mostly positive (the Psychological Education Curriculum, Ciffone, Kalafat, Nelson), but Shaffer had a mixed effect on attitudes, with males significantly more negatively affected than females. One of the evaluations of the Samaritans of Rhode Island Curriculum reported improved attitudes in girls and the other some positive changes due to pretesting but not the curriculum. There was mixed evidence relating to coping skills and hopelessness. Improvements in coping skills were reported in the Psychological Education Curriculum and Orbach, the latter finding no effect on hopelessness. Of the evaluations of Samaritans of Rhode Island Curriculum, one found positive effects on girls but that boys were negatively affected, and the other found no significant changes, in both coping and hopelessness. The Psychological Education Curriculum reported increased empathy in girls only. Suicide risk scores were reduced in Orbach and the Psychological Education Curriculum (boys only), while no significant changes were found in Postvention Group Counselling. Postvention Group Counselling examined suicide attempts as an outcome and found no difference.

Authors' conclusions
There is insufficient evidence to support curriculum-based suicide prevention programmes for adolescents. There may be both beneficial and harmful effects of the programmes on some students.

Review quality score
11.

Comments
None of the studies were conducted in the UK. The review gives good information about study methodology, the interventions and the measurement tools used.

Personal hygiene

Synthesis of personal hygiene reviews

Summaries of each of the included reviews (*Table 13*) are given at the end of the main section. Tables of the individual studies included in the reviews are given in appendix 6.

Review coverage

In the area of personal hygiene, two reviews were identified, and two, both on oral health promotion, met the criteria for inclusion.[480,481] These are recent, broad-ranging reviews covering interventions carried out in schools and other settings using a range of study designs.

Quality of primary studies as judged by authors

Kay[480] noted that many of the studies were marred by incomplete reporting of baseline

TABLE 13 *Personal hygiene reviews included in the synthesis*

Authors	Primary focus	Number of studies	Review quality
Kay and Locker (1997), UK[480]	Oral health	49	11
Sprod and co-workers (1996), UK[481]	Oral health	13	8

and follow-up data, or failure to report the length of time between the intervention and subsequent data collection, particularly in studies using a before-and-after design. They also identified the problem of a lack of valid and reliable measures of outcomes such as knowledge and attitudes. Other outcomes too, such as levels of plaque, were measured in different ways. These factors and the lack of consensus about what is 'dental knowledge', for example, limit the extent to which study findings can be meaningfully compared.

Outcomes

The outcomes reported in the reviews were levels of caries (seven studies) and plaque (21 studies), gingival health (15 studies), knowledge (17 studies), attitudes (10 studies) and behaviour (six studies).

Programme domains

One study evaluated instruction given in a school-based clinic;[482] the other interventions were all classroom-based.

Curricular components

Interventions included practical instruction and supervision in oral hygiene techniques such as brushing and flossing, fluoride treatments and dental health curricula, either alone or in combination.

Implementation

Where this information was given, the interventions were implemented by teachers and/or dental hygienists and occasionally dentists. Two peer-led programmes were evaluated. Seven studies involved parents through a workshop, home visits, home assignments or in unspecified ways.

For many studies, the intensity and duration of the intervention were not reported. Where this detail was given, interventions ranged from a single session to daily measures (such as plaque removal) over a number of years. Many studies included only short-term follow-up.

Theoretical bases

No details were given of the theoretical bases of the interventions.

Generalisability

Information about the target populations was often lacking, but from the information available it is evident that both primary and secondary school age children and young people are represented, from a wide range of countries, including the UK.

Costs and resources

Cost and resource implications were not reported.

Synthesis of results

Behaviour

Six studies considered behaviour as an outcome, but the reviews reported that the data were missing or insufficient in three of the studies. Of the remaining three studies, two controlled trials of oral health curricula, and one, combined with supervised brushing, reported behavioural gains.[483,484]

Levels of caries

Seven studies were reported to have used caries levels as an outcome. One intervention, evaluated in a controlled trial, found significant positive effects on caries levels, in permanent but not deciduous teeth.[485] This was an intervention involving supervised brushing and the administration of fluoride. The remaining studies reported small or no effects on caries levels. One study[486] was reported in one review[481] to have shown a reduction in caries, but no effect was found in the other review.[480]

Levels of plaque

Of the 21 studies reporting plaque levels as an outcome, 10 found no improvement, and three studies only small or variable gains, while two studies were reported by reviewers as having insufficient data on this outcome. Gains were reported in six studies. Two of these were controlled trials of an intervention involving supervised brushing and fluoride administration,[485] and of an intervention combining a lesson, brushing instruction and home visits, with home visits appearing to offer additional benefits, evaluated 44 weeks postintervention.[487] The remaining studies reporting a reduction in plaque levels were before-and-after studies of supervised brushing,[488,489] including one in a school for the 'intellectually handicapped'[490] and of the peer-led Learning by Teaching programme.[491] The follow-up period was either not stated or was up to a month after the intervention.

Gingival health

Of the 15 studies reporting gingival health as an outcome, most did not find evidence that school-based interventions, including curricula, practical instruction, fluoride treatment and involving parents, were effective in improving gingival health. Gains were reported in RCTs of a plaque removal intervention[492] (short-term gain) and a programme based on individual needs and involving parents,[493] controlled trials

of a school-based clinic programme[482] and Natural Nashers,[494] and before-and-after studies of brushing instruction.[488,495] The last was effective only with less deprived children and young people.

Attitudes

Of the 10 studies reporting the impact of oral health promotion interventions on attitudes, positive effects were found in the four studies evaluating the Natural Nashers programme.[494,496–498] This intervention was described in the review by Sprod[481] as a 3 week, teacher-led curriculum programme centring on specific needs of target groups, with active participation, parental involvement, repetition and reinforcement of messages. The review by Kay[480] did not give details of the programme. A controlled trial comparing the use of teachers and older peers to deliver information found that peers engendered negative attitudes, especially in males.[499]

Knowledge

Where this was evaluated, all but two studies found knowledge gains.

Conclusions

Some programmes were found effective in improving oral health knowledge, some on tooth brushing behaviour and some on dental plaque. However, overall, this analysis suggests that the majority of oral health promotion interventions in schools were not effective on a range of outcomes. The failure to describe interventions named only as 'dental health education', for instance, precludes comment about particular strategies, and the theoretical bases for the interventions were not stated. Parental involvement was a feature of effective interventions but also of some that were found to be ineffective. The one peer-led programme produced undesirable results.

Personal hygiene review summaries

Key to notes:

- The programme **domains** have been coded as: A, ethos and/or environment; B, curriculum; C, family and/or community.
- The curricular **components** have been coded as: 1, information; 2, decision making skills; 3, pledge; 4, values clarification; 5, goals setting; 6, stress management; 7, self-esteem; 8, resistance skills training; 9, life skills training; 10, norm setting; 11, assistance; 12, alternatives.
- The **personnel** used to deliver the interventions have been coded as: a, teacher led; b, peer led; c, outside expert.
- An asterisk (*) denotes an RCT.

(1) Kay and Locker (1997), UK[480]

Authors' objective

This was to review the research evidence on the effectiveness of health promotion aimed at improving oral health. Oral health promotion defined as 'any process which enables individuals or communities to increase control over the determinants of their oral health'.

Review methodology

Search. Databases searched: MEDLINE, E.Med, CANCERLIT, Dissertation Abstracts Outline, government document listings, Current Research in Britain, Dental Abstracts, and Health Service Abstracts. Relevant professionals and interest groups were contacted. Also, reference lists of retrieved articles searched, and 96 journals handsearched.

Inclusion criteria. Published between 1980 and 1995 in English, or with an English abstract. If multiple reports from the same study, only that with the highest quality rating was included. Must report outcome measures. The review also reported separately 'grey' literature demonstrating the scope of current oral health promotion practice in the UK.

Quality assessment. Papers were classified and grouped by study design, and each paper scored for quality on 20 criteria and the follow-up period reported. These were considered in the qualitative synthesis of the results.

Number and type of studies

Seven RCTs, 32 controlled trials and 10 before-and-after studies were included (see comments). The review also included four reviews, studies of other target groups and settings, and a report on current oral health promotion practice in the UK.

Study quality as assessed by authors

Studies measured outcomes using different instruments, making comparisons difficult. Follow-up periods varied. Some studies were reported as providing data that were insufficient or difficult to interpret. Incomplete reporting of baseline and follow-up data was a common flaw among the before-and-after studies.

Participants

Children and young people from primary and secondary schools from Europe (including the UK), Scandinavia, South Africa, New Zealand, Canada and the USA participated. One study from a school for the 'intellectually handicapped' was included.

Intervention

Content and implementation. Albandar[493,500] BC1?; Axelsson[501] ?; Natural Nashers[496–498] ?; Blinkhorn[502] BC1ac; Craft1[494] B1; Craft2[494] B1a; Craft3[497] B1a; Craft4[497] B1a; Davis[503] B1ac; Dowey[504] B1a; Dulac[505] BC1; Ehudin[506] B1ab; Emier[487] BC1; Gleam Team[507] ?; Hartshorne[508] BC1; Holund[509] ?; Houle[510] B1ac; Jodaiken[511] B1a; Julien[512] BC1; Kallio[513] B1a; Lachapelle[514] B1; Laiho[499] B1a/b; Learning by Teaching[491] B1b; Lee[515] ?; McIntyre[484] B1; Melsen[516] B; Murray[517] B1; Peterson[518] BC1; Peterson[519] B1; Schou[495] B1; Sogaard[520,521] B1; ter Horst[522] B1; Wight[486] B1a/c; Wright[523] B1.

Curriculum and brushing/flossing instruction/ supervision: Barrie;[483] Yours for Life;[494] Emier;[487] Teeth for Life.[524]

Curriculum and brushing/flossing instruction / supervision and fluoride treatment: Blinkhorn.[525] Plus parental involvement: Kerebel.[485]

Curriculum plus fluoride treatment: Weisenberg.[526]

Brushing/flossing only: Brown;[490] Croft;[489] Holund;[263,488] Lalloo;[527] Schou.[495]

Plaque removal only: Horowitz.[492,528]

School-based clinic (information and brushing/ flossing): Ivanovic.[482]

Results

Two RCTS[492,501] and four controlled trials[486,502,525,527] reported small or no effects on caries levels, while one controlled trial found significant gains from supervised brushing and fluoride treatment for permanent but not deciduous teeth.[485] Improvements in plaque control were reported in controlled trials by Kerebel[485] and Emier,[487] with home visits appearing to offer additional benefits in the latter, in before-and-after studies of supervised brushing,[489,509] including one in a school for the 'intellectually handicapped'.[490] For the 'Learning by teaching' programme Craft4, Melsen and Jodaiken reported variable or slight gains from curricular programmes, while no improvement in plaque control was found in 10 studies of a range of interventions. Improvements in gingival health were found following a plaque removal intervention,[492]* a comprehensive programme based on individual needs and involving parents,[493]* a school-based clinic programme[482] and brushing instruction.[488,495]

Natural Nashers was found to have positive effects on attitudes. A study comparing the use of teachers and older peers to deliver information found that peers engendered negative attitudes, especially in males.[499] Behavioural gains were reported in two controlled trials,[483,484] and knowledge gains were found in 15 of 17 studies.

Authors' conclusions

School-based health education aimed at improving oral hygiene has not been shown to be effective.

Review quality score

11.

Comments

Some studies appear to have been reported in more than one paper, although the authors state that only the highest quality report was selected for inclusion. From the three studies by Craft and co-workers, seven studies have been reported, and it appears that there may have been some overlap, but it was not possible to be sure how many different studies were presented. The review reported two other studies as being school based, but this appeared to be incorrect on checking the titles and abstracts, so they have been omitted here. Little or no details were given about the curricula used.

(2) Sprod and co-workers (1996), UK[481]

Authors' objectives

These were to identify and describe oral health promotion practices which have been shown to be effective or ineffective and to highlight those practices which show some evidence of effectiveness but need further evaluation in order to determine their benefits. The review covers only dental caries, gingivitis and periodontal disease and oral cancer.

Review methodology

Search. The MEDLINE database and reference lists of retrieved papers were searched, and also 'sources already known to the authors'.

Inclusion criteria. Published in refereed journals in English between 1982 and 1995.

Quality assessment. Papers assessed against quality criteria relating to methodology including design features, outcome measures used and length of follow-up, reporting and effect sizes. Papers judged to be reliable or unreliable and as providing evidence of effectiveness, of ineffectiveness or evidence unclear, according to methods detailed in the report.

Number and type of studies
Eleven controlled trials (three with quasi-randomisation) and two before-and-after studies were included. The review also included studies of other target groups and settings.

Study quality as assessed by authors
One paper was classified as of strong evaluative design using health outcome measures; five papers as strong quasi-experimental design using health outcome measures; six papers as strong quasi-experimental design using knowledge, attitude and behaviour outcome measures; and one paper as other (not strong).

Participants
Children and young people from primary and secondary schools in the UK, the Netherlands, Poland, Brazil, South Africa and the USA participated.

Intervention
Content and implementation. Natural Nashers[494] BC1a; Albandar[500] BC1 and B1; Teeth for Life[524] B1c; ter Horst[522] B1; Learning by teaching[263,488] B1b; Sugar clock[529] B1.

Curriculum plus brushing/flossing instruction/supervision: McIntyre;[484] Walsh[530] B1c.

Curriculum plus brushing/flossing instruction/supervision plus fluoride treatment: Wight[486] B1a/c. Plus free toothbrushes and/or toothpaste: Carlsson[531] B1c; Schou[495] B1ac.

Curriculum plus dental examination and polish: Brown[532] B1c.

Results
A controlled trial conducted in Brazil of a conventional programme demonstrating oral hygiene measures and a comprehensive programme involving specific needs, active participation and parental involvement found that the comprehensive programme yielded significant gains in plaque and gingival scores and oral hygiene behaviours compared with the control and conventional programme groups.[500] The Natural Nashers programme, which also incorporated specific needs, active participation and parental involvement, yielded significant gains in plaque and gingival scores, knowledge and attitudes. Instruction by a dental hygienist and fluoride treatment were effective in preventing dental caries but only slightly effective in improv-ing knowledge.[486] A programme of education, treatment and free supplies in Poland was judged to be effective at preventing caries, but the paper does not report the number of participants.[531] A before-and-after study of an intervention in Scotland involving instruction and free toothbrushes found improved plaque and gingival scores in children and young people from non-deprived but not from deprived areas.[495] The effect of the Teeth for Life programme[524] and a programme in areas where dental non-attendance was high was unclear.[532] The use of a film on dental health improved knowledge, but there were no significant gains in behaviour or attitudes.[522] The Learning by Teaching programme was found to be effective in reducing sugar intake but not in knowledge, attitudes and beliefs relating to long-term oral health gain.[263,488]

Authors' conclusions
No clear conclusions specifically about school-based programmes could be drawn. The authors note that several effective interventions were conducted by personnel from non-health sectors and incorporated into daily routines in settings such as schools. They also note that relatively stable and resistant attitudes and behaviours have become established by adolescence and longer-term health gains are possible if the very young are targeted.

Review quality score
8.

Comments
For six studies the number of participants was not reported and for several studies no figures were reported for the results.

Environmental aspects of health

Reviews identified

Two reviews were identified in this area of health need, and one review met the inclusion criteria (*Table 14*).[533] It is summarised at the end of this

TABLE 14 *Environmental aspects of health reviews included in the synthesis*

Authors	Primary focus	Number of studies	Review quality
Peters and Paulussen (1997), The Netherlands[533]	Skin cancer prevention	4	12

main section. A table of the individual studies included in the review is given in appendix 6. Four relevant studies – all of them RCTs – were included.

Quality of primary studies as assessed by the authors

The reviewers highlighted a number of methodological shortcomings in the studies. These included, absence of pre-test and long-term follow-up, small sample sizes, questionable behavioural effect parameters, and analyses not controlled for unit of randomisation.

Outcomes

The outcomes evaluated were knowledge, attitudes and behaviour. Behavioural variables included the use of solar protection such as sunscreen and lying in the sun to get a tan. The authors of one study[534] commented that the seasons mentioned in the questionnaire did not correspond with the period of measurement, leading them to conclude that the behavioural variables should be considered as indicators of intention rather than of actual behaviour. Diary records of solar protection behaviour, with protection level calculated by aggregating scores for use of protection on each of eight body regions, weighted to reflect the comparative risk of that region developing skin cancer, were used in another study.[535] The surveys used to assess attitudes and behaviour in the study by Hughes and co-workers[536] were judged by the reviewers[533] to be ambiguous and unspecific. The measures used in the fourth study[537] to assess knowledge, attitudes and the likelihood of taking precautions were not described.

Programme domains

The interventions were mostly confined to the classroom, with one including a newsletter for parents[534] and two[534,536] homework assignments. One intervention[534] presented suggestions for spreading a sun-safety message throughout the school, but no details are given and it is not known whether, or by whom, these suggestions were implemented, so it cannot be assumed that a school-wide approach was used. Curricular approaches largely consisted of the delivery of information, sometimes with active or passive (video) discussion. Skin Safe[535] involved the use of cooperative learning techniques, student participation and problem-based learning strategies, and posters and sunscreen samples were distributed. The intervention evaluated by Mermelstein co-workers[537] included an assessment of students' personal risk of skin damage.

Curricular components

All of the interventions included information giving. Sunshine and Skin Health[534] and Skin Safe[535] are described as focusing on skills, but the nature of these skills was not discussed in the primary studies.

Implementation

Three studies evaluated interventions implemented by classroom teachers while one was delivered by a researcher. The duration of the interventions varied from a single session to a session a week over several weeks. In one intervention,[535] the extent of implementation during the four week intervention period depended on the classroom teacher.

Theoretical bases

There was no information about the theoretical bases from which the interventions were developed.

Generalisability

Two studies were conducted in the USA, one in the UK and one in Australia. They involved children aged from 9 to 16 years.

Costs and resources

No information was given about costs or resources.

Synthesis of results

Behaviour

The interventions evaluated by Hughes and co-workers[536] and the standard intervention in the study by Girgis co-workers[535] were not found to produce behaviour change. The Skin Safe intervention[535] was a predictor of a high level of solar protection. The effects of Sunshine and Skin Health[534] on behaviour were mixed, with only sunscreen use in winter showing intervention effects for the whole group at both post-tests.[534] Regarding sunscreen use in summer, in the same study, a positive immediate intervention effect was found for fourth graders but a negative effect for fifth graders, but these effects were not present at the 8 week follow-up. The researchers concluded that these behavioural variables should be considered as indicators only of intention, as the seasons mentioned in the questionnaire did not correspond with the actual period of measurement (spring). In the fourth study[537] no intervention effects were found on the use of solar protection.

Knowledge and attitudes

Knowledge gains were found in all three studies in which it was assessed. In one study[534] the effect on attitudes was inconsistent and data on some

of the attitude statements not reported. Another[535] addressed knowledge and attitudes but these were not included in the regression model and the reviewers note that it cannot be concluded whether knowledge and attitudes changed as a result of the intervention. Knowledge and attitude gains were reported in all the intervention groups in the third study.[536]

Conclusions

The interventions reviewed here were almost entirely confined to the classroom and were largely focused on the delivery of information. The less effective programmes were targeted at adolescents aged over 12 years and consisted of a single session, while more effective programmes were targeted at 9–11 year olds, were implemented over 4 or 5 weeks, and were reported to address skills in addition to knowledge and attitudes (although the nature of the skills was not explained). The reviewers highlighted a number of shortcomings in the methodologies and reported detail in all the studies and urge caution when considering the results and conclusions of the review.

Environmental aspects of health review summaries

Key to notes:

- The programme **domains** have been coded as: A, ethos and/or environment; B, curriculum; C, family and/or community.
- The curricular **components** have been coded as: 1, information; 2, decision making skills; 3, pledge; 4, values clarification; 5, goals setting; 6, stress management; 7, self-esteem; 8, resistance skills training; 9, life skills training; 10, norm setting; 11, assistance; 12, alternatives.
- The **personnel** used to deliver the interventions have been coded as: a, teacher led; b, peer led; c, outside expert.
- An asterisk (*) denotes an RCT.

(1) Peters and Paulussen (1997), The Netherlands[533]

Authors' objectives

This is one of a series of reviews resulting from a project on school health promotion and cancer prevention, designed to support the adoption and dissemination of 'best practices' of school health promotion in Europe. This review evaluates research evidence on skin cancer prevention interventions and attempts to identify characteristics that seem to contribute to effectiveness of interventions.

Review methodology

Search. Databases searched: PsycLIT, MEDLINE, ERIC (Educational Resources Information Centre), CHID (Combined Health Information Database) and NIGZ-DB (Netherlands Institute for Health Promotion and Disease Prevention Database). Reference lists of retrieved articles checked.

Inclusion criteria. Study conducted with young people aged 10–18 years; effects described separately for young people if part of broader target group; intervention aimed at primary prevention and based on educational principles, intervention and study design described; effects evaluated at least at the level of intention or behaviour; includes school-based interventions; includes controlled or time-series studies.

Quality assessment. Strengths and weaknesses of each study discussed.

Number and type of studies

Four RCTs were included. The review also included a study conducted in a university and another at a swimming pool.

Study quality as assessed by authors

The studies generally had poor methodology, with limitations including absence of pre-test and long-term follow-up, small sample sizes, questionable behavioural effect parameters and analyses not controlled for unit of randomisation. Information on programme characteristics was inadequate in some cases. These limitations do not permit detailed and reliable comparisons of programme characteristics to be made.

Participants

Children in elementary and secondary schools, aged 9–16 years, in the UK (one study), Australia (one study) and the USA (two studies) participated.

Intervention

Content and implementation. Hughes[536] B1a (four variants); Mermelstein[537] B1c; Skin Safe[535] B1,2,4a versus standard intervention B1a; Sunshine and Skin Health[534] BC1,4, 8?a.

Results

Sunshine and Skin Health was found to have a significant positive effect on knowledge, maintained at the 8 week follow-up. Its effect on attitudes and behaviour was inconsistent. Intervention effects for the whole group at both post-tests were shown only on sunscreen use in winter; a positive immediate intervention

effect was found on sunscreen use in summer for fourth graders and a negative effect for fifth graders, but these effects were not present at the 8 week follow-up. When Skin Safe and a standard intervention were compared to a control group, Skin Safe was found to be effective in increasing participants' use of solar protection, while the standard intervention was not. These findings were maintained at the 7 month follow-up, with the Skin Safe group being $2^1/_2$–3 times more likely than the control group to use a high level of protection. In the RCT by Hughes, four variants of a classroom-based intervention were compared with each other and with a control group: after 2 months the control group had significantly less knowledge and more negative attitudes than intervention groups, among which no differences were found; at 4 months, behaviour was assessed and did not show any differences, while the same pattern was found for attitudes. The RCT by Mermelstein found strong, positive intervention effects on knowledge and perceived susceptibility to skin cancer, but no intervention effects on the likelihood of taking precautions.

Authors' conclusions
Less effective programmes were targeted at adolescents aged over 12 years, and consisted of a single session, while more effective programmes were targeted at 9–11 year olds, were implemented over 4 or 5 weeks, and were reported to address skills in addition to knowledge and attitudes (although the nature of the skills was not explained) The results and conclusions presented in this report should be regarded with great caution and merely indicate potentially fruitful avenues for further research.

Review quality score
12.

Comments
That studies must be published is not listed as an inclusion criterion, but only published studies have been included; it is not clear whether unpublished evaluations were considered for inclusion. The report includes a useful discussion of the methodology of each study, but few data from the studies are presented. In the Sun Safe intervention, the extent of implementation during the 4 week intervention period depended on the classroom teacher, but no details were provided about this variable. Our classification of the skill components of the interventions should be regarded as a rough approximation, as little information was available.

Discussion on review of reviews

Review coverage

During the systematic search for this review over 200 reviews of school health promotion programmes were identified. There has been a large amount of secondary research in this field covering a great array of primary studies, most of which have been carried out in the USA. The great majority of the reviews focused on specific aspects of health-related behaviour or physical health. Among the included reviews, the only two exceptions focused on aspects of mental health. The emphasis of this review is constrained by the content of these reviews and therefore primarily covers programmes to improve physical health. Unlike previous reviews, however, it covers the range of school health promotion programmes. It is therefore able to take a more holistic view of health and health promotion and is in a position to make wider ranging observations than has been possible before.

This review was based on a very wide search for reviews including searches of the 'grey' literature, web sites and consultation with experts. The gaps we identified are therefore likely to represent real gaps in the literature. We failed to identify any reviews meeting the inclusion criteria which specifically focused on family life education. Given the increasing recognition of the importance of parenting education this is a notable gap. We did not identify any reviews or studies covering the promotion of health in schools for pupils with special educational needs. There were also no studies or reviews which took into account the health of children who were absent from school; these children are often a disadvantaged group. There was a lack of studies focusing on social and economic inequalities in health which is remarkable given its central importance in the development of health promotion in other settings. These gaps may reflect features of this review such as the search strategy and inclusion criteria. As the focus of the review was on health promoting schools, to which whole-school approaches are central, studies and reviews which singled out groups of pupils at high risk of specific health problems (such as those who had experienced divorce or separation of their parents) were excluded. This criteria would have ensured the exclusion of reviews and studies which singled out pupils who lived in deprived socio-economic circumstance, as opposed to studies of schools in deprived areas, which would have been included. Although we identified and excluded studies within the reviews of programmes targeted at pupils at high risk of specific health problems,

we identified no reviews focusing entirely on pupils at high risk.

Absence of topics from systematic reviews does not necessarily mean that the topics have not been covered in primary studies – either experimental or observational – but it may say something about the research interests which prevailed over the time that the reviews have been conducted. Systematic reviews of effectiveness can only be based on completed studies. The development of interventions, the establishment and execution of evaluative studies and the gathering of these studies into reviews takes many years. Their conclusions therefore inevitably lag behind those of primary studies and of practice. The impact of the passage of time is exacerbated in a review of reviews. The fact that the reviews covered in this review do not report aspects of health promotion whose importance has only recently been recognised, for example the process of delivery, or that they rarely use measures of general health and well-being, may reflect in part the historical nature of the review process.

Methodological issues

The proportion of identified reviews which met the inclusion criteria varied from one topic to another, with half the reviews relevant to cardiovascular health and only 1 in 20 of those on psychological aspects of health being eligible for inclusion. For many reviews it was immediately apparent that they were not systematic reviews; others, however, failed to meet one particular criterion. In such instances the study was checked for details of an original report or the author was contacted. In some cases, reviews published in journals lacked methodological details or sufficient description of content which was, however, presented in the full report. Lack of assessment of the methodological quality of the studies and lack of description of the interventions were the next most common reasons for exclusion. The quality varied among the included reviews, with less than half the reviews gaining a score of 10 or more out of a total of 16. The six highest quality reviews were all published after 1994, but not all recent reviews were of high quality – the review with the lowest quality score[398] was published in 1996. The imbalance of included-to-rejected reviews suggests that this review of reviews may cover a smaller proportion of available studies of mental health promotion relative to studies of substance misuse prevention and healthy eating, both of which have been extensively reviewed. A review of school mental health promotion currently underway in the Health Services Research Unit has identified a large number of controlled studies which have not been covered in these reviews.[538]

The number of relevant primary studies covered by the reviews varied across areas of health need from four (environmental aspects of health) to 146 (substance misuse). Surprisingly, reviews covering substantively the same subject area contained relatively few common papers. This may be due to a number of aspects of the systematic review process, for example the specific review questions, the intensity and breadth of the search, inclusion criteria or use of quality assessment. Additionally, many studies are subject to duplicate publication – reviews may have selected different papers to represent a given evaluation.

The reviews varied in their assessment of the quality of the evaluations which were included. Some assessed each study against formal criteria, while others discussed factors affecting quality across the studies as a group, but did not assess individual studies. Reviewers also varied in how their assessment of study quality influenced their presentation of the findings and conclusions. In some, it did not appear to have much influence. In others, for example the review of healthy eating interventions by Roe and co-workers,[233] study quality was assessed in such a way that studies of any design might be judged to be good, medium or poor quality, rather than ranking them according to the type of design used. Among reviews which did assess the quality of the primary studies, the lack of methodological rigour was a consistent issue. Incomplete reporting of baseline data, lack of valid and reliable outcome measures, high attrition rates, inadequate follow-up, and lack of information about methodological features or the interventions are recurring themes.

Obtaining and comparing several reviews covering substantively the same area has also brought to light a lack of methodological rigour in reviews. Discrepancies between reviews were noted in the details reported of primary studies. For example a fire safety programme, Learn Not to Burn,[456] was reported to be a before-and-after study in one review[420] but a controlled trial with random allocation to groups in another.[419] Numbers of participants also varied – one evaluation of Know Your Body[274] was reported to involve 1141 participants in nine schools,[238] another reported 1063 participants in nine schools[236] and another 216 participants (number of schools not stated).[237] Without recourse to the original primary study, it is impossible to tell which is the correct representation. Inaccuracies in reporting were also discovered on obtaining primary studies of interventions which, from the information given in reviews, appeared to use a health promoting

schools approach. Although almost all the reviewers were critical of the methodological rigour in primary studies, many of them failed to achieve this in their reviews. 'Methodological rigour' it would seem is not an easily attainable goal.

Few studies were included in the reviews which used methods other than controlled or before-and-after study designs. Although the inclusion of at least one study using these designs was a criterion for inclusion in the review of reviews, no reviews were rejected for failing to meet this criterion alone. The paucity of other research methods, including qualitative techniques, is likely to reflect the selection criteria employed by reviewers, as some reviews only include experimental studies. Although many of the interventions covered in this review will have been informed by research using other study designs, the value of this body of literature has not until recently been explicitly recognised in systematic reviews.

Findings

Most interventions evaluated in the reviews were confined to the classroom where they aimed to develop pupils' knowledge, attitudes and health-related skills both specific (road crossing) and generic (refusal or resistance). According to the definitions described in the introduction these, strictly speaking, were health education interventions. With very few exceptions the interventions were effective in increasing knowledge. Although this finding is perhaps unremarkable it is important. Health knowledge is a prerequisite for health, and as such has a value in its own right regardless of its impact on behaviour. Failure to achieve a gain in knowledge would indicate either that the programme developers had failed to take prior knowledge into account when designing the course and materials, or that those delivering the programme were so lacking in credibility that pupils did not believe them.

In contrast, curricular interventions were not reliably effective in changing attitudes or behaviour. A wide variety of teaching methods and a wide variety of curricular packages have been developed to try and increase the impact on behaviour. Teaching methods have involved small group discussion, role play, video, theatre groups and didactic lectures. The use of the Hansen criteria[71] to classify different curricular components in this review could be criticised. It is only one of a number of possible schema. The criteria worked well for substance misuse programmes for which they had been designed, and the analysis of the latter results suggested that normative education and resistance skills training were more likely to be associated with behaviour change. Given the lack of effect of most of these programmes, these results are worth noting. The Hansen criteria also worked reasonably well for classifying sexual health, and nutrition programmes where the teaching of resistance skills was most common. They were less readily applicable to accident prevention, personal safety or oral health interventions which appeared to include a much smaller range of classroom approaches and in which the reviewers did not always specify the components of the classroom activity. For interventions which aimed to develop specific skills like pedestrian safety or food preparation, Hansen's criteria were not applicable. They were inadequate as a system of coding for fitness programmes in which schools increased the amount of time that was spent on exercise which might enhance fitness. They were also inadequate as a system of classification in reviews of psychological aspects of health. These covered a broader range of life skills training methods together with programmes which aimed to reduce mental illness and promote mental well-being.

Most of the programmes in most of the reviews were delivered by classroom teachers or by outsiders. The involvement of peers as educators and influencers has been tried in some areas of health need, but the way in which they were involved was not always clear from the reviews. In the substance misuse studies, peer led interventions were more likely to be associated with a positive behavioural outcome than those with no peer involvement, but this could have been due to the fact that these programmes were more sophisticated in other ways. There were too few peer-led sex education programmes to comment on effectiveness compared to other programmes and in one dental health programme male peer influence was regarded as harmful.

A relatively small number of studies covered interventions which would be defined as 'health promotion' in terms of the definitions presented in the introduction. These were the interventions which were designed to operate in health promotion domains other than the classroom. Only in three areas were such non-curricular activities at all common; these were nutrition and exercise, sexual health and accident prevention. Initiatives involving parents were the commonest in nutrition and exercise and accident prevention programmes. They had also been tried in some accident prevention, sexual health and personal hygiene programmes. The way in which parents were involved varied from information provision to

playing a part in programme development, and provision of supportive events. Neither the reviews nor this review of reviews provides definitive evidence that the involvement of parents was effective. However together with reviewers of both healthy eating and accident prevention programmes we have concluded that this is very likely to be the case.

Examples of changes to the school environment varied from one area to another, but have been incorporated into some interventions in several areas – changes to school meals and the promotion of healthy eating in nutrition and exercise programmes; safety equipment promotion and safe routes to school in accident prevention programmes; and school clinics in sex education programmes. These all appeared to increase the effectiveness of interventions. Examples of changes to the school ethos were rare in studies covered by the review. Given that changes to the school ethos such as the development of policies on substance misuse are a common part of health education practice in the UK and staff development training is an important part of the health promoting school approach, this is notable. Although this gap could be due to a lack of reviewer interest it may also indicate a lack of experimental studies using such approaches. The few examples of studies of interventions covering all three domains of the health promoting school were among the most effective of the programmes, on a range of different outcomes. This could be due to the fact that these programmes were also more sophisticated in other ways. The majority of these studies have been included in the review of health promoting schools; some were excluded as these did not show the necessary school involvement or turned out on closer inspection not to cover all three domains.

Answers to review questions

Although this review has identified a large amount of experimental research on the effectiveness of health promotion interventions in schools, the evidence is extraordinarily complex to synthesise. In theory it might be possible to estimate the effectiveness of the myriad of different approaches, independently of one another, using regression techniques, but such techniques depend on the identification of a single outcome. Most of the reviews reported a behavioural outcome and it would be possible to code many of the studies on the basis of 'some', 'none' or 'negative' effect on behaviour. This approach would mean, however, assuming a large impact to be as important as a small impact, and that an impact on different behaviours was of similar difficulty and importance. For example, it would mean assuming that an impact on initiation of drug use is as important as an impact on tooth cleaning and that influencing the onset of sexual activity is as easy as getting children to take more exercise while they are in school. Although it might be possible to code up the intensity and duration of all interventions, some of the reviews did not provide this information. Similarly, although it was clear that the involvement of parents and peers, and the training offered to teachers varied considerably, it was not possible to extract this information on individual interventions consistently. We have therefore chosen to undertake a qualitative synthesis, which suffers from the disadvantage of lack of precision but avoids the disadvantage of over interpretation of the literature.

Table 15 provides a summary of the aspects of health that appear to be influenced by school health promotion programmes. An impact on health-related knowledge was easy to achieve as was the development of resistance or refusal skills. Most of the programmes designed to change the environment in or around schools were successful in doing so. The health-related behaviours which were most readily influenced were those which increase safety – the wearing of protective equipment such as cycle helmets and car seat belts and abuse prevention skills. Physical fitness was the health outcome most amenable to influence. It was possible to influence the stated intentions of young children to resist the adoption of unhealthy behaviours in adolescence.

Although programmes could not be relied upon to do so, many of those designed to impact on psychological health were successful, at least in the short-term. This was true both of programmes which focused on psychological health and of those whose primary aim was to change health-related behaviour, but included a psychological component on the grounds that psychological health is necessary to achieve behaviour change. The aspects of psychological health most amenable to change were self-concept, and self-efficacy, both of which are important for empowerment, together with the interpersonal or life skills necessary to make the close relationships. Some aspects of psychological health development appeared more successful with girls than boys. Programmes designed to increase healthy eating were moderately successful and some of these programmes were able to show an impact on health outcomes such as cholesterol levels. Specific skills such as road crossing and tooth brushing and specific behaviours such as sun protection could also be

TABLE 15 *Positive outcomes in school health promotion programmes*

Usually achievable	Sometimes achievable	Rarely/not achievable
Improvement of health-related knowledge	Improvement in psychological health: • self-concept • self-efficacy	Reduction in 'unhealthy' behaviour: • alcohol consumption • drug misuse
Reduction in intention to smoke, drink and take drugs	• coping skills • interpersonal skills (communication) • development of specific skills	• high-risk sexual behaviour • long-term smoking rates
Development of health protecting skills: • resistance/refusal • abuse prevention skills	• road crossing • tooth brushing • sun protection	Reduction in weight Improvements in self-esteem
Improvement in health protecting behaviour: • cycle helmet wearing • seat belt wearing	Improvement in dietary intake Improvement in cholesterol levels Postponement of initiation of smoking	Improvements in attitudes towards drinking, smoking, drug taking
Improvement in physical fitness		
Environment improvement: • school meals • safer roads		

influenced. Many studies suggest that it is possible to delay the initiation of smoking and possibly of marijuana use. The lack of apparent long-term influence may be a consequence of a real lack of effectiveness or a lack of long-term follow up in evaluation studies.

The programmes which were least successful were the ones designed to reduce the misuse of alcohol and drugs, high-risk sexual behaviour and pupils' weight. The substance misuse programmes were the ones most likely to involve only one health promotion domain – classroom teaching – and it may be that a multifaceted approach would increase their effectiveness. Alternatively substance misuse may be an indicator of psychological distress and programmes may need to find ways of impacting on this aspect of health before they can expect to be successful. In this respect it may be important to note that it appeared from the studies in which it was investigated that self-esteem may be more difficult to influence than other aspects of psychological health.

In terms of the questions 'How effective is each type of approach (e.g. curriculum) in promoting positive health outcomes in each area of health need (e.g. exercise)? Are some approaches effective across several areas and if so what do these have in common?' there were few studies which specifically compared the effectiveness of interventions in different domains, but there were several which suggested that a combination of approaches was more successful than any one alone. Comparison of different approaches in different areas of health need is constrained by two things. First the great majority of studies used classroom only approaches so limiting the opportunity for direct comparisons and secondly interventions in the ethos/environment domain have been very different in different areas – clinics in sex education, school meals in healthy eating and road engineering in accident prevention making generalisation difficult. Although the addition of a programme for parents appears very likely to increase effectiveness these studies are not able to provide a definitive answer. Peer education seems promising, but not yet proven in all areas.

The process of appraising reviews limits the reviewer to the data extracted by the previous reviewers. The amount of information which can be provided about the interventions is inevitably limited, but it is reasonable to conclude that reviewers are likely to extract the data that they feel is of most relevance. Thus in substance misuse and sexual health programmes reviewers nearly always reported who delivered the intervention in terms of their job status and any special training they received. The lack of such information in accident prevention interventions suggests that the reviewers did not consider this to be a variable of significance for effectiveness. What was missing from all the reviews was information about the way in which the programmes were provided. Were teachers or others careful to provide the new knowledge and teach the new skills in a way which was honest and empowering,

or were they sometimes potentially manipulative and subtly coercive to the pupils? If health promotion interventions depend for their effectiveness on the way in which they are provided such key data are missing from most reviews. Had such data been universally reported and regarded as of significance in all primary studies it is likely that the reviewers would have picked it up. The variability in the results of studies of apparently similar health promoting interventions suggests that an unidentified factor such as this may be important in determining effectiveness.

Conclusions

(1) What is the available evidence of effectiveness of health promotion interventions in schools?

This review of reviews has shown that systematic reviews of effectiveness are available in these areas highlighted by Curriculum Guidance Five for health education activity in schools:

- nutrition and exercise
- safety and accident prevention
- psychological aspects of health
- sexual health
- substance use
- personal hygiene (oral health only).

Four reviews of effectiveness which did not meet the inclusion criteria were found in the areas of family life education, alone or with sex education or psychological issues, and one on environmental education. Most of the studies included in the reviews originated in North America. Cultural differences, for example in the education and health systems, could limit the generalisability of the findings to the UK. Overall, some effective or partially effective interventions have been identified in most of the areas covered by the reviews. The notable exception is substance use where, although some programmes are beneficial in the short-term, there is a lack of evidence overall of long-term effectiveness. Few adverse effects were reported in any of the reviews.

(2) How effective is each type of approach (e.g. curriculum) in promoting positive health outcomes in each area of health need (e.g. exercise)? Are some approaches effective across several areas and if so what do these approaches have in common?

The majority of programmes have used curriculum-only approaches; few have looked at environmental changes or parental involvement in isolation. A number of evaluations included in the reviews have combined a curriculum approach with changes to the school ethos and environment or with family and community involvement. In general, the effective programmes were those which used either of these combinations, and those areas of health need where there were few effective programmes were the ones which used mainly curriculum only approaches, for example substance use. Few programmes have incorporated all three elements identified as a health promoting schools approach but these programmes were the most successful.

(3) What are the effective components of these approaches?

Rigorous assessment of which were the effective components was limited by the standard of reporting of programme content in reviews, which was often poor. The exception was in the area of substance use. Here, the use of a normative education component and resistance skills training improved the programmes' short-term effectiveness. The mental health programmes which had a positive impact on psychological factors such as children and young people's suicidal tendencies and coping skills were likely to include stress management training, and those which succeeded in improving children and young people's self-concept involved life skills training.

(a) What (if any) are the theoretical bases of effective interventions?

Many of the interventions which were reviewed clearly rest implicitly on a range of health promotion theories but reviews often failed to report the theoretical bases of interventions, which limits the extent to which conclusions can be drawn. From the limited available evidence it seems that those programmes based on social learning theory and social influences are the most effective. However, this conclusion is primarily based on studies of substance use and sexual health interventions.

(b) Which (if any) areas require further research, for example where there are suggestive results from poor evaluations or potentially effective interventions which have not yet been evaluated?

Good-quality systematic reviews reporting on good quality research can provide directions for future research. Almost without fail, the included reviews called for further, good-quality research in their area. In addition, there are areas where

no reviews exist, for example very few reviews were identified which looked at family life education and of those identified none met the inclusion criteria. In addition, most of the reviews concentrated on curriculum rather than other approaches. It is not possible to determine if this is indicative of a paucity of primary research in these areas.

Chapter 6

Overview of studies of health promotion in schools and health promoting schools and directions for the future

The development of school health promotion programmes

The studies reviewed in this report have been published over a period of more than 30 years, and during that time both the theoretical basis and the practice of health promotion has undergone considerable development. Although development has not been uniform over time, in all countries, there has been a gradual move away from definitions of health promotion based on individual behaviour change towards definitions which take account of the conditions that enable people to make health-enhancing changes to their behaviour – supportive social and physical environments and individuals who do not feel powerless.

Definitions of health promotion developed in the 1970s (see *Table 1* in chapter 2) focused on the individual, and on the health education components of health promotion. School-based interventions which were developed and evaluated in the 1970s and published in the 1980s would therefore be expected to focus on classroom health education. Although this was true on the whole, we identified one study of a nutrition programme from the 1950s in which breakfast was provided for pupils[341] and two studies from the 1970s in which parents were involved, a burn prevention programme[442] and a dental health programme.[53] The importance of supporting behaviour change by making changes to the school and home environment was thus recognised in school health promotion programmes before it began to appear in definitions of health promotion. The impact of powerlessness on health-related behaviour was implicitly recognised in some programmes developed in the 1980s which aimed to enhance self-esteem[100] and assertiveness.[128] The importance of powerlessness appears to have received less recognition in accident prevention programmes. Health promotion practice has thus also developed unevenly in programmes targeting different health needs. Practice develops on the basis of the experiential knowledge of practitioners as well as on the results of experimental studies. Although the results of the latter are internationally available, the former may be quite localised. At any one point in time therefore developers of programmes may be working to different definitions of health promotion and different theoretical models. It is important for those who are trying to interpret the results of studies that they can identify the theoretical models and definitions underpinning interventions. The relative lack of explicit information both in reviews and primary studies relating to the theory base of school health promotion programmes is therefore notable.

Given the recognition that is implicit in current definitions of health promotion of the importance of establishing the right conditions for achieving behaviour change, it is curious that the majority of systematic reviews and experimental studies still focus primarily on behaviour change as the outcome of greatest interest. All the health-related behaviours covered in the review have been shown to be important risk factors for physical health problems in later life and are therefore valid outcomes. However healthy behaviour can be achieved at the expense of mental and social well-being which, like unhealthy behaviours, have long-term consequences for physical health.[9] In the context of schools, such an eventuality is illustrated by a coercive physical activity policy in which all pupils are required to participate. If adequately enforced, such a policy would increase exercise participation and physical fitness in the short-term. Coercing children and young people to take part in activities is, however, dis-empowering, and may in the long-term render pupils less psychologically healthy than they might have been. Schools are settings where the recipients of health promotion are also uniquely vulnerable to misinformation. Distorting the health problems attributable to unhealthy behaviours in order to scare children away from adopting them is an attractive short-term option. However when personal or peer experience is at odds with what is taught in the classroom, the latter

will be rejected and a measure of trust in health educators forfeited. Trust is an important component of social well-being in its own right[539] and lack of trust of health educators could have detrimental effects on the assimilation of health information in the future.

The impact of the social environment on health is recognised in several definitions of health promotion, but the application of this theory to the school setting appears to be more recent. The importance of the social environment or school ethos was not apparent in the review of reviews, but does feature in the definition and studies of health promoting schools. The definition includes the promotion of staff well-being, the development of good relationships between staff and pupils and the clarification of the social aims of the school. In recognising the importance of staff well-being the definition implicitly recognises the interrelationship between the mental health of staff and pupils and the importance of both for the social well-being of the school. Staff who feel unsupported and under pressure are more likely to use dis-empowering methods of control such as shouting or humiliation in the classroom. These methods model, and thus tacitly encourage, bullying behaviour which has a negative impact on pupils' self-esteem. The health and well-being of staff is important in health promotion not just for the impact this has on the health of pupils and the social environment of the school. The enthusiasm and commitment of staff are important for delivering school health promotion programmes; one or two disaffected individuals can prevent the full implementation of a programme. Over-committed, under-supported teachers may find it difficult to embrace new programmes.

Future research on and development of school health promotion programmes therefore needs to measure their impact on the mental well-being of pupils and teachers and the social well-being of the school, in addition to their impact on health-related behaviour. The reviews demonstrate that a variety of measures of different aspects of mental and social well-being are now available. Although these may need to be combined in generic measures of well-being, and their psychometric validity established, some of the ground work has already been done.

If social and mental well-being are important for health and related behaviour there is an equally pressing need to develop programmes which can reliably impact on these aspects of health in both pupils and staff. Although there is evidence in this report that school-based programmes can impact on psychological aspects of the health and mental well-being of pupils, these programmes are not sufficiently effective or reliable to assume that we have the answers. The review of studies of the health promoting school suggests that this approach is more effective than stand alone mental health promotion programmes in promoting self-esteem and reducing aggression among pupils. New school-based mental health promotion programmes are currently being developed, evaluated and reviewed.[538] Although programmes are being developed in this country[540] attempts to implement and evaluate these programmes in UK schools are rare.

The evidence presented in this review suggests that improving health in school children is a challenging and gradual process. School-based interventions are often operating against a background of public scepticism and powerful vested financial interests. Although health behaviour may be more amenable to change in young people than it is in adults, young people are very sensitive to the norms of adult behaviour and find being different uncomfortable. Trying to change children's behaviour away from current societal norms is difficult. Given this background, positive outcomes of any sort may be a major achievement. Given the central importance of the health of children and young people for future public health this should be a reason for greater not lesser investment in research and development.

Evaluating the effectiveness of health promotion in schools

The review of studies of the health promoting school approach and the reviews covered in the review of reviews cover a wide range of study designs. The distribution of study designs may reflect trends over time in evaluation research, with more recent reviews containing a larger proportion of RCTs. It may also reflect a tendency by researchers to use different methodologies in different fields. For example, there are fewer RCTs in accident prevention reviews than in reviews of substance misuse. Although none of the reviews were restricted to RCTs, the hierarchy of evidence approach adopted in some systematic reviews can give added weight to the results of RCTs, both in the interpretation of the evidence and the drawing of conclusions.

Random allocation is the optimum way of overcoming the problem of bias attributable

to the assignment of individuals or schools to intervention and control groups, and of ensuring comparability between groups in terms of potential and recognised confounding factors. To this end RCTs meet the critical aim of experimental studies, which is to ensure that observed changes can be attributed to the intervention and have not arisen due to bias or error. However it can be argued (see chapter 2) that meeting the basic criteria for randomised design could run counter to key attributes of effective health promotion programmes – empowerment and participation – and place constraints on the effectiveness of the intervention. If this is the case, RCTs might fail to find an intervention effective not because it was intrinsically ineffective but because the process of evaluation interfered with its implementation.

In the context of health promotion interventions in schools, randomisation requires very large numbers. School organisation makes it virtually impossible to randomise individual pupils to interventions and although it is possible to randomise classes there is the danger of contamination between control and intervention groups. Randomisation based on classes is also impractical in evaluation of interventions which adopt a whole-school approach The optimum design from a statistical point of view is therefore the cluster design in which schools are the unit of randomisation. Large numbers of schools are necessary to ensure that randomisation effectively distributes potentially confounding variables between the groups of schools and sample size calculations need to take intra-school or class correlation into account in estimating the power of study.[541] The very small number of studies covered in this review, which met these methodological goals, may be an indication of the enormous difficulty and expense involved in conducting such studies. Trials of this size are usually beyond the resources of practitioners and become the preserve of academic departments which may or may not have the relevant experiential knowledge.

Alternative approaches – quasi-experimental designs including controlled studies and before-and-after studies – have other problems. Confounding factors are likely to be present in controlled studies if the groups are not comparable at baseline, and if intervention and control schools are not allocated prospectively. Baseline assessments are essential to assess the degree to which the groups involved are properly matched, and to control for disparity in interpreting results, but this process does not solve problems of interpretation arising from unrecognised confounding factors.

Biases in allocation, which may occur in this study design lead to uncertainty regarding interpretation of the results. Studies using a before-and-after design offer a more practical and inexpensive means of evaluation at a local level, but the lack of a control group diminishes their power to establish a causal link between the intervention and observed changes in the sample. This is due to the difficulty of accounting for confounding effects such as other changes in the population which are not related to the effects of the intervention.[542] However, observational studies and quasi-experimental designs do not inevitably lead to bias.[40] Many important developments in health promotion and public health practice have been made on the basis of this sort of evidence.

Problems with research design may be compounded by problems with implementation, which can occur in any type of study design. Attrition – when participants drop out and are not available to provide either postintervention and/or follow-up information is a serious problem for research involving school health promotion as such drop-out is rarely random. The larger the size of the study the more difficult it is to track participants. Attrition was a problem in many of the studies in this review. Where no adjustment is made for dropouts, it is possible that an inflated picture of effect can emerge.

There are other potential problems for large scale health promotion evaluation. In the absence of accepted and validated measures of mental and social well-being, qualitative evaluation is critically important. Such evaluation can collect information about the process of intervention delivery – is it appropriate for the setting, practical, acceptable and sustainable, as well as information about the ethos of delivery – was it truly participative? – was it offered in an empowering and honest way? Such evaluation is important both for replicating the intervention if proven effective and also for determining whether lack of effectiveness might be due to the way the programme was delivered. Although a large amount of data on the process of implementation was presented in the report of the English Health Promoting Schools Evaluation,[26] in the review of reviews, information about delivery was mostly restricted to information about the provider of activities, the intensity and duration of the intervention and, in some, the resources used.

Evaluation of school health promotion programmes is therefore complex and challenging.

Due to the debate on optimum study design, assessing the quality of the evidence of effectiveness is not as straightforward as it is for trials of clinical or pharmaceutical treatments. In this report we have therefore erred on the side of caution and among those we identified have included rather than excluded studies. We have described study designs and problems with the implementation of studies rather than weighting the results of studies. In contrast, in the review of reviews we have applied quality criteria for inclusion of reviews and a large number were excluded. Although this has constrained the number of primary studies on which conclusions can be based and may have excluded valuable research the review does cover a very large number of studies. The inclusion of reviews which did not include a systematic search or which selectively reported the results could have seriously biased the conclusions. The results of reviews which fail to describe the interventions, the study design or the number of participants are difficult to interpret.

Although evaluation in health promotion is challenging it is also critical both for the development of interventions and for evidence-based practice. Requirements for evaluation of small scale, pilot and developmental projects are, however, different from the requirements for evaluation of effectiveness necessary for investment of public finances. Given the partial or inadequate effectiveness of many interventions covered in this review the current priority may be investment in developmental research. Very little research of this type has been carried out in the UK and as social and cultural norms may be important for success there is a need for local investment. Large-scale UK trials are important only when seemingly effective interventions are identified. There may be a window of opportunity to resolve the debate about the value of different approaches to establishing evidence in health promotion research before further large scale trials are set up in the UK. During this time it is important that outcome measures appropriate for evaluation of health promotion are developed which cover mental and social as well as physical well-being.

In the meanwhile the process of reviewing the evidence base for health promotion in schools would be more effective and efficient if the quality of reporting in both primary studies and reviews was improved. This may be something to which journal editors could give consideration. Peer review publication is important for dissemination of evidence and for academic success. At present space constraints in many peer review journals preclude full reporting of all these details.

Since the searches for these reviews were completed in March 1998 a large number of further papers have been published. A search at the beginning of 1999 indicated that a further 1500 new titles and abstracts needed to be assessed as potentially appropriate for inclusion. This field of health promotion practice is rapidly evolving. As it is a service, not a 'technology' this evolution is likely to continue. The service may never reach a time when it is 'stable'. Thus, while further reviews are likely to be valuable, they are unlikely to provide a final answer.

The question of whether these reviews should be repeated and when, is complicated by a further question: should reviews of health promotion interventions be limited to experimental studies in the tradition of the systematic review of effectiveness? The desirability of both updating and repeating these reviews therefore depends on the extent to which practitioners and researchers believe that this methodology contributes to the assessment of health promotion interventions. Whatever the decision about which studies should be included, further systematic searching of the literature together with collation and appraisal of studies will be important for the development and dissemination of evidence based practice in this rapidly evolving field. Pragmatically, a repeat review in 2 years' time is likely to be valuable.

Chapter 7
Conclusions

Effectiveness of health promoting schools and school health promotion programmes

- Some school health promotion programmes have been demonstrated to be effective in changing health-related behaviour and improving health, but very few programmes or approaches have been shown to be reliably effective. Those which were, aimed to increase pupils' fitness through school-based physical activity programmes.

- Effectiveness has been demonstrated more frequently in injury prevention programmes, programmes to promote healthy eating and cardiovascular health, and programmes to improve mental health, than in programmes to prevent substance misuse or high-risk sexual behaviours.

- The studies covered in this report show that programmes incorporating changes to the physical environment of the school are more likely to be effective than programmes which do not. The environmental changes were specific to areas of health need, for example school meals in healthy eating programmes, school clinics in sex education and the sale of cycle helmets in injury prevention.

- The reviews strongly suggest that the involvement of parents and peers is helpful. A review of reviews is limited by the evidence presented in the reviews. Although it was clear that both programmes involving parents and those involving peers differed in approach, intensity and content this information was not reliably or sufficiently reported in reviews to determine if variation in effectiveness was attributable to the type of programme. The apparent effectiveness of both parental and peer involvement could be attributable to the fact that these were associated with generally more sophisticated interventions.

- The results of the four studies of health promoting schools and the eight studies of programmes using a health promoting school approach confirm that this is a promising approach. There were only two large-scale RCTs; most of the other studies were small. The health promoting schools initiative is new, complex and developing, and implementation of all the components may take several years in any one school. Definitive studies of this approach are therefore still awaited. Studies of programmes combining the three domains of curriculum, school ethos and environment, and parents and community showed that these were more likely to be effective than those which did not.

- The investment of a limited amount of money and support in schools was identified in the large UK RCT of health promoting schools as an important component of successful implementation.

- The great majority of school health promotion interventions have been developed and evaluated outside the UK.

Methodological issues

- A large number of reviews have been undertaken of health promotion in schools covering all aspects of health apart, from family life education. The greatest number of reviews were identified in the area of substance misuse. The second greatest number were on psychological aspects of health, but only two of these met the quality criteria for inclusion. Included reviews varied in methodological quality and differences were found between reviews in their coverage of the same primary studies, including reporting and interpretation of their results.

- Both the primary studies covered in the reviews, and those included in the review of health promoting schools approach, varied in methodological quality. A minority of studies met widely accepted criteria for a 'gold standard' evaluation in systematic reviews – a well-conducted, adequately powered, randomised control trial. There is, however, extensive debate as to whether this is the optimum methodology in evaluation of school health promotion initiatives. RCTs of health promotion in schools need to be large in order to take the clustered design into account,

and large size can create a number of problems for high-quality evaluation in health promotion. The process of randomisation is difficult to reconcile with readiness to change, which is likely to be important in achieving the active participation of schools.

- The great majority of reviews focused on health-related behaviour change and physiological measurement as outcomes. Lack of validated outcome measures was a common criticism of primary studies. Most of the studies measuring behaviour change based their observations on self-report. Only a small number of studies incorporated measures which attempted to assess impact on health in general including mental and social well-being. If evaluative studies are based on inappropriate or invalidated outcome measures their results are difficult to interpret.

- In the absence of measures of mental and social well-being, qualitative studies of the process of delivery and the impact of the interventions are an important way of identifying programmes which might be harmful to these aspects of health. Although this was a common feature of studies evaluating the health promoting school approach it was not commonly reported in the reviews. It is therefore difficult to assess whether lack of effectiveness was attributable to the way in which programmes had been delivered or to their intrinsic ineffectiveness.

Chapter 8

Implications and recommendations

Implications for practice in the UK

The evidence presented in this report supports the following:

- The case for continuing experimentation with the health promoting school initiative taking into account the potential importance of the health and well-being of school staff. Ensuring that experimentation is accompanied by evaluation.
- Where schools are still providing meals and commercial considerations permit, improving the content of school meals and promote healthy options.
- Encouraging and supporting physical activity in schools, but not on a compulsory basis.
- Experimenting with school-based clinics providing advice on contraception and safe sex, and coordinate with sex education in the classroom.
- Experimenting with involving parents in school health promotion initiatives.
- Experimenting with programmes which make use of peers.
- Establishing school injury prevention programmes, particularly those covering cycle helmets.
- Encouraging debate and agreement on the mental and social goals of health promoting schools.
- Developing methods to improve mental and social well-being within the context of the health promoting school initiative.
- Investing small amounts of finance in schools which are interested in developing health promotion initiatives.

Recommendations for research

Recommendations for commissioners of research

- Invest in primary UK-based studies of health promoting school initiatives giving priority to those which aim to promote the social and mental well-being of staff and pupils.
- Commission the development of new outcome measures for school health promotion interventions (see recommendations for research below).
- Commission a review of primary studies of school-based family life education programmes and a further review of school mental health promotion programmes.
- Encourage and enable further debate on the value of including studies using observational and qualitative methodologies in reviews of effectiveness of health promotion interventions.
- Commission a further review in this area in two years time, taking into account the outcome of the debate proposed in the fourth point in recommendations for research below.

Recommendations for researchers

- Ensure that process evaluation which describes the way in which programmes have been implemented is undertaken and reported in all studies of health promotion in schools.
- Develop valid and reliable measures for evaluating the outcome of the health promoting school initiatives, particularly those measuring mental and social well-being for children and adults. Incorporate these in all studies of health promotion in schools.
- Investigate the relationship between staff health and well-being and that of pupils taking account of research which has been conducted on staff morale and the social ethos of schools.
- Research the impact of randomisation on participation in health promotion intervention studies and continue the debate on methods of evaluating school health promotion interventions. Investigate costs and benefits of very large trials of health promotion programmes.

- Ensure that future reviews of school health promotion programmes include a systematic search and critical appraisal of studies and that they describe the development of the interventions, and their content and implementation as well as the design and implementation of the studies.

Recommendations for journal editors and peer reviewers

- Ensure, in publications of studies of school health promotion interventions, that the following are reported: the theoretical basis or assumptions underpinning the interventions; the content of the interventions; and the process of delivery.

Acknowledgements

This review was commissioned by the Health Technology Assessment Programme (project number 95/37/01)and carried out at the NHS Centre for Reviews and Dissemination, University of York, and the Health Services Research Unit, Department of Public Health, University of Oxford. We would like to thank Lisa Mather, Jill Pattenden, Trevor Sheldon, Frances Sharp, Paula Press, Sally Baker, Jane Wells, Jane Barlow and John Fletcher, and all those who gave their help and support. Our thanks are also due to those who responded to our request for data or gave their assistance and advice. We would also like to acknowledge the helpful assistance of the members of the expert panel (see appendix 4) and the referees.

The Health Services Research Unit was supported by a grant from the NHS Executive (Anglia and Oxford), and is now supported by the NHS Executive (South East).

References

1. Tones K, Tilford S. Health education. Effectiveness, efficiency and equity. London: Chapman and Hall, 1994.
2. Tudor K. Mental health promotion paradigms and practice. London: Routledge, 1996.
3. Rootman I, Goodstadt M, Potvin L, *et al.* A framework for health promotion evaluation. In: Evaluation W-EWGoHP, editor. Evaluation and health promotion: principles and perspectives. Copenhagen: WHO, 1999.
4. Paulussen T. Review of the Methodology of School Health Education Evaluation. In: Piette D, Rasmussen V, editors. Towards an evaluation of the European Network of Health Promoting Schools (The EVA Project). Brussels: Universite Libre de Bruxelles, 1995.
5. WHO. Promoting health through schools. Geneva: WHO, 1997.
6. Naidoo J, J W. Health promotion: foundations of practice. London: Baillière Tindall, 1994.
7. Nutbeam D. Evaluating health promotion – progress, problems and solutions. *Health Promot Int* 1998;**13**:27–43.
8. Wilkinson R. Unhealthy societies – the afflictions of inequality. London: Routledge, 1996.
9. Stewart-Brown S. Emotional well-being and its relation to health. *BMJ* 1998;**317**:1608–9.
10. WHO. Expert committee on school health services. Geneva: WHO, 1951.
11. WHO. Expert committee on new approaches to health education in primary care. Geneva: WHO, 1983.
12. National Curriculum Council. Curriculum guidance 5: health education. London: National Curriculum Council, 1990.
13. Cockerill A, Barron J. Personal communication, 1998.
14. Department for Education and Employment. Building excellence in schools together. London: The Stationery Office, 1997.
15. Department of Health. Our healthier nation: a contract for health. London: Department of Health, 1998.
16. Williams H. The National Advisory Group preparing young people for adult life. 1999.
17. Allensworth D, Kolbe L. The comprehensive school health program: exploring an expanded concept. A special issue supported by the Metropolitan Life Foundation. *J Sch Health* 1987;**57**:409–73.
18. Francois Y. The health and physical environment in the school setting. In: Piette D, Rasmussen V, editors. Towards an evaluation of the European Network of Health Promoting Schools (The EVA Project). Brussels: Universite Libre de Bruxelles, 1995.
19. Davis TM, Allensworth DD. Program management: a necessary component for the comprehensive school health program. *J Sch Health* 1994;**64**:400–4.
20. Went S. A healthy start: holistic approaches to health promotion in school communities. Victoria: The School of Graduate Studies, Faculty of Education, 1991.
21. WHO DoMH. Life skills education for children and adolescents in schools. Introduction and guidelines to facilitate the development and implementation of life skills programmes in schools. Geneva, 1994.
22. Piette D, Rasmussen V, editors. Towards an evaluation of the European Network of Health Promoting Schools (The EVA Project): Universite Libre de Bruxelles, 1995.
23. Parsons C, Stears D, Thomas C. The health promoting school in Europe: conceptualising and evaluation the change. *Health Educ J* 1996;**55**:311–21.
24. Nutbeam D. The Health Promoting school: closing the gap between theory and practice. *Health Promot Int* 1992;**7**:151–3.
25. Tones K, Dixey R, Green J. Developing and evaluating the curriculum of the health promoting schools. In: Piette D, Rasmussen V, editors. Towards an evaluation of the European Network of Health Promoting Schools (The EVA Project). Brussels: Universite Libre de Bruxelles, 1995.
26. Jamison J, Ashby P, Hamilton K, *et al.* The health promoting school. Final report of the ENHPS evaluation project in England. London: European Network of Health Promoting Schools Health Education Authority, 1998.
27. Health Education Board for Scotland, Health Promotion Wales, Health Education Authority (England), *et al.* The European Network of Health Promoting Schools: introduction – the UK project. *Health Educ J* 1996;**55**:447–9.

28. Bowker S, Tudor-Smith C. The European Network of Health Promoting Schools: development and evaluation in Wales. *Health Educ J* 1996;**55**:457–64.

29. Crosswaite C, Currie C, Young I. The European Network of Health Promoting Schools: development and evaluation in Scotland. *Health Educ J* 1996;**55**:450–6.

30. Hickman M, Healy C. The European Network of Health Promoting Schools: development and evaluation in England. *Health Educ J* 1996;**55**:456–70.

31. Rogers E, Moon A, Mullee M, *et al.* Developing the "health promoting school" – a national survey of health schools awards. *Public Health* 1998;**112**:37–40.

32. Speller V, Learmouth A, Harrison D. The search for evidence of effective health promotion. *BMJ* 1997;**315**:361–3.

33. Oakley A. Experimentation in social science research. *Soc Sci Health* 1998;**4**:73–88.

34. Kippax S, Van den Ven P. An epidemic of orthodoxy? Design and methodology in the evaluation of the effectiveness of HIV health promotion. *Critical Public Health* 1998;**8**:371–85.

35. Stephenson J, Imrie J. Why do we need RCTs to assess behavioural interventions? *BMJ* 1998;**316**:611–13.

36. Prochaska J, DiClemente C. Stages and processes of self-change of smoking: towards an integrative model of change. *J Consult Clin Psychol* 1983;**51**:390–5.

37. Silverman, Altman D. Patients' preferences and randomised trials. *Lancet* 1996;**347**:171–4.

38. Bradley C. Clinical trials – time for a paradigm shift. *Diabetic Med* 1988;**5**:107–9.

39. Antman E, Lau J, Kupelnick B, *et al.* A comparison of results of meta-analysis of RCTs and recommendations of clinical experts. Treatment for myocardial infarction. *JAMA* 1992;**268**:240–8.

40. Britton A, McKee M, Black N, *et al.* Choosing between randomised and non-randomised studies – a systematic review. *Health Technol Assess* 1998;**13**:1–124.

41. WHO Working Group on Health Promotion Evaluation. Health promotion evaluation: recommendations to policy makers. Brighton: WHO-Euro, 1998.

42. Piette D, Tudor-Smith C, Kadijk J, *et al.* Use of the HBSC Study in 14 ENHPS. In: Piette D, Rasmussen V, editors. Towards an evaluation of the European Network of Health Promoting Schools (The EVA Project). Brussels: Universite Libre de Bruxelles, 1995.

43. Deeks J, Sheldon T. Guidelines for undertaking systematic reviews of effectiveness. York: NHS Centre for Reviews and Dissemination, 1995.

44. Moon A, Rogers L. Evaluation of the Wessex Healthy Schools Award Project. Southampton: Wessex Institute for Health, 1998.

45. Sobczyk W, Hazel N, Reed CD, *et al.* Health Promotion Schools of Excellence: a model program for Kentucky and the nation. *J Kentucky Med Assoc* 1995;**93**:142–7.

46. Young I. Healthy eating policies in schools: an evaluation of effects on pupils knowledge, attitudes and behaviour. *Health Educ J* 1993;**52**:6–9.

47. Coates T, Barofsky I, Saylor K, *et al.* Modifying the snack consumption patterns of inner city high school students: The Great Sensations study. *Prevent Med* 1985;**14**:234–47.

48. Luepker R, Perry C, McKinlay S. Outcomes of a field trial to improve children's dietary patterns and physical activity: the Child and Adolescent Field Trial for Cardiovascular Health (CATCH). *JAMA* 1996;**275**:768–76.

49. Arbeit M, Johnson C, Mot D, *et al.* The Heart Smart cardiovascular school health promotion: behavior correlates of risk factor change. *Prevent Med* 1992;**21**:18–32.

50. DuShaw ML. A comparative study of three model comprehensive elementary school health education programs. *J Sch Health* 1984;**54**:397–400.

51. Arora CMJ. Is there any point in trying to reduce bullying in secondary schools? A two year follow-up of a whole-school anti-bullying policy in one school. *Educ Psychol Practice* 1994;**10**:155–62.

52. Buller M, Loescher L, Buller D. "Sunshine and skin health": a curriculum for skin cancer prevention education. *J Cancer Educ* 1994;**9**:155–62.

53. Agerbaek N, Melsen B, Lind OP, *et al.* Effect of regular small group instruction per se on oral health status of Danish schoolchildren. *Community Dent Oral Epidemiol* 1979;**7**:17–20.

54. Koo H, Dunteman G, Geoprge C, *et al.* Reducing adolescent pregnancy through a school and community beased intervention: Denmark, South Carolina revisited. *Family Plann Perspect* 1994;**26**:206–11.

55. Vincent M, Clearie A, Schluchter M. Reducing adolescent pregnancy through school and community-based education. *JAMA* 1987;**257**:3382–6.

56. Cogdon A, Belzer E. Dartmouth's health promotion study: testing the coordinated approach. *Health Promot* 1991;**29**:6–10.

57. McIntyre L, Belzer EG, Jr, Manchester L, *et al.* The Dartmouth Health Promotion Study: a failed quest for synergy in school health promotion. *J Sch Health* 1996;**66**:132–7.

58. O'Donnell J, Hawkins J, Catalano R, *et al.* Preventing school failure, drug use and delinquency among low income children – long term intervention in elementary schools. *Am J Orthopsychiatr* 1995;**65**:87–100.

59. Sexter J, Sullivan A, Weppner S, *et al.* Substance abuse: assessment of the outcomes of activities and activity clusters in school-based prevention. *Int J Addict* 1984;**19**:79–92.

60. McKay R, Levine D, Bone L. Community organisation in a school health education program to reduce sodium consumption. *J Sch Health* 1985;**55**:364–6.

61. Malenfant F, Van Houten R. Increasing the percentage of drivers yielding to pedestrians in three Canadian cities with a multifaceted safety program. *Health Educ Res* 1989;**5**:275–9.

62. Nielson O. Safe routes to school in Odense, Denmark. In: Tolley R, editor. The greening of urban transport. London: Bellhaven, 1990:225.

63. Puczynski M, Marshall D. Helmets! All the pros wear them. *Am J Dis Child* 1992;**146**:1465–7.

64. Wood T, Milne P. Head injuries to pedal cyclists and the promotion of helmet use in Victoria, Australia. *Accid Anal Prevent* 1988;**20**:177.

65. Moon A, Rogers L, Mullee M, *et al.* The health promoting school – an effective vehicle for school-based health promotion for a new millennium. In: Proceedings of the 1st UK Health Promotion Research Conference. Edinburgh, 1998.

66. Simpson G, Young A, Towner E. Promoting Safety in Schools – a RCTs. In the proceedings of the 1st UK Health Promotion Research Conference, 1998 6–8 April, 1998; Edinburgh.

67. Oakley A, Fullerton D. Risk, knowledge and behaviour: HIV/AIDS education programmes and young people. London: Institute of Education, University of London, 1994.

68. Williams K, Chambers J, Logan S, *et al.* Association of common health symptoms with bullying in primary schoolchildren. *BMJ* 1998;**313**:17–19.

69. Rigby K. The relationship between reported health and involvement in bully/victim problems among male and female school children. *J Health Psychol* 1998;**4**:465–76.

70. Green L, Kreuter M, Deeds S. Health education planning: a diagnostic approach. California: Mayfield, 1980.

71. Hansen W. School-based substance abuse prevention: a review of the state of the art in curriculum, 1980–1990. *Health Educ Res* 1992;**7**:403–30.

72. Bangert-Drowns RL. The effects of school-based substance abuse education–meta-analysis. *J Drug Educ* 1988;**18**:243–64.

73. Tobler N. Meta-analysis of adolescent drug prevention programs. PhD thesis, State University of New York at Albany, 1994.

74. Bruvold WH. A meta-analysis of adolescent smoking prevention programs. *Am J Public Health* 1993;**83**:872–80.

75. Foxcroft D, Lister-Sharp D, Lowe G. Review of effectiveness of health promotion Interventions: Young people and alcohol misuse. York: University of York, 1995.

76. White D, Pitts M. Health promotion with young people for the prevention of substance misuse. London: Health Education Authority, 1997.

77. Gorman DM. Are school-based resistance skills training-programs effective in preventing alcohol misuse. *J Alcohol Drug Educ* 1995;**41**:74–98.

78. Gorman DM. Do school-based social skills training-programs prevent alcohol-use among young-people. *Addict Res* 1996;**4**:191–210.

79. Peters L, Paulussen T. A review of international effect research on the prevention of alcohol abuse. Woerden, The Netherlands: NIGZ Netherlands Institute for Health Promotion and Disease Prevention, 1997.

80. James J, Fisher J. A review of school-based drug education in Australia. Perth: National Centre for Research into the Prevention of Drug Abuse, Curtin University of Technology, 1991.

81. Ennett ST, Tobler NS, Ringwalt CL, *et al.* How effective is drug abuse resistance education? A meta-analysis of Project DARE outcome evaluations. *Am J Public Health* 1994;**84**:1394–401.

82. Binyet S, de Haller R. [Efficacy of smoking prevention campaign in adolescents: critical review of the literature.] *Soz Praventivmed* 1993;**38**:366–78.

83. Stephenson J, Quine S, Magaskill P, *et al.* Drug awareness and use among primary school children: an evaluation of the life education centre. Canberra: Australian Government Publishing Service, 1988.

84. Bremberg S, Arborelius E. Effects on adolescent alcohol consumption of a school-based student centred health counselling programme. *Scand J Soc Med* 1994;**22**:113–19.

85. Thompson R. Action research applied to drug education – the DAPPS study. *Drug Educ J Aust* 1988;**2**:7–14.

86. Naccarella L, Borland R, Hill D. Evaluation of the Kylie Mole smoking prevention campaign. In: Proceedings of the 5th National Drug Educators Seminar. Melbourne, 1990.

87. Krupka L, Knox L. Enhancing the effectiveness of alcohol and substance abuse prevention programs for children. *Int J Addict* 1985;**20**:1435–42.

88. Perry C, Williams C, Verblen-Mortenson S, *et al.* Project Northland: Outcomes of a community-wide alcohol use prevention program during early adolescence. *Am J Public Health* 1996;**86**:956–65.

89. Werch C, Young M, Clark M, *et al.* Effects of a take home drug prevention program on drugs related communication and beliefs of parents and children. *J Sch Health* 1991;**61**:346–50.

90. Wiener R, Pritchard C, Frauenhoffer S, *et al.* Evaluation of a drugs free school and community program: integration of qualitative and quasi-experimental methods. *Eval Rev* 1993;**17**:488–503.

91. Hansen W, Malotte C, Fielding J. Tobacco and alcohol prevention: preliminary results of a four-year study. *Adolesc Psychiatry* 1987;**14**:556–75.

92. Biglan A, Weissman W, Severson H. Coping with Social Influences to Smoke. In: Shiffman P, Wills T, editors. Coping and substance use. New York: Academic Press, 1985:95–115.

93. Losciuto L, Ausetts M. Evaluation of a drug abuse prevention program: a field experiment. *Addict Behav* 1988;**13**:337–51.

94. Pentz M, Dwyer J, Mackinnon D, *et al.* A multi-community trial for primary prevention of adolescent drug abuse: effects on drug use prevalence. *JAMA* 1989;**261**:3259–66.

95. Mackinnon D, Johnson C, Pentz M, *et al.* Mediating mechanisms in a school-based drug prevention program – 1st year effects of the Midwestern Prevention Project. *Health Psychol* 1991;**10**:164–72.

96. Johnson C, Pentz M, Weber M, *et al.* Relative effectiveness of comprehensive community programming for drug abuse prevention with high risk and low risk adolescents. *J Consult Clin Psychol* 1990;**58**:447–56.

97. Caplan M, Weissberg R, Grober J, *et al.* Social competence promotion with inner city and suburban young adolescents: effects on social adjustment and alcohol use. *J Consult Clin Psychol* 1992;**60**:56–63.

98. Gliksman L, Douglas R, Smythe C. The impact of a high school alcohol education program utilising a live theatrical performance: a comparative study. *J Drug Educ* 1983;**13**:229–47.

99. Botvin G, Schinke S, Epstein J, *et al.* Effectiveness of culturally focused and generic skills training approaches to alcohol and drug abuse prevention among minority adolescents: two year follow-up results. *Psychol Addict Behav* 1995;**9**:183–94.

100. Botvin G. School-based smoking prevention: the teacher training process. *Prevent Med* 1989;**18**:280–9.

101. Botvin G, Baker E, Filazzola A, *et al.* A cognitive behavioural approach ot substance abuse prevention: one year follow up. *Addict Behav* 1989;**15**:47–63.

102. Botvin G, Baker E, Dusenbury L, *et al.* Preventing adolescent drug abuse through a multimodal cognitive behaviour approach: results of a three year study. *J Consult Clin Psychol* 1990;**58**:437–46.

103. Ellickson P, Bell R. Prospects for preventing drug use among young adolescents. Santa Monica, CA: RAND, 1990.

104. Hansen W, Johnson C, Flay B, *et al.* Affective and social influences approaches to the prevention of multiple substance abuse among seventh grade students: results from Project SMART. *Prevent Med* 1988;**17**:135–54.

105. Graham J, Johnson C, Hansen W, *et al.* Drug use prevention programs, gender and ethnicity: evaluation of 3 seventh grade Project SMART cohorts. *Prevent Med* 1990;**19**:305–13.

106. Hansen W, Graham J. Preventing alcohol, marijuana and cigarette use among adolescents: peer pressure resistance training versus establishing conservative norms. *Prevent Med* 1991;**20**:414–30.

107. Armstrong B, de Klerk N, Shean R, *et al.* Influences of education and advertising on the uptake of smoking by children. *Med J Aust* 1990;**152**:117–24.

108. Pentz M, Johnson C, Dwyer J, *et al.* A comprehensive community approach to adolescent drug abuse prevention: effects on cardiovascular disease risk behaviours. *Ann Med* 1989;**21**:219–22.

109. Dwyer J, Mackinnon D, Pentz M, *et al.* Estimating intervention effects in longitudinal studies. *Am J Epidemiol* 1989;**130**:781–95.

110. Pentz M, Trebow E, Hansen W, *et al.* Effects of program implementation on adolescent drug use behaviour. The Midwestern Prevention Project (MPP). *Eval Rev* 1990;**14**:264–89.

111. Pentz M, Brannon B, Charlin V, *et al.* The power of policy: the relationship of smoking policy to adolescent smoking. *Am J Public Health* 1989;**79**:857–62.

112. Gaffney D, Rowling L. Report on the evaluation of the Straight Talking Project. Sydney: Health education Unit, University of Sydney, 1990.

113. Gilchrist L, Schinke S. Life skills counselling for preventing problems in adolescence. Special Issue: Progress in behavioural social work. *J Soc Sci Res* 1987;**19**:73–84.

114. Homel P, Daniels P, Reid T, *et al.* Effective health and personal development: an experiment in school education. *Med J Aust* 1982;**2**:41–2.

115. Hurd P, Johnson C, Pechacek T, *et al.* Prevention of cigarette smoking in seventh grade students. *J Behav Med* 1980;**3**:15–27.

116. Miller S, Slap G. Adolescent smoking. A review of prevalence and prevention. *J Adolesc Healthcare* 1989;**10**:129–35.

117. Perry C. Prevention of alcohol use and abuse in adolescence: teacher vs peer led intervention. *Crisis* 1989;**10**(Special issue):52–61.

118. Schinke S, Gilchrist L, Schilling R, *et al.* Skills methods to prevent smoking. *Health Educ Q* 1986;**13**:23–72.

119. Vartiainen E, Pallonen U, McAlister A, *et al.* Four year follow-up results of the smoking prevention program in the North Karelia youth project. *Prevent Med* 1986;**15**:692–8.

120. Clarke J, MacPherson B, Holmes D, *et al.* Reducing adolescent smoking: a comparison of peer-led, teacher-led and expert interventions. *J Sch Health* 1986;**56**:102–6.

121. Moskowitz J, Schaps E, Schaeffer G, *et al.* Evaluation of a substance abuse prevention program for junior high school students. *Int J Addict* 1984;**19**:419–30.

122. Moskowitz J, Malvin J, Schaeffer G, *et al.* Evaluation of a junior high school primary prevention program. *Addict Behav* 1983;**8**:393–401.

123. Evans R, Rozelle R, Mittlemark M, *et al.* Deterring the onset of smoking in children: knowledge of immediate physiological effects and coping with peer pressure, media pressure and parent modelling. *J Appl Soc Psychol* 1978;**8**:126–35.

124. Evans R, Rozelle R, Maxwell S, *et al.* Social modelling films to deter smoking in adolescents: results of a three year field investigation. *J Appl Psychol* 1981;**66**:399–414.

125. Murray D, Pirie P, Luepker R, *et al.* Five and six year follow-up results from four seventh-grade smoking prevention strategies. *J Behav Med* 1989;**12**:207–18.

126. Flay B, Koepke D, Thompson S, *et al.* Six-year follow-up of the first Waterloo school smoking prevention trial. *Am J Public Health* 1989;**79**:1371–6.

127. Beaulieu M, Jason L. A drug abuse prevention program aimed at teaching seventh grade students problem solving strategies. *Child Youth Services Rev* 1988;**10**:131–49.

128. Del Greco L, Breitbach L, Ruumer S, *et al.* Four-year results of a youth smoking prevention program using assertiveness training. In: Shiffman P, Wills T, editors. Coping and substance use. New York: Academic Press, 1985:631–40.

129. Stead C. Skylark Puppet and Mask Theatre Company Evaluation Project: evaluation of use of puppets in drug education for preschool and primary school children. Canberra: ACT Health Authority/Schools Authority Project, 1987.

130. Byrne M, Glen M. The ADPU Smoking Education Project: an evaluation of the 1983 Implementation: Research Services Branch, Queensland Department of Education, 1984.

131. Hirschman R, Leventhal H. Preventing smoking behaviour in school children: an initial test of cognitive-developmental program. *J Appl Psychol* 1989;**19**:559–83.

132. McAlister A, Perry C, Killen J, *et al.* Pilot study of smoking, alcohol and drug abuse prevention. *Am J Public Health* 1980;**70**:719–21.

133. DeJong W. A short-term evaluation of Project DARE (Drug Abuse Resistance Education). *J Drug Educ* 1987;**17**:279–94.

134. Ellickson P, Bell R. Drug prevention in junior high: a multi-site longitudinal test. *Science* 1990;**247**:1299–305.

135. Ellickson P, Bell R, McGuigan K. Preventing adolescent drug use: long-term results of a junior high program. *Am J Public Health* 1993.

136. Bell R, Ellickson P, Harrison E. Do drug prevention effects persist into high school. How project ALERT did with ninth graders. *Prevent Med* 1993;**22**:463–83.

137. Botvin G, Baker E, Dusenbury L. Long-term follow up results of a randomised drug abuse prevention trial. *JAMA* 1995;**273**:1106–12.

138. Mitchel M, Hu T, McDonnell N, *et al.* Cost effectiveness analysis of an educational drug abuse prevention program. *J Drug Educ* 1984;**14**:271–92.

139. Schinke S, Orlandi M, Botvin G, *et al.* Preventing substance abuse among American-Indian adolescents: a bicultural competence skills approach. *J Counsel Psychol* 1988;**35**:87–90.

140. Moskowitz J, Schaps E, Malvin J, *et al.* The effects of drugs education at follow-up. *J Drug Educ* 1984;**14**.

141. Schaps E, Moskowitz J, Condon J, *et al.* Process and outcome evaluation of a drug education course. *J Drug Educ* 1982;**12**:353–64.

142. Horan J, Williams J. Longitudinal study of assertion training as a drug abuse prevention strategy. *Am Educ Res J* 1982;**19**:341–51.

143. Ringwalt C, Ennett S, Holt K. An outcome evaluation of Project DARE (Drug Abuse Resistance Education). *Health Educ Res* 1991;**6**:327–37.

144. Hecht M, Corman S, Miller-Rassulo M. An evaluation of the Drug Resistance Project: a comparison of film vs live performance media. *Health Commun* 1993;**5**:75–88.

145. Wragg J. The longitudinal evaluation of a primary school drug education programme: did it work? *Drug Educ J Aust* 1990;**4**:33–44.

146. Malvin J, Moskowitz J, Schaeffer G, *et al.* Teacher training in affective education for the primary prevention of adolescent drug abuse. *Am J Drug Alcohol Abuse* 1984;**10**:223–35.

147. Jones R, McDonald D, Fiore M, *et al.* A primary preventive approach to children's drug refusal behavior: the impact of Rehearsal Plus. *J Pediatr Psychol* 1990;**15**:211–23.

148. Malvin J, Moskowitz J, Schaps E, *et al.* Evaluation of two school-based alternatives programs. *J Alcohol Drug Educ* 1985;**30**:98–108.

149. Wragg J. Drug and alcohol education: the development, design and longitudinal evaluation of an early childhood programme. *Aust Psychol* 1986;**21**:282–9.

150. Eiser C, Eiser J. Implementing a life-skills approach to drug education – a preliminary evaluation. *Health Educ Res Theory Practice* 1987;**2**:319–27.

151. Becker H, Agopian M, Yeh S. Impact evaluation of Drug Abuse Resistance Education (DARE). *J Drug Educ* 1992;**22**:283–91.

152. Cook R, Lawrence H, Morse C, *et al.* An evaluation of the alternatives approach to drug abuse prevention. *Int J Addict* 1984;**19**:767–87.

153. Kim S, McLeod J, Shantzis C. An outcome evaluation of refusal skills program as a drug abuse prevention strategy. *J Drug Educ* 1989;**19**:363–71.

154. Allison K, Siver G, Dignam C. Effects on students of teacher training in the use of a drug education curriculum. *J Drug Educ* 1990;**20**:31–46.

155. Bagnall G. Alcohol education for 13 year olds – does it work?. Results of a controlled evaluation. *Br J Addict* 1990;**85**:89–96.

156. Ellickson P, Bell R, Harrison E. Changing adolescent propensities to use drugs: results from project ALERT. *Health Educ Q* 1993;**20**:227–42.

157. Botvin G, Baker E, Botvin E, *et al.* A cognitive-behavioral approach to substance abuse prevention. *Addict Behav* 1984;**9**:137–47.

158. Brewer L. Social skills training as a deterrent to entry level drug experimentation among 15 yr old adolescents. PhD thesis, University of Pennsylvania, 1991.

159. Clayton RR, Cattarello A, Walden KP. Sensation seeking as a potential mediating variable for school-based prevention intervention: a two-year follow-up of DARE. Special issue: communication and drug abuse prevention. *Health Commun* 1991;**3**:229–39.

160. Harmon M. Reducing the risk of drug involvement among early adolescents: An evaluation of Drug Abuse Resistance Education (DARE). *Eval Rev* 1993;**17**:221–39.

161. Rosenbaum D, Flewelling R, Bailey S, *et al.* "Cops in the Classroom": a longitudinal evaluation of drug abuse resistance education. *J Res Crime Delinquency* 1994;**31**:3–31.

162. Ennett S, Rosenbaum D, Flwelling R, *et al.* Long-term evaluation of drug abuse resistance education. *Addict Behav* 1994;**19**:113–25.

163. Dielman T, Shope J, Butchart A, *et al.* Prevention of adolescent alcohol misuse: an elementary school programme. *J Pediatr Psychol* 1986;**11**:259–82.

164. Dielman T, Shope J, Leech S, *et al.* Differential effectiveness of an elementary school-based alcohol misuse prevention programme. *J Sch Health* 1989;**59**:255–63.

165. Shope J, Dielman T, Butchart A, *et al.* An elementary school-based alcohol misuse prevention program: follow-up evaluation. *J Stud Alcohol* 1992;**53**:106–21.

166. Donaldson S, Graham J, Piccinin A, *et al.* Resistance skills training and onset of alcohol use: evidence of beneficial and potentially harmful effects in public schools and private catholic schools. *Health Psychol* 1995;**14**:291–300.

167. Durrant L. A multicomponent approach to prevention of adolescent substance abuse. PhD thesis, University of Utah, 1986.

168. Duryea E. An application of inoculation theory to preventive alcohol education. *Health Educ* 1984;**15**:4–7.

169. Duryea E, Okwumabua J, Rouse J. Preliminary 6 month follow up results of a preventive alcohol intervention. *Aust Council Health Phys Educ Recreat Natl J* 1984;**104**:15–18.

170. Duryea E, Okwumabua J. Effects of a preventive alcohol education program after three years. *J Drug Educ* 1988;**18**:23–31.

171. Gilchrist L, Schinke S, Trimble J, *et al.* Skills enhancement to prevent substance abuse among American Indian adolescents. *Int J Addict* 1987;**22**:869–79.

172. Goodstadt M, Sheppard M. Three approaches to alcohol education. *J Stud Alcohol* 1983;**44**:362–80.

173. Hopkins R, Mauss A, Kearney K, *et al.* Comprehensive evaluation of a model alcohol education curriculum. *J Stud Alcohol* 1988;**49**:38–50.

174. Moskowitz J, Malvin J, Schaeffer G, *et al.* An experimental evaluation of a drug education course. *J Drug Educ* 1984;**14**:9–22.

175. Newman I, Anderson C, Farrell K. Role rehearsal and efficacy: two 15 month evaluations of a ninth grade alcohol education program. *J Drug Educ* 1992;**22**:55–67.

176. Perry C, Grant M, Ernberg G, *et al.* WHO collaborative study on alcohol education and young people: outcomes of a four country pilot study. *Int J Addict* 1989;**24**:1145–71.

177. Perry C, Grant M. Comparing peer-led to teacher-led youth alcohol education in four countries (Australia, Chile, Norway and Swaziland). *Alcohol Health Res World* 1988;12.

178. Scaggs L. A substance abuse awareness prevention program: knowledge, attitudes and behaviours. PhD thesis, Ohio State University, 1985.

179. Wilhelmsen B, Laberg J, Klepp K-I. Evaluation of two student and teacher involved alcohol prevention programmes. *Addiction* 1994;**89**:1157–65.

180. Williams A, DiCicco L, Unterberger H. Philosophy and evaluation of an alcohol education program. *Q J Stud Alcohol* 1968;**29**:685–702.

181. Donaldson S, Graham J, Hansen W. Testing the generalisability of intervening mechanism theories: Understanding the effects of adolescent drug use prevention interventions. *J Behav Med* 1994;**17**:195–216.

182. Snow D, Tebes J, Arthur M, *et al.* Two year follow-up of a social cognitive intervention to prevent substance use. *J Drug Educ* 1992;**22**:101–14.

183. Church P, Forehand J, Brown C, *et al.* Prevention of drug abuse: examination of the effectiveness of a program with elementary school children. *Behav Therapy* 1990;**21**:339–47.

184. Barrett A, White D. How John Henry Effects confound the measurement of self-esteem in primary prevention programs for drug abuse in middle schools. *J Alcohol Drug Educ* 1991;**36**:87–102.

185. Wysong E, Aniskiewicz R, Wright D. Truth and DARE: tracking drug education to graduation and as symbolic politics. *Soc Problems* 1994;**41**:448–72.

186. Gonzalez G. Effects of a theory based, peer focused drug education course. *J Counsel Dev* 1990;**68**:446–9.

187. Kim S, McLeod J, Shantziz C. An outcome evaluation of Here's Looking at You 2000. *J Drug Educ* 1993;**23**:67–81.

188. Weiss S, Moore M. The second evaluation of the curriculum program "Hashish and Marijuana" in Israeli high-schools. *J Drug Educ* 1987;**17**:143–8.

189. Hawthorne G, Garrard J, Dunt D. Does Life Education's drug education programme have a public health benefit? *Addiction* 1995;**90**:205–15.

190. Kreutter K, Gewirtz H, Davenny J, *et al.* Drug and alcohol prevention project for sixth grades: first year findings. *Adolescence* 1991;**26**:287–93.

191. Powers S, Miller C. Effects of a drug education program on 3rd and 4th grade pupils. *J Alcohol Drug Educ* 1987;**3**3:25–30.

192. Schaps E, Moskowitz J, Malvin J, *et al.* Evaluation of seven school-based programs: a final report on the NAPA Project. *Int J Addict* 1986;**21**:1081–112.

193. Sarvela P, McClendon E. An impact evaluation of a rural youth drug education program. *J Drug Educ* 1987;**17**:213–31.

194. Smart R, Bennet C, Fejer D. A controlled study of the peer group approach to drug education. *J Drug Educ* 1976;**6**:305–11.

195. Casswell S, Mortimer D, Gilroy C. The minimal effects and methodological problems in the evaluation of a harm reduction drug education programme in a high school setting. *J Drug Educ* 1982;**12**:345–52.

196. Casswell S, Mortimer D. Evaluation of a school-based alcohol education programme. In: Grant M, Waahlberg R, editors. Extending alcohol education. Oslo: Statens Edruskapadirektorat, 1985:111–20.

197. Dupont P, Jason L. Assertiveness training in a preventive drug education programme. *J Drug Educ* 1984;**14**:369–78.

198. Duryea E. Utilising tenets of inoculation theory to develop and evaluate a preventive alcohol education intervention. *J Sch Health* 1983;**53**:250–6.

199. Farrow J. Evaluation of a behavioural intervention to reduce DWI among adolescent drivers. *Alcohol Drugs Driving* 1988;**5**:61–72.

200. Gersick K, Grady K, Snow D. Social cognitive skill development with sixth graders and its initial impact on substance use. *J Drug Educ* 1988;**18**:55–70.

201. Baer P, McLaughlan R, Burnside M, *et al.* Alcohol use and the psychosocial outcome of two preventive classroom programs with seventh and tenth graders. *J Drug Educ* 1988;**18**:171–84.

202. Botvin G, Baker E, Botvin E, *et al.* Alcohol abuse prevention through the development of personal and social competence: a pilot study. *J Stud Alcohol* 1984;**45**:550–2.

203. Hansen W, Mallotte C, Fielding J. Evaluation of a tobacco and alcohol abuse prevention curriculum for adolescents. *Health Educ Q* 1988;**15**:93–114.

204. Shope J, Kloska D, Dielman T, *et al.* Longitudinal evaluation of an enhanced Alcohol Misuse Prevention Study (AMPS) curriculum for grades 6–8. *J Sch Health* 1994;**64**:160–6.

205. Dielman T, Kloska D, Leech S, *et al.* Susceptibility to peer pressure as an explanatory variable for the differential effectiveness of an alcohol misuse prevention program in elementary schools. *J Sch Health* 1992;**62**:233–7.

206. Dukes R, Ullman J, Stein J. Three year follow up of drug abuse resistance education (DARE). *Eval Rev* 1996;**20**:49–66.

207. Collins D, Cellucci T. Effects of a school-based alcohol education program with a media prevention component. *Psychol Rep* 1991;**69**:191–7.

208. Werch C, Anzalone D, Brokiewicz L, *et al.* An intervention for preventing alcohol use among inner city middle-school students. *Arch Family Med* 1996;**5**:146–52.

209. Wilton E. Alcohol education in the school. In: Powell K, Santamaria J, editors. Proceedings of papers, seminars and workshops: Autumn school of studies on alcohol and drugs. Melbourne: Department of Community Health Medicine, St Vincent's Hospital, 1980:139–46.

210. Lloyd D, Alexander H, Callcott R, *et al.* Cigarette smoking and drug use in school children: III evaluation of a smoking prevention education program. *Int J Epidemiol* 1983;**12**:51–8.

211. Barber J, Walsh C, Bradshaw R. An alcohol prevention programme for Aboriginal children. *Drug Educ J Aust* 1988;**2**:91–103.

212. Reilly C. An evaluation of the peer support program. Directorate of the Drug Offensive In House Report Series A88/5. Sydney: NSW Department of Health, 1988.

213. Drink Driving Project Team. The development and implementation of the "Plan a Safe Strategy" drink driving program. Canberra: Australian Government Publishing Service, 1990.

214. Albert W, Simpson R. Evaluating an educational program for the prevention of impaired driving among Grade 11 students. *J Drug Educ* 1985; **15**:57–71.

215. Schlegel R, Manske S, Page A. A guided decision making program for elementary school students. In: Miller P, Nirenberg T, editors. Prevention of alcohol abuse. New York: Plenum Press, 1984.

216. Kearney A, Hines M. Evaluation of the effectiveness of a drug prevention education program. *J Drug Educ* 1980;**10**:127–34.

217. Newman I, Mohr P, Badger B, *et al.* Effects of teacher preparation and student age on an alcohol and drug education curriculum. *J Drug Educ* 1984;**14**:23–35.

218. Pipher J, Rivers C. The differential effect of alcohol education on junior high school students. *J Alcohol Drug Educ* 1982;**27**:73–88.

219. Kim S. An evaluation of Ombudsman primary prevention program on student drug abuse. *J Drug Educ* 1981;**11**:27–36.

220. Goodstadt M, Sheppard M, Chan G. An evaluation of two school-based alcohol education programmes. *J Stud Alcohol* 1982;**43**:352–69.

221. Duryea E, Mohr P, Newman I, *et al.* Six month follow-up results of an preventive alcohol education intervention. *J Drug Educ* 1984;**14**:97–104.

222. Clayton R, Cattarello A, Day L, *et al.* Persuasive communication and drug prevention: an evaluation of the DARE program. In: Donohew L, Sypher H, Bukowski W, editors. Persuasive communication and drug abuse prevention. Hillsdale NJ: Lawrenace Erlbaum, 1992.

223. Botvin G, Baker E, Botvin E, *et al.* Prevention of alcohol misuse through the development of personal and social competence: a pilot study. *J Stud Alcohol* 1984;**45**:550–2.

224. Faine J, Bohlander E. Drug abuse resistance education: an assessment of the 1987–1988 Kentucky State Police DARE program. Bowling Green, KY: Western Kentucky University, Social Research Laboratory, 1988.

225. Faine J, Bohlander E. DARE in Kentucky Schools 1988–1989. Bowling Green KY: Western Kentucky University, Social Research laboratory, 1989.

226. Manos M, Kameoka K, Tanji J. Evaluation of Honolulu Police Department's Drug Abuse Resistance Education Program. Honolulu, Hawaii: University of Honolulu-Manoa, School of Social Work, Youth Development and Research Center, 1986.

227. Walker S. The Victoria Police Department Drug Abuse Resistance Education (DARE) Programme evaluation #2. Victoria British Columbia: The Ministry of the Solicitor General, Federal Government of Canada, 1990.

228. McCormick F, McCormick E. An evaluation of the third year Drug Abuse Resistance Education (DARE) Program in Saint Paul. St Paul, MN: Educational Operations Concepts, 1992.

229. Johnson C, Hansen W, Collins L, *et al.* High school smoking prevention: results of a three year longitudinal study. *J Behav Med* 1986;**9**:439–52.

230. Mathey M. Evaluation der basler Schuler-multiplikatorenkurse 1985 uber Alkohol-und Tabakprobleme. Monogr Schweize Bund Gesundheitsw 1991.

231. Pentz M. Social competence and self-efficacy as determinants of substance use in adolescents. In: Shiffman P, Wills T, editors. Coping and substance use. New York: Academic Press, 1985:117–39.

232. Wills T, Shiffman P. Conceptual framework. In: Shiffman P, Wills T, editors. Coping and substance use. New York: Academic Press, 1985:3–21.

233. Roe L, Hunt P, Bradshaw H, *et al.* Review of effectiveness of health promotion interventions to promote healthy eating. Oxford: Department of Public Health and Primary Care, 1997.

234. Willemse G, Peters L, Paulussen T, *et al.* School health promotion and cancer prevention: a review of international effect research on nutrition education. Woerden, The Netherlands: NIGZ Netherlands Institute for Health Promotion and Disease Prevention, 1997.

235. Contento IR. Chapter 4. Nutrition education for school-aged children. *J Nutr Educ* 1995;**27**:298–311.

236. Resnicow K, Cross D, Wynder E. The Know Your Body program: a review of evaluation studies. *Bull NY Acad Sci* 1993;**70**:188–207.

237. Resnicow K. School-based obesity prevention. Population versus high-risk interventions. *Ann NY Acad Sci* 1993;**699**:154–66.

238. Contento IR, Manning AD, Shannon B. Research perspective on school-based nutrition education. *J Nutr Educ* 1992;**24**:247–60.

239. Levy SR, Iverson BK, Walberg HJ. Nutrition-education research: an interdisciplinary evaluation and review. *Health Educ Q* 1980;**7**:107–26.

240. Keays J. The effects of regular (moderate to vigorous) physical activity in the school setting on students' health, fitness, cognition, psychological development, academic performance and classroom behaviour. York, Ontario: North York Community Health Promotion Research Unit, 1993.

241. Kirks B, Hendricks D, Wyse B. Parent involvement in nutrition education for primary grade students. *J Nutr Educ* 1982;**13**:140–4.

242. Perry CL, Klepp KI, Shultz JM. Primary prevention of cardiovascular disease: community wide strategies for youth. *J Consult Clin Psychol* 1988;**56**:358–64.

243. Perry C, Luepker R, Murray D, *et al.* Parent involvement with children's health promotion: a one-year follow-up of the Minnesota Home Team. *Health Educ Q* 1989;**16**:171–80.

244. Nader P, Sallis J, Patterson T. A family approach to cardiovascular risk reduction: results from the San Diego family health project. *Health Educ Q* 1989;**16**:229–44.

245. Nader P, Sallis J, Abramson I, *et al.* Family-based cardiovascular risk reduction education among Mexican- and Anglo-Americans. *Fam Community Health* 1992;**15**:57–74.

246. Lionis C, Kafatos A, Vlachonikolis J. The effects of a health education intervention program among Cretan adolescents. *Prevent Med* 1991;**20**:685–99.

247. Perry C, Mullis R, Maile M. Modifying the eating behavior of young children. *J Sch Health* 1985;**55**:399–402.

248. Byrd-Bredbenner C, Hsu-O'Connell L, Shannon B, *et al.* A nutrition education curriculum for health education: its effects on students' knowledge, attitude and behavior. *J Sch Health* 1984;**54**:385–8.

249. Graves K, Shannon B, Sims L, *et al.* Nutrition knowledge and attitudes of elementary school students after receiving nutrition education. *J Am Diet Assoc* 1982;**81**:422–7.

250. Shannon B, Graves K, Hunt M. Food behavior of elementary school students after receiving nutrition education. *J Am Diet Assoc* 1982;**81**:428–34.

251. Shannon B, Chen A. A three-year school-based nutrition education study. *J Nutr Educ* 1988;**20**:114–24.

252. Bell C, Lamb M. Nutrition education and dietary behaviour of fifth graders. *J Nutr Educ* 1973;**5**:196–9.

253. Hearn M, Bigelow C, Nader P. Involving families in cardiovascular health promotion: the CATCH feasibility study. *J Health Educ* 1992;**23**:22–31.

254. Klepp K-I, Wilhelmsen B. Nutrition education in junior high schools: incorporating behaviour change strategies into home economics courses. *Health Educ Res: Theory Practice* 1993;**8**:547–54.

255. Walter H, Hofman A, Vaughan R, *et al.* Modification of risk factors for coronary heart disease: five-year results of a school-based intervention trial. *N Engl J Med* 1988;**318**:1093–100.

256. Walter H, Vaughan R, Wynder E. Primary prevention of cancer among children: changes in cigarette smoking and diet after six years of intervention. *J Natl Cancer Inst* 1989;**81**:995–9.

257. Burnett K, Magel P, Harrington S, *et al.* Computer-assisted behavioral health counseling for high school students. *J Counsel Psychol* 1989;**36**:63–7.

258. Parcel G, Simons-Morton B, O'Hara N, *et al.* School promotion of healthful diet and physical activity: Impact on learning outcomes and self-reported behaviour. *Health Educ Q* 1989;**16**:181–99.

259. Perry C, Klepp K, Halper A, *et al.* Promoting healthy eating and physical activity patterns among adolescents: a pilot study of "Slice of Life". *Health Educ Res* 1987;**2**:93–103.

260. Walter H, Hofman A, Barrett L. Primary prevention of cardiovascular disease among children: three year results of a randomized intervention trial. In: Hetzel B, Berenson G, editors. Cardiovascular risk factors in childhood: epidemiology and prevention. Netherlands: Elsevier, 1987.

261. Walter H. Primary prevention of chronic disease among children: the school-based "Know Your Body" intervention trials. *Health Educ Q* 1989;**16**:201–14.

262. Vandongen R, Jenner D, Thompson C, *et al.* A controlled evaluation of a fitness and nutrition intervention program on cardiovascular health in 10- to 12-year-old children. *Prevent Med* 1995;**24**:9–22.

263. Holund U. Promoting change of adolescents' sugar consumption: the 'Learning by Teaching' study. *Health Educ Res* 1990;**5**:451–8.

264. Resnicow K, Cohn L, Reinhardt J, *et al.* A three-year evaluation of the "Know Your Body" program in inner-city schoolchildren. *Health Educ Q* 1992;**19**:463–80.

265. Ellison R, Capper A, Goldberg R, *et al.* The environmental component: changing school food service to promote cardiovascular health. *Health Educ Q* 1989;**16**:285–97.

266. Hopper C, Gruber M, Munoz K, *et al.* Effect of including parents in a school-based exercise and nutrition program for children. *Res Q Exercise Sport* 1992;**63**:315–21.

267. Domel S, Baranowski T, Davis H, *et al.* Development and evaluation of a school intervention to increase fruit and vegetable consumption among 4th and 5th grade students. *J Nutr Educ* 1993;**25**:345–9.

268. Gillespie A. Evaluation of nutrition education and training mini-grant programs. *J Nutr Educ* 1984;**16**:8–12.

269. Killen J, Telch M, Robinson T, *et al.* Cardiovascular disease risk reduction for tenth graders: a multiple-factor school-based approach. *JAMA* 1988; **260**:1728–33.

270. Snyder M, Story M, Trenkner L. Reducing fat and sodium in school lunch programs: the LUNCHPOWER! Intervention Study. *J Am Diet Assoc* 1992;**92**:1087–91.

271. Whitaker R, Wright J, Finch A, *et al.* An environmental intervention to reduce dietary fat in school lunches. *Pediatrics* 1993;**91**:1107–11.

272. Whitaker R, Wright J, Koepsell T, *et al.* Randomized intervention to increase children's selection of low-fat foods in school lunches. *J Pediatr* 1994;**125**: 535–40.

273. Jensen H, Ferris A, Neafsey P, *et al.* Promoting school lunch participation through nutrition education. *J Nutr Educ* 1985;**17**:15–18.

274. Bush P, Zuckerman A, Taggert V, *et al.* Cardiovascular risk factor prevention in black school children: The "Know Your Body" evaluation project. *Health Educ Q* 1989;**16**:215–27.

275. Walter H, Hofman A, Connelly A, *et al.* Primary prevention of chronic disease in childhood: changes in risk factors after one year of intervention. *Am J Epidemiol* 1985;**122**.

276. Dwyer T, Coonan W, Leitch D, *et al.* An investigation of the effects of daily physical activity on the health of primary school students in South Australia. *Int J Epidemiol* 1983;**12**:308–13.

277. Hofman A, Walter H, Connelly P, *et al.* Blood pressure and physical fitness in children. *Hypertension* 1987;**9**:188–91.

278. Killen J, Robinson T, Telch M. The Stanford Adolescent Heart Health Program. *Health Educ Q* 1989;**16**:263–83.

279. Alexandrov AA, Maslennikova G, Kulikov S, *et al.* Primary prevention of cardiovascular disease: 3 year intervention results in boys of 12 years of age. *Prevent Med* 1992;**21**:53–62.

280. Tamir D, Feurstein A, Brunner S. Primary prevention of cardiovascular diseases in childhood: changes in serum total cholesterol, high density lipoprotein, and body mass index after 2 years of intervention in Jerusalem schoolchildren age 7–9 years. *Prevent Med* 1990;**19**:22–30.

281. Moody D, Wilmore J, Girandola R, *et al.* The effects of a jogging program on the body composition of normal and obese high school girls. *Med Sci Sports* 1972;**4**:210–13.

282. Adeniran S, Toriola A. Effects of different running programmes on body fat and blood pressure in schoolboys aged 13–17 years. *J Sports Med Phys Fitness* 1988;**28**:267–73.

283. Alexandrov A, Isakova G, Maslennikova G. Prevention of atherosclerosis among 11-year-old schoolchildren in two Moscow administrative districts. *Health Psychol* 1988;**7**(Suppl):247–52.

284. Tuckman B, Hinckle S. An experimental study of the physical and psychological effects of aerobic exercise on schoolchildren. *Health Psychol* 1986;**5**:197–207.

285. Worsley A, Coonan W, Worsley A. The First Body Owner's Programme: An integrated school-based physical and nutrition education programme. *Health Promot* 1987;**2**:39–49.

286. Tell G, Vellar O. Noncommunicable disease risk factor intervention in Norwegian adolescents: the Oslo youth study. In: Hetzel B, Berenson G, editors. Cardiovascular risk factors in childhood: epidemiology and prevention. Amsterdam: Elsevier Science Publishers, 1987.

287. Bush P, Zuckerman A, Theiss P, *et al.* Cardiovascular risk factor prevention in black school children: two-year results of the 'Know Your Body' program. *Am J Epidemiol* 1989;**129**:466–82.

288. Taggart V, Bush P, Zuckerman A, *et al.* A process of evaluation of the District of Columbia "Know Your Body" project. *J Sch Health* 1990;**60**:60–6.

289. Savage M, Petratis M, Thomson W, *et al.* Exercise training effects on serum lipids of prepubescent boys and adult men. *Med Sci Sports Exercise* 1986;**18**:197–204.

290. Gillam T, Burke M. Effects of exercise on serum lipids and lipoproteins in girls. *Artery* 1978;**4**:203–13.

291. MacConnie S, Gillam T, Geenen D, *et al.* Daily physical activity patterns of prepubertal children involved in a vigorous exercise program. *Int J Sports Med* 1982;**3**:202–7.

292. Adeniran S, Toriola A. Effects of continuous and interval running programmes on aerobic and anaerobic capacities of schoolgirls aged 13 to 17 years. *J Sports Med Phys Fitness* 1988;**28**:260–5.

293. Goode R, Virgin A, Romet T, *et al.* Effects of a short period of physical activity in adolescent boys and girls. *Can J Appl Sport Sci* 1976;**1**:241–50.

294. Lussier L, Buskirk R. Effects of an endurance training regimen on assessment of work capacity in prepubertal children. *Ann NY Acad Sci* 1977;**301**:734–47.

295. Sinclair G. A daily physical education pilot project. *CAPHER J* 1983;March (suppl):22–6.

296. Cooper K, Purdy A, Friedman A, *et al.* An aerobics conditioning program for the Fort Worth Texas School District. *Res Q* 1975;**45**:345–50.

297. Duncan B, Boyce T, Itami R, *et al.* A controlled trial of a physical fitness program for fifth grade students. *J Sch Health* 1983;**53**:467–71.

298. Johnson L. Effects of a 5-day-a-week vs 3-day-a-week physical education class on fitness, skills, adipose tissue and growth. *Res Q* 1986;**40**:93–8.

299. Wearring G. Daily physical education: necessary but not sufficient. *CAPHER J* 1981;March–April.

300. Petchers M, Hirsch E, Bloch B. The impact of parent participation on the effectiveness of the heart health curriculum. *Health Educ Q* 1987;**14**:449–60.

301. McDonald WF, Brun JK, Esserman J. In-home interviews measure positive effects of a school nutrition program. *J Nutr Educ* 1981;**13**:140–4.

302. Lewis M, Brun J, Talmage H, *et al.* Teenagers and food choices: the impact of nutrition education. *J Nutr Educ* 1988;**20**:336–40.

303. Devine C, Olson C, Frongillo J. Impact of the Nutrition For Life program on junior high students in New York State. *J Sch Health* 1992;**62**:381–5.

304. Resnicow K, Cross D, Lacosse J, *et al.* Evaluation of a school-site cardiovascular risk factor screening intervention. *Prevent Med* 1993;**22**:838–56.

305. King A, Saylor K, Foster S, *et al.* Promoting dietary change in adolescents: a school-based approach for modifying and maintaining healthful behavior. *Am J Prevent Med* 1988;**4**:68–74.

306. Simons-Morton B, Parcel G, Baranowski T, *et al.* Promoting physical activity and a healthful diet among children: results of a school-based intervention study. *Am J Public Health* 1991;**81**:986–91.

307. Byrd-Bredbenner C, Shannon B, Hsu L, *et al.* A nutrition education curriculum for senior high home economics students: Its effect on students' knowledge, attitudes, and behaviours. *J Nutr Educ* 1988;**20**:341–6.

308. Kirks B, Hughes C. Long-term behavioral effects of parent involvement in nutrition education. *J Nutr Educ* 1986;**5**:203–6.

309. Luepker R, Perry C, Murray D, *et al.* Hypertension prevention through nutrition education in youth: a school-based program involving parents. *Health Psychol* 1988;**7** (suppl):233–45.

310. Perry C, Luepker R, Murray D. Parent involvement with children's health promotion: the Minnesota Home Team. *Am J Public Health* 1988;**78**:1156–60.

311. La Porte M, Gibbons C, Cross E. The effects of a cancer nutrition education program on sixth grade students. *Sch Food Service Res Rev* 1989;**13**:124–8.

312. White A, Skinner J. Can goal setting as a component of nutrition education affect behavior change among adolescents? *J Nutr Educ* 1988;**29**:327–35.

313. Connor M, Smith L, Fryer A, *et al.* Future fit: a cardiovascular health education and fitness project in an after-school setting. *J Sch Health* 1986;**56**:329–33.

314. Coates T, Jeffrey R, Slinkard L. Heart healthy eating and exercise: introducing and maintaining changes in health behaviors. *Am J Public Health* 1981;**71**:15–23.

315. German M, Pearce J, Wyse B, *et al.* A nutrition component for high school health education curriculums. *J Sch Health* 1981;**51**:49–153.

316. Green J, McIntosh M, Wilson W. Changes in nutrition knowledge scores and calcium intake in female adolescents. *Home Economics Res J* 1991;**19**:207–14.

317. Howison D, Niedermyer F, Shortidge R. Field testing a fifth-grade nutrition education program designed to change food-selection behavior. *J Nutr Educ* 1988;**20**:82–6.

318. Kelder S, Perry C, Lytle L, *et al.* Community-wide nutrition education: long-term outcomes of the Minnesota Heart Health Program. *Health Educ Res* 1995;**10**:119–31.

319. Killen J, Taylor C, Hammer L. An attempt to modify unhealthful eating attitudes and weight regulation practices of young adolescent girls. *Int J Eating Disorders* 1993;**13**:369–84.

320. Lindholm B, Touliatos J, Wenberg M. Predicting changes in nutrition knowledge and dietary quality in ten to thirteen-year-olds following a nutrition education program. *Adolescence* 1984;**14**:370–5.

321. Marcus A, Wheeler R, Cullen J, *et al.* Quasi-experimental evaluation of the Los Angeles Know Your Body Program: knowledge, beliefs and self-reported behaviors. *Prevent Med* 1987;**16**:803–15.

322. Byrd-Bredbenner C, Hsu-O'Connell L, Shannon B. Junior high home economics curriculum: Its effects on students' knowledge, attitude, and behaviour. *Home Economics Res J* 1982;**11**:123–33.

323. St. Pierre R. An evaluation of the nutrition education and training program: project. Cambridge, MA: Abt Associates. Washington, DC: Food and Nutrition Service (DOA), 1981.

324. Angelico F, Ben M, Fabiani L. Management of childhood obesity through a school-based programme of general health and nutrition education. *Public Health (Lond)* 1991;**105**:393–8.

325. Lionis C, Kafatos A, Vlachonikolis J. The effects of a health education intervention program among Cretan adolescents. *Prevent Med* 1991;**20**:685–99.

326. Chethik B. Turning kids onto good nutrition. *Teacher* 1976;Feb:44–6.

327. Cohn J, Johnson M, Randolph M. Cooking in the kindergarten. *J Nutr Educ* 1972;**4**:26–7.

328. George J. A nutrition education unit for a sixth grade. *J Nutr Educ* 1971;**3**:111–12.

329. Head M. A nutrition education program at three grade levels. *J Nutr Educ* 1974;**6**:56–9.

330. Picardi S, Porter D. Multidimensional evaluation of a food and nutrition minicourse. *J Nutr Educ* 1976;**8**:162–8.

331. Roth A. The effect of an instructional unit incorporating live animals on knowledge for different age levels. In: Proceedings of the Meeting of the American Educational Research Association. San Francisco, 1976.

332. Jenkins S, Strum M, Voichick J. Evaluation of a nutrition film series "Mulligan Stew". *J Nutr Behav* 1975;**7**:17–19.

333. Baker M. Influence of nutrition education on fourth and fifth graders. *J Nutr Educ* 1972;**4**:55–8.

334. Boysen S, Ahrens R. Nutrition instruction and lunch surveys with second graders. *J Nutr Educ* 1972;**5**:172–5.

335. Casper B, Hayslip D, Force S. The effect of nutrition education on dietary habits of fifth graders. *J Sch Health* 1977;**47**:475–7.

336. Clark R, Fisher R. A token reinforcement system applied to the school lunch program. *Colorado J Educ Res* 1975;**15**:17–20.

337. Garrett P, Vaden A. Influence of student-selected menus on participation, plate-waste and student attitudes. *Sch Food Service Journal* 1978;**2**:28–33.

338. Lovett R, Barker E, Marcus B. The effect of a nutrition education program at the second grade level. *J Nutr Educ* 1970;**2**(Suppl 1):81–95.

339. Shoup E. Teens teach children nutrition. *J Nutr Educ* 1976;**7**:107–8.

340. Wang M, Dwyer J. Reaching Chinese-American children with nutritional education. *J Nutr Educ* 1975;**7**:145–8.

341. Tuttle W, Dawn K, Larsen R, *et al.* Effect on school boys of omitting breakfast. *J Am Diet Assoc* 1954;**30**:675–7.

342. Boone E, White E. The effect of Extension Services youth nutrition session series on behavioural change in EFNEP youth utilizing different educational environments and teachers. Raleigh, NC: North Carolina State Agricultural Extension Service, 1976.

343. Siegal J, Manfredi T, Thiel R. Effects of a ten month running program on selected physiologic and risk factors in ten year old children. In: Proceedings of the Connecticut State College, New Haven. Unpublished.

344. Gillam T, Freedson P. Effects of a 12-week school physical fitness program on peak VO2, body composition and blood lipids in 7 to 9 year old children. *Int J Sports Med* 1980;**1**:73–8.

345. Dicenso A. systematic overviews of the prevention and predictors of adolescent pregnancy. University of Waterloo (Canada), 1995.

346. Peersman G, Oakley A, Oliver S, *et al.* Review of effectiveness of sexual health promotion interventions for young people. London: Epicentre, 1996.

347. Kirby D. A review of educational programs designed to reduce sexual risk taking behaviour among school aged youths in the United States. Santa Cruz: ETR Associates, 1995.

348. Kirby D, Short L, Collins J, *et al.* School-based programs to reduce sexual risk behaviors: a review of effectiveness. *Public Health Rep* 1994;**109**:339–60.

349. Walter H, Vaughn R. AIDS risk reduction among a multi-ethnic sample of urban high school students. *JAMA* 1993;**270**:725–30.

350. McEwan R, Bhopal R, Patton W. Drama on HIV and AISA: an evaluation of a theatre in education programme. *Health Educ J* 1991;**50**:155–60.

351. Michaud PA, Hausser D. Swiss teenagers, Aids and sexually-transmitted diseases – presentation and evaluation of a preventive exhibition. *Health Educ Res* 1992;**7**:79–86.

352. Christopher S, Roosa M. An evaluation of an adolescent pregnancy prevention program: is "Just Say No" enough? *Fam Relations* 1990;**39**:68–72.

353. Barth R, Fetro J, Leland N, *et al.* Preventing adolescent pregnancy with social and cognitive skills. *J Adolesc Res* 1992;**7**:208–32.

354. Kisker E, Brown R, Hill J. Health Caring: outcomes of the Robert Wood Johnson Foundation's school-based adolescent program. Princeton: Robert Wood Johnson Foundation, 1994.

355. Sellers D, McGraw S, McKinlay J. Does the promotion and distribution of condoms increase teen sexual activity? Evidence from an HIV prevention program for Latino youth. *Am J Public Health* 1994;**84**:1952–8.

356. Thomas B, Mitchell A, Devlin C, *et al.* Small group sex education at school: the McMaster Teen Program. In: Miller B, Card R, Paikoff R, *et al.,* editors. Preventing adolescent pregnancy. Newbury Park, CA: Sage Publications, 1992:28–52.

357. Zabin L, *et al.* Evaluation of a pregnancy prevention program for urban teenagers. *Fam Plann Perspect* 1986;**18**:119–26.

358. Moberg D, Piper D. An outcome evaluation of Project Model Health: a middle school health promotion program. *Health Educ Q* 1990;**17**:37–51.

359. Jemmott J, Jemmott L, Fong G. Reductions in HIV risk-associated sexual behaviors among black male adolescents: effects of an AIDS prevention intervention. *Am J Public Health* 1992;**82**:372–7.

360. Levy S, Perhats C, Weeks K, *et al.* Impact of a school-based AIDS prevention program on risk and protective behavior for newly sexually active students. *J Sch Health* 1995;**65**:145–51.

361. Smith M. Teen incentives program: evaluation of a health promotion model for adolescent pregnancy prevention. *J Health Educ* 1994;**25**:24–9.

362. Main D, Iverson D, McGloin J, *et al.* Preventing HIV infection among adolescents: evaluation of a school-based education program. *Prevent Med* 1994;**23**:409–17.

363. Kirby D, Warszak C, Ziegler J. Six school-based clinics: their reproductive health services and impact on sexual behaviour. *Fam Plann Perspect* 1991;**23**:6–16.

364. Edwards LE, Steinman ME, Arnold KA, *et al.* Adolescent pregnancy prevention services in high school clinics. *Fam Plann Perspect* 1980;**12**:6–14.

365. Weeks K, Levy S, Zhu C, *et al.* Impact of school-based AIDS prevention program on young adolescents' self efficacy skills. *Health Educ Res* 1995;**10**:329–44.

366. Caceres C, Rosasco A, Mandel J, *et al.* Evaluating a school-based intervention for STD/AIDS prevention in Peru. *J Adolesc Health* 1994;**15**:582–91.

367. Schaalma H, Kok G, Bosker R, *et al.* Short-term effects of a systematically developed school-based AIDS/STD education for secondary school students in the Netherlands. Unpublished, 1994.

368. Klepp K, Ndeki S, Seha A, *et al.* AIDS education for primary school children in Tanzania. An evaluation study. *AIDS* 1994;**8**:1157–62.

369. Eisen M, Zellman G, McAlister A. Evaluating the impact of a theory based sexuality and contraceptives education programme. *Fam Plann Perspect* 1990;**22**:261–71.

370. Kirby D, Barth R, Leland N, *et al.* Reducing the risk: a new curriculum to prevent sexual risk taking. *Fam Plann Perspect* 1991:252–63.

371. Howard M, McCabe J. Helping teenagers postpone sexual involvement. *Fam Plann Perspect* 1990;**22**:21–6.

372. Jorgensen S. Project taking charge: an evaluation of an adolescent pregnancy prevention program. *FAMR* 1991;**40**:373–80.

373. Frappier J. Evaluation d'un programme d'education sexuelle dans une polyvante. Unpublished, 1981.

374. Gibson J. Black and Hispanic teenage and contraceptive attitudes and behavior: a school-based study. PhD thesis, Columbia University, 1987.

375. Handler A. An evaluation of school-based education pregnancy prevention program. PhD thesis, University of Illinois, 1987.

376. Philliber S, Allen J. Life options and community service: Teen Outreach Program. In: Miller B, Card J, Paikoff P, *et al.,* editors. Preventing adolescent pregnancy: model programs and evaluations. Newbury Park, CA: Sage, 1992:139–55.

377. Ralph H, Edgington A. An evaluation of an adolescent family panning program. *J Adolesc Health Care* 1983;**4**:158–62.

378. Slade L. Life-outcomes perceptions and adolescent contraceptive use. PhD thesis, Emory University, 1989.

379. Smith M. The Teen Incentive Program: a research and evaluation model for adolescent pregnancy prevention: Columbia University, 1990.

380. Ashworth C, Durant R, Newman C, *et al.* An evaluation of a school-based AIDS/HIV education program for high school students. *J Adolesc Health* 1992;**13**:582–8.

381. Barth R, Leland N, Kirby D, *et al.* Enhancing social and cognitive skills. In: Miller B, Card J, Paikoff R, *et al.,* editors. Preventing adolescent pregnancy: model programs and evaluations. Newbury Park, CA: Sage Publications, 1992.

382. DiClemente R, Pies C, Stoller E, *et al.* Evaluation of a school-based AIDS education curricula in San Francisco. *J Sex Res* 1989;**26**:188–98.

383. Hamalainen J, Keinanen-Kiukaaniemi S. A controlled study of the effects of one lesson on the knowledge and attitudes of school children concerning HIV and AIDS. *Health Educ J* 1992;**51**:135–9.

384. Herz E, Goldberg W, Reis J. Family life education for young adolescents: a quasi-experiment. *J Youth Adolesc* 1984;**13**:309–27.

385. Brown L, Barone V, Fritz G, *et al.* AIDS education: The Rhode Island experience. *Health Educ Q* 1991;**18**:195–206.

386. Gilles P, Stork A, Bretman M. Streetwize UK: a controlled trial of an AIDS education comic. *Health Educ Res* 1990;**5**:27–33.

387. Huszti H, Clopton J, Mason P. Acquired immunodeficiency syndrome educational program: effects on adolescents' knowledge and attitudes. *Paediatrics* 1989;**84**:986–94.

388. Jorgensen S, Potts V, Camp B. Project taking charge: six month follow-up of a pregnancy prevention program for early adolescents. *Fam Relations* 1993;**42**:401–6.

389. Young M, Core-Gebhart P, Marx D. Abstinence-orientated sexuality education: initial field tests of the Living Smart Curriculum. *Fam Life Educator* 1992;**10**:4–8.

390. Roosa M, Christopher S. Evaluation of an abstinence-only adolescent pregnancy prevention programme: a replication. *Fam Relations* 1990;**39**:363–7.

391. Warren W, King A. Development and evaluation of an AIDS/STD/sexuality program for Grade 9 students. Kingston, Ontario: Social Program Evaluation Group, 1994.

392. Kirby D. The effects of selected sexuality education programmes: towards a more realistic view. *J Sex Educ Ther* 1985;**11**:28–37.

393. Walker G, Vilella-Velez F. Anatomy of a demonstration. Philadelphia: Public/Private Ventures, 1992.

394. Kipke M, Boyer C, Hein K. An evaluation of an AIDS risk eradication education and skills training (ARREST) programme. *J Adolesc Health* 1993;**14**:533–9.

395. Kirby YD, Resnik MD, Downes B, *et al.* The effects of school-based clinics in St Paul on school wide birth rates. *Fam Plann Perspect* 1993;**25**:12–16.

396. MacMillan HL, MacMillan JH, Offord DR, *et al.* Primary prevention of child sexual abuse: a critical review. Part II. *J Child Psychol Psychiatry* 1994;**35**:857–76.

397. Daro DA. Prevention of child sexual abuse. *Future Child* 1994;**4**:198–223.

398. Miltenberger RG, Olsen LA. Abduction prevention training: a review of findings and issues for future research. *Educ Treat Child* 1996;**19**:69–82.

399. Fryer G, Krazier S, Miyoshi T. Measuring actual reduction of risk to child abuse: a new approach. *Child Abuse Negl* 1987;**11**:173–9.

400. Harvey P, Forehand R, Brown C, *et al.* The prevention of sexual abuse: examination of the effectiveness of a program with kindergarten-age children. *Behav Ther* 1988;**19**:429–35.

401. Hazzard A, Kleemeier C, Webb C. Teacher versus expert presentations of sexual abuse prevention programs. *J Interpersonal Violence* 1990;**5**:23–35.

402. Hazzard A, Kleemeier C, Webb C. Teacher versus expert presentations of sexual abuse prevention programs. *J Interpersonal Violence* 1990;**5**:23–35.

403. Saslawsky D, Wurtele S. Educating children about sexual abuse: implications for pediatric intervention and possible prevention. *J Pediatr Psychol* 1986;**11**:235–45.

404. Krazier S, Witte S, Fryer G. Child abuse prevention programs: what makes them effective in protecting children? *Child Today* 1989;**18**:23–7.

405. Poche C, Yoder P, Miltenberger R. Teaching self-protection to children using television techniques. *J Appl Behav Anal* 1988;**21**:253–61.

406. Hazzard A, Webb C, Kleeimeier C, *et al.* Child sexual abuse prevention: evaluation and one-year follow-up. *Child Abuse Negl* 1991;**15**:123–38.

407. Kolko D, Moser J, Hughes J. Classroom training in sexual victimization awareness and prevention skills: an extension of the red flag/green flag people program. *J Fam Violence* 1989;**4**:25–45.

408. Conte J, Rosen C, Saperstein L, *et al.* An evaluation of a progam to prevent the sexual victimization of young children. *Child Abuse Negl* 1985;**9**:319–28.

409. Kolko D, Moser J, Litz J, *et al.* Promoting awareness and prevention of child victimization using the red flag/green flag program: an evaluation with follow-up. *J Fam Violence* 1987;**2**:11–35.

410. Tutty L. The ability of elementary school children to learn child sexual abuse prevention concepts. *Child Abuse Negl* 1992;**16**:369–84.

411. Wurtele S, Saslawsky D, Miller C, *et al.* Teaching personal safety skills for potential prevention of sexual abuse: a comparison of treatments. *J Consult Clin Psychol* 1986;**54**:688–92.

412. Wolfe D, MacPherson T, Blount R, *et al.* Evaluation of a brief intervention for educating school children in awareness of physical and sexual abuse. *Child Abuse Negl* 1986;**10**:85–92.

413. Nibert D, Cooper S, Ford J, *et al.* The ability of young children to learn abuse prevention. *Response* 1989;**12**:14–20.

414. Blumberg E, Chadwick M, Fogarty L. The touch discrimination component of sexual abuse prevention training: unanticipated positive consequences. *J Interpersonal Violence* 1991;**6**:12–28.

415. Nelson D. An evaluation of the student outcomes and instructional characteristics of the 'You're in Charge' program. Salt Lake City: Utah State Office of Education, 1985.

416. Woods S, Dean K. Community based options for maltreatment prevention: augmenting self-sufficiency. National Center on Child Abuse and Neglect, 1986.

417. Wurtele S, Marrs S, Miller-Perrin C. Practice makes perfect: the role of participant modelling in sexual abuse prevention programs. *J Consult Clin Psychol* 1987;**55**:599–602.

418. Klassen T. The effectiveness of injury control interventions. MSc thesis, McMaster University, 1995.

419. Towner E, Dowswell T, Simpson G, *et al.* Preventing unintentional injuries in childhood and adolescence. Newcastle-upon-Tyne: Department of Child Health, University of Newcastle-upon-Tyne, 1995.

420. Speller V, Mulligan J-A, Law C, *et al.* Preventing injury in children and young people: a review of the literature and current practice. Wessex Institute of Public Health Medicine, 1995.

421. Boxall J. School crossing patrols: how effective are they. *Traffic Eng Control* 1988;Nov:586.

422. Preusser D, Blomberg R. Reducing child pedestrian accidents through public education. *J Safety Res* 1984;**15**:47.

423. Preusser D, Lund A. And keep on looking: a film to reduce pedestrian crashes among 9 to 12-year-olds. *J Safety Res* 1988;**19**:177–85.

424. Rivara F, Booth C, Bergman A, *et al.* Prevention of pedestrian injuries to children: effectiveness of a school training program. *Pediatrics* 1991;**88**:770–5.

425. Yeaton W, Bailey J. Teaching pedestrian safety skills to young children: an analysis and one-year follow up. *J Appl Behav Anal* 1978;**11**:315.

426. Fortenberry J, Brown D. Problem identification, implementation and evaluation of a pedestrian safety program. *Accid Analysis Prevent* 1982;**14**:315–22.

427. Harland G, Tucker S. Lets decide – Walk Wise – the development and testing of a pedestrian training resource. In: Proceedings of the 14th Conference of the British Health and Safety Society.1994.

428. Penna C, Lambert A. "Streets Ahead" evaluation. Victoria: Vic Roads,1994.

429. Young D, Lee D. Training children in road crossing skills using a roadside simulation. *Accid Anal Prevent* 1987;**19**:327.

430. Demetre J, Lee D, Grieve R, *et al.* Young people's learning on road crossing simulations. *Br J Educ Psychol* 1992.

431. Nishioka N, Ieda S, Takahashi H. An experimental study on the safety behavior of children in a dashing-out situation – effects of verbal instructions and traffic conditions on safety behavior. *IATSS Res* 1991;**15**:39–45.

432. Ampofo-Boateng K, Thomson J, Grieve R, *et al.* A developmental and training study of children's ability to find safe routes to cross the road. *Br J Dev Psychol* 1992.

433. Thomson J, Ampofo-Boateng K, Pitcairn T, *et al.* Behavioural group training of children to find safe routes to cross the road. *Br J Educ Psychol* 1992;**62**:173.

434. Gregersen N, Nolen S. Children's road safety and the strategy of voluntary traffic safety clubs. *Accid Anal Prevent* 1994;**26**:463–70.

435. Wright M, Rivara F, Ferse D. Evaluation of the Think First head and spinal cord injury prevention program. *Injury Prevent* 1995;**1**:81–5.

436. Morris B, Trimble N. Promotion of bicycle helmet use among schoolchildren: a randomized clinical trial. *Can J Public Health* 1991;**82**:92–4.

437. DiGuiseppi C, Rivara F, Koepsell T, *et al.* Bicycle helmet use by children. Evaluation of a community wide helmet campaign. *JAMA* 1989;**262**:2256.

438. Parkin P, Spence L, Hu X, *et al.* Evaluation of a promotional strategy to increase bicycle helmet use by children. *Pediatrics* 1993;**91**:772–7.

439. Pendergrast R, Ashworth C, DuRant R, *et al.* Correlates of children's bicycle helmet use and short-term failure of school-level interventions. *Pediatrics* 1992;**90**:354–8.

440. Stutts J, Hunter W. Evaluation of a bicycle safety education curriculum for elementary school age children. Chapel Hill, NC: North Carolina University, 1990.

441. Dannenberg A, Gielen A, Beilenson P, *et al.* Bicycle helmet laws and educational campaigns: an evaluation of strategies to increase children's helmet use. *Am J Public Health* 1993;**83**:667–74.

442. McLoughlin E, Healer C, Crawford J. Burn education intervention: a controlled study. *Burns* 1979;**6**:26–9.

443. Morrow R. A school-based program to increase seatbelt use. *J Fam Pract* 1989;**29**:517–20.

444. Lonero L, Wilson W, Ish D. The seatbelt education project. Toronto: Ministry of Transport and Communications, 1973.

445. Neuwelt E, Coe M, Wilkinson A, *et al.* Oregon head and spinal cord injury prevention program and evaluation. *Neurosurgery* 1989;**24**:453–8.

446. Robertson L. Driver education and fatal crash involvement of teenaged drivers. *Am J Public Health* 1978;**68**:959–65.

447. Lund A, Williams A, Zador P. High school driver education: further evaluation of the DeKalb County study. *Accid Anal Prevent* 1986;**18**:349–57.

448. Antaki C, Morris P, Flude B. The effectiveness of the 'Tufty Club' in road safety education. *Br J Educ Psychol* 1986;**56**:363–5.

449. Tziotis M. Evaluation of the "Safe Routes to Schools" and "Walk with Care" Programs. Victoria: Vic Roads, 1994.

450. van Schagen I, Brookhuis K. Training young cyclists to cope with dynamic traffic situations. *Accid Anal Prevent* 1994;**26**:223–30.

451. Roberts M, Fanurik D. Rewarding elementary school children for their use of safety belts. *Health Psychol* 1986;**5**:185–96.

452. Linares A, Linares H. Burn prevention programmes for children: are they effective? *Burns* 1979;**6**:73–9.

453. McLoughlin E, Vince C, Lee A, *et al.* Project Burn Prevention: outcome and implications. *Am J Public Health* 1982;**72**:241–7.

454. Eckelt K, Fannon M, Blades B, *et al.* A successful burn prevention program in elementary schools. *Accid Anal Prevent* 1985;**22**:263–79.

455. Varas R, Carbone R, Hammond J. A one hour burn prevention program for grade school children: its approach and success. *J Burn Care Rehab* 1988;**9**:69–71.

456. Grant E, Turney E, Bartlett M, *et al.* Evaluation of a burn prevention programme in a public school system. *J Burn Care Rehab* 1992;**13**:703–7.

457. Lewis B, Kaplan S, Weinberg K. Do children retain what they are taught? *J Burn Care Rehab* 1994;**15**:298–302.

458. Thompson R, Summers S, Rampey-Dobbs R, *et al.* The effect of instruction on burn prevention in eighth grade students in preparation for babysitting. *J Burn Care Rehab* 1992;**13**:482–6.

459. Morton J, Burton J. An evaluation of the effectiveness of mouthguards in high school rugby players. *NZ Dent J* 1979;**75**:151–3.

460. McKnight A, McPherson K. Evaluation of peer intervention training for high school alcohol safety education. *Accid Anal Prevent* 1986;**18**:339–47.

461. Tilford S, Delaney F, Vogels M. Effectiveness of mental health promotion interventions: a review. London: Health Education Authority, 1997.

462. Ploeg J, Ciliska D, Dobbins M, *et al.* A systematic overview of adolescent suicide prevention programs. *Can J Public Health Rev* 1996;**87**:319–24.

463. Klingman A, Hochdorf Z. Coping with distress and self-harm: the impact of a primary prevention program among adolescents. *J Adolesc* 1993;**16**: 121–40.

464. Orbach I, Bar-Joseph H. The impact of a suicide prevention program for adolescents on suicidal tendencies, hopelessness, ego identity, and coping. *Suicide Life Threaten Behav* 1993;**23**:120–9.

465. Hazell P, Lewin T. An evaluation of postvention following adolescent suicide. *Suicide Life Threaten Behav* 1993;**23**:101–9.

466. Henderson P, Kelbey T, Engebretson K. Effects of a stress-control program on children's locus of control, self concept and coping behavior. *Sch Counselor* 1992;**40**:125–30.

467. Overholser J, Hemstreet A, Spirito A, *et al.* Suicide awareness programs in the schools: effects of gender and personal experience. *J Am Acad Child Adolesc Psychiatry* 1989;**28**:925–30.

468. Spirito A, Overholser J, Ashworth S. Evaluation of a suicide awareness curriculum for high school students. *J Am Acad Child Adolesc Psychiatry* 1988;**27**:705–11.

469. Stacey S, Rust J. Evaluating the effectiveness of the DUSO-1 (revised) program. *Elementary Sch Guidance Counsel* 1985;**20**:84–90.

470. Battaglia J, Coverdale J, Bushong C. Evaluation of a mental illness awareness week program in public schools. *Am J Psychiatry* 1990;**147**:324–9.

471. Bonaguro J, Rhonehouse M, Bonaguro E. Effectiveness of four school health education projects upon substance use, self-esteem and adolescent stress. *Health Educ Q* 1988;**15**:81–92.

472. Dubow E, Schmidt D, McBride J, *et al.* Teaching children to cope with stressful experiences: initial implementation and evaluation of a primary prevention program. *J Clin Child Psychol* 1993;**22**:428–40.

473. Fertman C, Chubb N. The effects of a psycho-educational program on adolescents' activity involvement, self-esteem and locus of control. *Adolescence* 1992;**27**:517–26.

474. Hains A, Szyjakowski M. A cognitive stress reduction intervention program for adolescents. *J Counsel Psychol* 1990;**37**:79–84.

475. Nelson G, Carson P. Evaluation of a social problem solving skills program for third- and fourth-grade students. *Am J Community Psychol* 1988;**16**:79–99.

476. Ciffone J. Suicide prevention: a classroom presentation to adolescents. *Soc Work* 1993;**38**:197–203.

477. Kalafat J, Elias M. An evaluation of a school-based suicide awareness intervention. *Suicide Life Threaten Behav* 1994;**24**:224–33.

478. Nelson F. Evaluation of a youth suicide prevention school program. *Adolescence* 1987;**22**:813–25.

479. Shaffer D, Garland A, Vieland V. The impact of curriculum-based suicide prevention programmes for teenagers. *J Am Acad Child Adolesc Psychiatry* 1991;**30**:588–96.

480. Kay E, Locker D. Effectiveness of oral health promotion – a review. London: Health Education Authority, 1997.

481. Sprod A, Anderson R, Treasure E. Effective oral health promotion. Dental Public Health Unit, University of Wales College of Medicine, 1996.

482. Ivanovic M, Lekic P. Effect of a short-term educational programme without prophylaxis on control of plaque and gingival inflammation in school children. *Acta Stomatol Croatica* 1990;**24**:123–31.

483. Barrie R, Carstens I. An evaluation of school dental health education programmes. *Dental Assoc S Africa J* 1989;**43**:137–40.

484. McIntyre J, Wight C, Blinkhorn A. A reassessment of Lothian Health Board's dental health education programme for primary school children. *Community Dent Health* 1985;**2**:99–108.

485. Kerebel L-M, Le Cabellec M-T, Kerebel B, *et al.* Effect of motivation on the oral health of French schoolchildren. *J Dentist Child* 1985;**52**:287–92.

486. Wight C, Blinkhorn A. An assessment of two dental health education programmes for school children in the Lothian region of Scotland. *J Pediatr Dentist* 1988;**4**:1–7.

487. Emier B, Windchy A, Zaino S, *et al.* The value of repetition and reinforcement in improving oral hygiene performance. *J Peridontol* 1980;**2**:228–34.

488. Holund U. The effect of a nutrition education programme 'learning by teaching' on the dietary attitudes of a group of adolescents. *Community Dent Health* 1990;**7**:395–401.

489. Croft L. The Effectiveness of the Toothkeeper Program after six years. *Texas Dent J* 1980;**9**:6–8.

490. Brown R, Morilleau J, Cross P. A toothbrushing programme in a school for the intellectually handicapped. *NZ Dent J* 1980;**76**:21–2.

491. Messer J. The Nain THETA programme: a peer group dental education program. *Can J Community Dent* 1987;**2**:18–21.

492. Horowitz A, Suomi J, Peterson J, *et al.* Effects of supervised daily dental plaque removal by children after 3 years. *Community Dent Oral Epidemiol* 1980;**8**:171–6.

493. Albandar J, Buischi Y, Oliveira L, *et al.* Lack of effect of oral hygiene training on peridontal disease progression over 3 years in adolescents. *J Peridontol* 1995;**66**:255–60.

494. Craft M, Croucher R, Dickinson J. Preventive dental health in adolescents: short and long-term pupil responses to trials of an integrated curriculum package. *Community Dent Oral Epidemiol* 1981;**9**:199–206.

495. Schou L, Wight C. Does dental health education affect inequalities in dental health? *Community Dent Health* 1994;**11**:97–100.

496. Arnold C, Doyle A. Evaluation of the dental health education programme 'Natural Nashers'. *Community Dent Health* 1984;**1**:141–7.

497. Craft M, Croucher R, Dickinson J, *et al.* Natural Nashers: a programme of dental health education for adolescents in schools. *Int Dent J* 1984;**34**:204–13.

498. Craft M, Croucher R, Blinkhorn A. 'Natural Nashers' dental health education programme: the results of a field trial in Scotland. *Br Dent J* 1984;**156**:103–5.

499. Laiho M, Honkala E, Nyssonen V, *et al.* Three methods of oral health education in secondary schools. *Scand J Dent Res* 1993;**101**:422–7.

500. Albandar J, Buischi Y, Mayer M, *et al.* Long-term effect of two preventive programs on the incidence of plaque and gingivitis in adolescents. *J Peridontol* 1994;**65**:605–10.

501. Axelsson P, Kristofferson K, Karlsson R, *et al.* A 30-month longitudinal study of some oral hygiene measures on *Streptoccocus mutans* and approximal dental caries. *J Dent Res* 1987;**66**:761–5.

502. Blinkhorn A, Wight C, Yardley A. Report of two dental health programmes for adolescents in the Lothian region of Scotland. *J Dent* 1987;**15**:213–17.

503. Davis B, Costanzo G. A comparison of the effectiveness of television vs live instruction for teaching flossing in the classroom. *Can Dent Hygienist* 1982;**16**:12–15.

504. Dowey J. Computer games for dental health education in primary schools. *Health Educ* 1987;**46**:107–8.

505. Dulac M, Ivory J, Horowitz A. Working with non-dental groups to influence adoption of self-applied fluoride programs in schools: one approach. *J Sch Health* 1983;**53**:184–8.

506. Ehudin H, Martin H. Tooth-tutoring: a pilot study to evaluate peer-teaching effectiveness. *J Dentist Child* 1983;**50**:287–91.

507. Towner E. The 'Gleam Team' programme: development and evaluation of a dental health education package for infant schools. *Community Dent Health* 1984;**1**:181–91.

508. Hartshorne J, Carstens I, Beilinsohn, B, *et al.* The effectiveness of a school-based oral health education program – a pilot study. *Dent Assoc S Afr J* 1989;**44**:5–10.

509. Holund U. Effect of a nutrition education programme, 'Learning by teaching', on adolescents' knowledge and beliefs. *Community Dent Oral Epidemiol* 1990;**18**:61–5.

510. Houle B. The impact of long-term dental health education on oral hygiene behaviour. *J Sch Health* 1982;**52**:256–61.

511. Jodaiken A. The effect of oral health care instruction during the 1979 National Dental Health Week on plaque removal by school children. *Dent Assoc S Afr J* 1981;**36**:691–3.

512. Julien M. The effect of behaviour modification techniques on oral hygiene and gingival health of 10-year-old Canadian children. *Int J Paediatr Dent* 1994;**4**:3–11.

513. Kallio P, Ainamo J. Self-assessment of gingival bleeding. *Int Dent J* 1990;**40**:231–6.

514. Lachapelle D, Desaulniers D, Bujold N. Dental health education for adolescents: assessing attitude and knowledge following two educational approaches. *Can J Public Health* 1989;**80**:339–44.

515. Lee A. Daily, dry toothbrushing in kindergarten. *J Sch Health* 1980;**50**:506–9.

516. Melsen B, Agerbaek N. Effect of an instructional program on oral health in Danish adolescents after 1 and 2 years. *Community Dent Oral Epidemiol* 1980;**8**:72–8.

517. Murray J, Epstein L. Improving oral hygiene with videotape modeling. *Behav Modification* 1981;**5**:360–71.

518. Peterson F, Rubinson L. An evaluation of a school dental health program: phase I. *J Dentist Child* 1981;**4**:433–6.

519. Peterson FJ, Rubinson L. An evaluation of the effects of the American Dental Association's dental health education program on the knowledge, attitudes and health locus of control of high school students. *J Sch Health* 1982;**52**:63–9.

520. Sogaard A, Tuominen R, Holst D, *et al.* The effect of 2 teaching programs on the gingival health of 15-year-old schoolchildren. *J Clin Peridontol* 1987;**14**:165–70.

521. Sogaard A, Holst D. The effect of different school-based dental health education programmes in Norway. *Community Dent Health* 1988;**5**:169–84.

522. ter Horst G, Hoogstraten J. Immediate and delayed effects of a dental health education film on peridontal knowledge, attitudes and reported behavior of Dutch adolescents. *Community Dent Oral Epidemiol* 1989;**17**:123–6.

523. Wright F. An assessment of dental health education. *NZ Dent J* 1984;**80**:74–80.

524. Hodge H, Buchanan M, O'Donnell P, *et al.* The evaluation of the junior dental health education programme developed in Sefton, England. *Community Dent Health* 1987;**4**:223–9.

525. Blinkhorn A, Taylor I, Willcox G. Report of a dental health education programme in Bedfordshire. *Br Dent J* 1981;**150**:319–22.

526. Weisenberg M, Kegeles S, Lund A. Children's health beliefs and acceptance of a dental preventive activity. *J Health Soc Behav* 1980;**21**:59–74.

527. Lalloo R, Solanki G. An evaluation of a school-based comprehensive public oral health care programme. *Community Dent Health* 1994;**11**:152–5.

528. Horowitz L. Dental patient education: self-care to human health development. *Patient Educ Counsel* 1990;**15**:65–71.

529. Fuller S, Harding M. The use of the sugar clock in dental health education. *Br Dent J* 1991;**170**:414–16.

530. Walsh M. Effects of school-based dental health education on knowledge, attitudes and behaviour of adolescents in San Francisco. *Community Dent Oral Epidemiol* 1985;**13**:143–7.

531. Carlsson P, Struzycka I, Wierzbicka M, *et al.* Effect of a preventive programme on dental caries and mutans streptococci in Polish schoolchildren. *Community Dent Oral Epidemiol* 1988;**16**:253–7.

532. Brown C, Lennon M, Crosland W. A dental care programme for occasional dental attenders. *Community Dent Health* 1990;**7**:407–12.

533. Peters L, Paulussen T. School health promotion and cancer prevention. A review of international effectiveness research on skin cancer prevention. NIGZ Netherlands Institute for Health Promotion and Disease Prevention, 1997.

534. Buller M, Loescher L, Buller D. Sunshine and Skin Health: a curriculum for skin cancer prevention education. *J Cancer Educ* 1994;**9**:155–62.

535. Girgis A, Sanson-Fisher R, Tripodi D, *et al.* Evaluation of interventions to improve solar protection in primary schools. *Health Educ Q* 1993;**20**:275–87.

536. Hughes B, Altman D, Newton J. Melanoma and skin cancer: evaluation of a health education programme for secondary schools. *Br J Dermatol* 1993;**128**:412–17.

537. Mermelstein R, Riesenberg L. Changing knowledge and attitudes about skin cancer risk factors in adolescents. *Health Psychol* 1992;**11**:371–6.

538. Wells J, Stewart-Brown S. A review of school mental health promotion. Health Services Research Unit, University of Oxford, 1999.

539. Kawachi I, Kenedy B, Lochner K, *et al.* Social capital, income inequality, and mortality. *Am J Public Health* 1997;**87**:1491–7.

540. Weare K, Gray G. Promoting mental and emotional health in the European network of Health Promoting Schools. University of Southampton, UK and WHO Regional Office for Europe, Copenhagen, 1995.

541. Altman DL. Practical statistics for medical research. London: Chapman and Hall, 1991.

542. Fraser E, Bryce C, Crosswaite C, *et al.* Evaluating health promotion: doing it by numbers. *Health Educ J* 1995;**54**:214–25.

543. Fisher D, Armstrong D, de Klerk N. A RCT of education for prevention of smoking in 12 year old children. In: Proceedings of the 5th World Conference on Smoking and Health, Winnipeg: Canadian Council of Smoking and Health, 1983.

544. Homel P, Daniels P, Reid T, *et al.* Results of an experimental school-based health development programme in Australia. *Int J Health Educ* 1981;**24**:263–70.

545. Anderson JE, Kiann L, Holtzman D, *et al.* HIV/AIDS knowledge and sexual behaviour among high school students. *Fam Plann Perspects* 1990;**22**:252–5.

546. Bellingham K, Gilles P. Evaluation of an AIDS education programme for young adults. *J Epidemiol Community Health* 1993;**47**:134–8.

547. Eisen M, Zellman G. A health beliefs field experiment: teen talk. In: Miller B, Card J, Paikoff P, *et al.,* editors. Preventing adolescent pregnancy: model programs and evaluations. Newbury Park, CA: Sage Publications, 1992:220–64.

548. Eisen M, Zellman G, McAlister A. A health belief model social learning theory approach to adolescents' fertility control: findings from a controlled field trial. *Health Educ Q* 1992;**19**:249–62.

549. Furstenberg F, Moore K, Peterson J. Sex education and sexual experience among adolescents. *Am J Public Health* 1985;**75**:1331–2.

550. Herz E, Reis J, Barbera-Stein L. Family life education for young teens: an assessment of three interventions. *Health Educ Q* 1986;**13**:201–21.

551. Howard M, McCabe J. An information and skills approach for younger teens: postponing sexual involvement program. In: Miller B, Card J, Paikoff P, *et al.,* editors. Preventing adolescent pregnancy: model programs and evaluations. Newbury Park, CA: Sage Publications, 1992:83–108.

552. Howard M. Delaying the start of intercourse among adolescents. *Adolesc Med State Art Rev* 1992;**3**:181–93.

553. Kirby D, Waswak C, Ziegler J. An assessment of six school-based clinics: services, impact and potential. Washington, DC: Center for Population Options, 1989.

554. Kirby D, Waszak C. School-based clinics. In: Miller B, Card J, Paikoff R, *et al.,* editors. Preventing adolescent pregnancy: model programs and evaluations. Newbury Park, CA: Sage, 1992.

555. Levy S, Weeks K, Handler A, *et al.* A longitudinal comparison of AIDS related attitudes and knowledge of parents and their children. *Fam Plann Perspects* 1995;**27**:4–10, 7.

556. Mitchell-Dicenso A, Thomas B, Devlin M, *et al.* Evaluation of an education program to prevent adolescent pregnancy. Unpublished, 1993.

557. Bergman A, Rivara F, Richards D, *et al.* The Seattle children's bicycle helmet campaign. *Am J Dis Child* 1990;**144**:727.

558. Morton J, Burton J. An evaluation of the effectiveness of mouthguards in high school rugby players. *NZ Dent J* 1979;**75**:151–3.

559. Schou L, Wight C, Wohlgemuth B. Deprivation and dental health: the benefits of a child dental health campaign in relation to deprivation as estimated by the uptake of free meals at school. *Community Dent Health* 1991;**8**:147–54.

Appendix 1

Search strategies

Review of the effectiveness of the health promoting schools approach: search strategies for primary studies of health promoting schools *(see chapter 4)*

An initial broad search was carried out to locate all papers concerned with health promoting schools. No design limitations were applied.

MEDLINE EXPRESS (R) (3/12/97)

No. Request
1 COMPREHENSIVE
2 SCHOOL
3 HEALTH
4 COMPREHENSIVE SCHOOL HEALTH
5 HEALTH
6 PROMOTING
7 SCHOOL*
8 HEALTH PROMOTING SCHOOL*
*9 #4 or #8

This strategy was modified for use in the following databases, which were then searched. Details of the full strategies are available from the authors.

ASSIA (1980–3/12/97)
BRITISH EDUCATION INDEX (1980–23/12/97)
CINAHL (R) database (1982–9/97)
DHSS Data (1980–3/12/97)
Dissertation Abstracts (1980–23/12/97)
EMBASE (1980 – 23/12/97)
ERIC (1980 – 23/12/97)
PsycINFO (1980 – 23/12/97)
SIGLE (1980 – 3/12/97)
Sociofile (1/74–10/97) (23/12/97)

Review of reviews of the effectiveness of health promotion in schools: search strategies for reviews of health promotion in schools *(see chapter 5)*

Initially MEDLINE was searched for reviews in each area of health interest listed in the National Curriculum using individual strategies containing additional relevant key words. Details of these preliminary searches are available from the authors.

There was considerable overlap in the results of these searches, so they were synthesised into a single strategy. The results of this search were compared with those of the original searches and the final strategy was adjusted accordingly

MEDLINE (searched 1966 to date)

#school health general
#school health
1 school health services/
2 adolescent behavior/
3 school nursing/
4 school health.tw.
5 school nursing.tw.
6 or/1-5
#health
7 health education/
8 health promotion/
9 health behavior/
10 attitude to health/
11 exp life style/
12 knowledge, attitudes, practice/
13 counsel$.tw.
14 social$ develop$.tw
15 life skill$.tw.
16 health education.tw.
17 resistance education.tw.
18 education programme$.tw.
19 health intervention$.tw.
20 health promot$.tw.
21 intervention strateg$.tw.
22 social education.tw.
23 health risk behavior.tw.
24 (substance$ adj2 education$).tw.
25 (alcohol adj2 education$).tw.
26 (drug$ adj2 education$).tw.
27 (sex$ adj2 education$).tw.
28 (family life adj2 education$).tw.
29 (safety adj2 education$).tw.
30 (nutrition$ adj2 education$).tw.
31 (food adj2 education$).tw.
32 ((healthy eating or diet$) adj2 education$).tw.
33 ((exercise or fitness or physical) adj2 education$).tw.
34 (hygiene adj3 education$).tw.
35 (environment$ adj2 education$).tw.
36 (mental health adj2 education$).tw.

37 (psycholog$ adj2 education$).tw.
38 or/7-37
#children and school
39 child/
40 adolescence/
41 child.tw.
42 children.tw.
43 young person.tw.
44 young people.tw.
45 adolescen$.tw.
46 youth$.tw.
47 pupil$.tw.
48 student$.tw.
49 teenage$.tw.
50 young adult$.tw.
51 schoolchildren.tw.
52 ((infant$ or junior$) adj2 school$).tw.
53 ((primary or secondary) adj3 (school$ or education$)).tw.
54 school$.ti.
55 school$.ab.
56 (class or classes).tw.
57 teach$.tw.
58 curricul$.tw.
59 or/39-58
60 38 and 59
61 6 or 60
#Optimal review search strategy
62 (meta-analysis or review literature).sh.
63 meta-analy$.tw.
64 metaanal$.tw.
65 (systematic$ adj4 (review$ or overview$)).tw.
66 meta-analysis.pt.
67 review.pt.
68 case report.sh.
69 letter.pt.
70 historical article.pt.
71 review of reported cases.pt.
72 review,multicase.pt.
73 review.ti.
74 review literature.pt.
75 62 or 63 or 64 or 65 or 66 or 67 or 73 or 74
76 68 or 69 or 70 or 71 or 72
77 75 not 76
78 animal.sh.
79 human.sh.
80 78 not (78 and 79)
81 77 not 80
#result
82 61 and 81

This strategy was used to search MEDLINE from 1966 to date, and modified for use with the following databases. Full details are available from the authors.

BIDS Social Science Citation Index (1981–1997): searched 25/7/97
CINAHL: searched 5/8/1997
DHSS Data (1983–1997): searched 5/8/97
Dissertation Abstracts (1993–1997)
EMBASE (1974–1997): searched 6/8/97
ERIC (1966–1997): searched: 1/8/97
PsycINFO (1967–1997): searched 06/08/97
PsycLIT (1991–3/97): searched 6/8/97
Science Citation Index (1981-1997): searched 25/7/97
SIGLE: searched 6/8/97
Sociofile (1/74–4/97): searched 25/7/97

Appendix 2

Relevant professionals and organisations contacted

Wendy Arnold-Dean, Project Officer (Health Promotion in Schools), HEA

Dr ME Bernard, Institute of Education, University of Melbourne

Dr Louise Brown, School of Dental Science, University of Melbourne

Dr P Cheung, Director, Centre for Health Studies, University of Durham

Catriona Crosswaite, Health and Behaviour Change Research Unit, University of Edinburgh

Dr Deborah Daro, Director, Center on Child Abuse Prevention Research, Chicago

Ms JA Davies, Dental Epidemiologist, Dental HSRU, Department of Dental Health, Dundee

Ms Sue Denman, Department of Public Health Medicine and Epidemiology, University of Nottingham

Rachal Dixey, Leeds Metropolitan University

Mary Duffy, Research Liaison Officer, Health Education Board for Scotland

Dr DM Gorman, Center of Alcohol Studies, New Jersey

Dr Philip Hanlon, Senior Lecturer in Public Health, Department of Public Health, University of Glasgow

Dr Wynne Harlen, Director, Scottish Council for Research in Education

Health Promoting School Award Scheme Administrator, Grimsby

Mary Hickman, Research Manager, European Network for Health Promoting Schools, HEA

Jennifer Holland, The Centre for Health Education and Research, Canterbury Christ Church College

Professor F Jarvis, Department of Child Health, University of Newcastle upon Tyne

National Foundation for Educational Research

Jane Leaman, Public Health Promotion Specialist, Public Health Department, Oxfordshire Health Authority

Dr Harriet MacMillan, Department of Psychiatry, McMaster University, Ontario

Dr R Miltenberger, Psychology Department, North Dakota State University

Alysoun Moon, Researcher, Wessex Institute for Health Research and Development

Dr P Nutman, Head of School, School of Health and Community Care, Leeds Metropolitan University.

Professor Ann Oakley, Social Science Research Unit, University of London

Dr Carl Parsons, Reader in Education, Christ Church College, Canterbury

Sandra Passmore, Dietitian (School Nutrition Advisory Group) Martineau Education Centre, Health Education Unit, Birmingham

Greet Peersman, EPICENTRE, Institute for Education, London

Professor P Pharoah, Department of Public Health, University of Liverpool

Dr F Platt, Director, Health and Behaviour Change Research Unit, University of Edinburgh

Vivian Barnekow Rasmussen, Consultant, Health Promoting Schools, WHO

Dr Mike Rayner, Department of Public Health and Primary Care, University of Oxford

Dr K Resnicow, Child & Adolescent Health Research, American Health Foundation

Prof. J Springett, Health Promotion and Research Development, Institute for Health, John Moores University, Liverpool

Lindsay Stead, Review Group Coordinator, Cochrane Tobacco Addiction Research

David Stears, Director, The Centre for Health Education and Research, Canterbury Christ Church College, Canterbury, Kent

Ms Katherine Weare, Director, Health Education Unit, University of Southampton

Appendix 3

Data extraction pro forma

Primary studies of the health promoting school approach

Author, year, country
Name of intervention

Author's objectives

Study methodology
School selection:
Design:
Outcomes measured and tools used:
Time between intervention and post-test(s):

Methodological quality

Participants

Intervention
Health needs addressed:
Setting:
Programme development:
Theory base:
Content:
Ethos/environment:
Curriculum:
Family/community:
Intensity/duration of intervention:
Provider of activities:
Resources:

Intervention quality

Results
Social and psychological effects
Effects on the organisation

Costs

Comments

Systematic reviews of the effectiveness of health promotion interventions in schools

Author, date, country

Author's objectives

Review methodology
Search:
Inclusion criteria:
Quality assessment:

Review quality

Participants

Intervention

Number and type of studies

Study quality

Results

Author's conclusions

Comments

Appendix 4

Membership of the steering group

Aidan MacFarlane, Director, Adolescent and Student Health Unit, Institute of Health Sciences

Siobhan Watt, Harewood Medical Practice, The Health Centre, Catterick Garrison

Lucy Jackson, Leeds Health Promotion Service

Janette Munton, Senior Health Promotion Specialist (young people), Leeds Community and Mental Health Service

Mary Hickman, Research Manager, Health Education Authority

Pamela Gillies, Research Director, Health Education Authority

Stuart Logan, Institute of Child Health, University of London

Ruth Gilbert, Director, Centre for Evidence-based Child Health, Institute of Child Health, University of London

Hilarie Williams, Senior Medical Officer, Department of Health

John Barron, Health Promotion Specialist, The Health Promotion Service, Scunthorpe Local Office

Karen Harries, School Health and Paediatric Community Nursing, Nuffield Health Centre

Sue Nashe, School Health and Paediatric Community Nursing, Nuffield Health Centre

Alison Cockerill, Senior Health Promotion Specialist, Hull and Holderness Community Health NHS Trust

Leslie Davidson, Director, National Perinatal Epidemiology Unit, Radcliffe Infirmary, Oxford

Jane Wells, Specialist Registrar in Public Health Medicine, Health Services Research Unit, Department of Public Health, University of Oxford

Appendix 5

Quality of reviews

The quality of each included review was rated as 0, 1 or 2 on each of the following criteria:

(1) Search
- 0 Vague or 1 database only
- 1 Several databases alone or plus other methods
- 2 Broad search, unpublished/ono-journal/foreign

(2) Data extraction process
- 0 No details
- 1 Either details of data extraction forms or numbers of reviewers given
- 2 Both details of data extraction forms and numbers of reviewers given

(3) Methodological quality assessment
- 0 No more than design given
- 1 Some extra discussion or information
- 2 Detailed discussion or formal assessment using criteria

(4) Use of methodological quality assessment
- 0 Not used
- 1 Presented but had little influence
- 2 Influenced presentation of results and/or conclusions

(5) Details of participants
- 0 Numbers only
- 1 Numbers and ages only
- 2 Numbers, ages and some demographic details

(6) Details of intervention content
- 0 Minimal details
- 1 Some description of the majority of interventions
- 2 Explicit descriptions of all interventions

(7) Details of intervention implementation
- 0 No/minimal details
- 1 Some details of length of sessions/duration or person implementing
- 2 Details of length of sessions/duration or person implementing

(8) Reporting of results
- 0 General statements but no numbers
- 1 Some details and numbers
- 2 Numbers/effect sizes etc for each study and all outcomes accounted for

Appendix 6

Primary studies included in reviews

The primary studies included in reviews are presented in the following tables according to topic area. The bibliographic reference number of each primary study is given at the start of each row and the first author's name and the bibliographic reference number of each review as column headings. Under 'Programme' the name of the intervention evaluated or, if untitled, the author's name, is given, plus a code detailing its content and personnel involved. The key to this code appears at the top of the table in each topic area. Additional information about the intensity and duration of the intervention and the people delivering it are given under 'Delivery'. In the review columns, the study design (RCT; CT, controlled trial; BA, before-and-after), unit of allocation (p, person; cl, class; sch, school) and number of participants **as reported in that review** are given.

The programme **domains** have been coded as: A, ethos and/or environment, B, curriculum; C, family and/or community.

The curricular **components** have been coded as: 1, information; 2, decision making skills; 3, pledge; 4, values clarification; 5, goals setting; 6, stress management; 7, self-esteem; 8, resistance skills training; 9, life skills training; 10, norm setting; 11, assistance; 12, alternatives.

The **personnel** used to deliver the interventions have been coded as: a, teacher led; b, peer led; c, outside expert.

Included studies	Programme name	Delivery	James (1991)[80]	Hansen (1992)[71]	Binyet (1993)[82]	Ennett (1994)[81]	Foxcroft (1995)[75]	Gorman (1995)[77]	Gorman (1996)[78]	White (1997)[76]	Peters (1997)[79]
Albert (1985)[214]	HBM (B1)			RCT 339 p							
Allison (1990)[154]	DAPPER (B1, 2,4, 9a)	5 x 3 h sessions Trained teachers					RCT (cl) 266				
Armstrong (1990)[107]	Smoking Prevention WA (B3,8a + b)	5 sessions Peer leaders, video tape simulated roles	RCT 1505 p								
Baer (1988)[201]	Social Skills Training (B1,7,8,11c)	22 sessions							CT (cl) 1037		
Bagnall (1990)[155]	Bagnall (B1,8a)	5 sessions over 4–5 weeks Teachers					CT (sch) 1560	RCT (sch) 1586			CT 1560
Barber (1988)[211]	Alcohol Programme for Aboriginal Children (B1,4,8a)	8 sessions, 1 h per week	CT 64 p								
Barrett (1991)[184]	DARE (B1,2,3,6,7,8,9,12c)	17 x 50 min lessons								RCT (cl) 604	
Beaulieu (1988)[127]	Beaulieu (B1,2,9,11ab)	45 min per week for 8 weeks Teacher and peer helpers					RCT (cl) 73 p	RCT (cl) ?		RCT (cl) 73	
Becker (1992)[151]	DARE (B1,2,3,6,7,8,9,12c)									CT 3000	
Bell (1993)[136]	See Elickson[134]	See Elickson[134]					See Elickson[134]			See Elickson[134]	
Biglan (1985)[92]	Biglan (BC1,8a; B1,8a)	Teachers (alone or with parents four sessions)			CT 3387 p						
Botvin (1984)[223]	LST (B1,2,5,6,7,8,9,10,12)			RCT 1 sch							

continued

Included studies	Programme name	Delivery	James (1991)[80]	Hansen (1992)[71]	Binyet (1993)[82]	Ennett (1994)[81]	Foxcroft (1995)[75]	Gorman (1995)[77]	Gorman (1996)[78]	White (1997)[76]	Peters (1997)[79]
Botvin (1984)[157]	LST (B1,2,5,6,7,8,9, 10,12a + b)	20 (+ 10 sessions) Trained teacher or trained peer leader		RCT 10 sch			RCT (sch) 1311 p		RCT (sch) 1311 p		
Botvin (1984)[202]	LST (B1,2,5,6,7,8,9,10,12a)	20 sessions							RCT (sc) 239		
Botvin (1989)[100]	Botvin (B1,2,6,7,8,9,10a/b)	20 sessions Peers or teachers			CT 1185						
Botvin (1989)[101]	LST (B1,2,5,6,7,8,9, 10,12a + b)	20 (+ 10 sessions) Trained teacher or trained peer leader		RCT 10 sch					See Botvin[157]	RCT (sch) 998	
Botvin (1990)[102]	LST (B1,2,5,6,7,8,9,10,12a)	15 + 10 + 5 session Personal or video training		RCT 56 sch	RCT 4466		RCT (sch) 5954		RCT (sch) 5954	RCT (sch) 3684	RCT 3684
Botvin (1995)[137]	LST (B1,2,5,6,7,8,9,10,12a)	15 + 10 + 5 session Personal or video training					See Botvin[102]		See Botvin[102]	See Botvin[102]	
Botvin (1995)[99]	LST-CFI (B2,5,6,7,8,9,10bc)	23 sessions over 2 years Health professional and peer									RCT 456
Bremberg (1994)[84]	It's Your Decision (A?B1,5,12a)	6 sessions (group and individual)					CT (cl) 124 p				
Brewer (1991)[158]	HLAY2 (B9c)	9 x 40 min Researcher and guidance counsellor					RCT (cl) 54				
Byrne (1984)[130]	Smoking Prevention Qns (B1,3,4a)	Implementation left to teachers	CT 761								
Caplan (1992)[97]	Positive Youth Development Programme (B1,2,6,7,8,9ac)	20 sessions over 15 weeks Health educators and trained classroom teachers					RCT (cl) 282		RCT (cl) 282		
Casswell (1982)[195]	Casswell (B1,2,8)	6 sessions						RCT (sch) (1931)			

continued

Included studies	Programme name	Delivery	James (1991)[80]	Hansen (1992)[71]	Binyet (1993)[82]	Ennett (1994)[81]	Foxcroft (1995)[75]	Gorman (1995)[77]	Gorman (1996)[78]	White (1997)[76]	Peters (1997)[79]
Casswell (1985)[196]	See Casswell[195]	Human sexuality						See Casswell[195]			
Church (1990)[183]	Church (B1a)	3 x 1 h								RCT 100	
Clarke (1986)[120]	Clarke (B1,8a/b/c)	4 x 1 h for 4 days + 2 sessions at 6 and 18 months Teachers, peers or experts			CT 1321						
Clayton (1991)[159]	DARE (B1,2,3,6,7,8,9,12c)	16 sessions over 16 weeks Uniformed police officer				RCT (1925)	RCT (sch) 2091			RCT ?	
Clayton (1992)[222]	DARE (B1,2,3,6,7,8,9,12c)			RCT 31 sch		See Clayton[159]					
Collins (1991)[207]	Collins (B1,8,12c)	3 sessions over 3 weeks Health professional									RCT 52
Cook (1984)[152]	Positive Alternatives for Youth (B7,12ac)	2–3 sessions a week over 1 semester Teachers, programme coordinator, alternatives specialist					RCT (p) 424			RCT 244	
DeJong (1987)[133]	DARE (B1,2,3,6,7,8,9,12c)	Uniformed police officers								CT 598	
Del Greco (1985)[128]	Del Greco (B1,8) (resistance only or + assertiveness)				BA? 161						
Dielman (1986)[163]	AMPS (B1,8a)	180 min, 135 min booster Expert consultant			RCT 6? sch		RCT (sch) 2589	RCT (sch) 5635			
Dielman (1989)[164]	See Dielman[163]	See Dielman[163]					See Dielman[163]	See Dielman[163]			

continued

Included studies	Programme name	Delivery	James (1991)[80]	Hansen (1992)[71]	Binyet (1993)[82]	Ennett (1994)[81]	Foxcroft (1995)[75]	Gorman (1995)[77]	Gorman (1996)[78]	White (1997)[76]	Peters (1997)[79]
Dielman (1992)[205]	AMPS (B1,8a)	4 sessions over 4 weeks Teacher led									RCT 714
Donaldson (1994)[181]	AAPT A (B1,2c), B(B1,2,8c), C (B1,2,10c), D (B1,2,8,10c)	4–10 x 45 min sessions + 5 booster over 2 years Health professional led								RCT (sch) 3077	RCT 3077
Donaldson (1995)[166]	See Hansen[106]	See Hansen[106]					See Hansen[106]				
Drink Driving Project Team (1990)[213]	Plan a Safe Strategy (B1,9a)	12 lessons, 3–8 weeks	CT 4 sch								
Dukes (1996)[206]	DARE (B1,2,3,6,7,8,9,12)	17 sessions over 17 weeks Uniformed police officer									CT 849
Dupont (1984)[197]	De Paul A (B1,4,8, 10,12), B (B1,4,10,12)	9 sessions		RCT 2 sch				RCT (p) ?			
Durrant (1986)[167]	Durrant (B1,2,4,8a)	9 x 45 min over 22 weeks Researchers and school counsellors					RCT (sch) 191				
Duryea (1983)[198]	Nebraska A (B1,8a)	6 h Trained teacher		RCT 154				RCT 155			
Duryea (1984)[168]	Duryea (B1,8a)	6 sessions over 2 weeks Trained teacher		?			RCT (p) 155				
Duryea (1984)[221]	Nebraska A (B1,8)			RCT 154							
Duryea (1984)[169]	See Duryea[168]						See Duryea[168]				
Duryea (1988)[170]	Nebraska A (B1,8)	6 sessions over 2 weeks Trained teacher		RCT 154			See Duryea[168]	See Duryea[168]			
Dwyer (1989)[109]	STAR (B1,2,3,8,10)			CT 4 sch							

continued

Included studies	Programme name	Delivery	James (1991)[80]	Hansen (1992)[71]	Binyet (1993)[82]	Ennett (1994)[81]	Foxcroft (1995)[75]	Gorman (1995)[77]	Gorman (1996)[78]	White (1997)[76]	Peters (1997)[79]
Eiser (1987)[150]	Eiser (B9a)	4 x 1 h								CT 136	
Ellickson (1990)[134]	ALERT (B1,8,10a + c)	7th grade – 8 sessions, 8th grade 3 sessions Adult health educator and peer		?			RCT (sch) 6527	RCT (sch) 6527		RCT 3852	RCT 3852
Ellickson (1990)[103]	ALERT (B1,8,10)			RCT 10 sch							
Ellickson (1993)[156]	See Ellickson[134]	See Ellickson[134]					See Ellickson[134]				
Ellickson (1993)[135]	See Ellickson[134]	See Ellickson[134]					See Ellickson[134]			See Ellickson[134]	
Ennett (1994)[162]	DARE (B1,2,3,6,7,8,9,12c)	17 sessions over 17 weeks Uniformed police officer				RCT (sch) 1323	See Rosenbaum[161]			RCT 1334	CT 1334
Evans (1978)[123]	Evans (B1,4,8ab)	4 sessions Teacher? Video of peers			CT 750						
Evans (1981)[124]	See Evans[123]	See Evans[123]									
Fisher (1983)[543]	Smoking Prevention WA (B2,8a + b)	5 sessions Peer leaders, video tape simulated roles	RCT 2500								
Faine (1988)[224]	DARE (B1,2,3,6,7,8,9,12c)	17 sessions over 17 weeks Uniformed police officer				CT 783					
Faine (1989)[225]	See Faine[224]	See Faine[224]				See Faine[224]					
Farrow (1988)[199]	RADD (B1,3,8,10,11)	10 + 6 sessions		CT 493				CT 493			
Flay (1989)[126]	Flay (B1,3,8c)	6 sessions + 5 over 3 years Researcher			RCT 22 sch						

continued

Included studies	Programme name	Delivery	James (1991)[80]	Hansen (1992)[71]	Binyet (1993)[82]	Ennett (1994)[81]	Foxcroft (1995)[75]	Gorman (1995)[77]	Gorman (1996)[78]	White (1997)[76]	Peters (1997)[79]
Gaffney (1990)[112]	Straight Talking (B6,7,8a)	16 lessons – 1 h per week	CT 1634								
Gersick (1988)[200]	Adolescent Decision Making Programme (B1,2,8,9)	12 sessions						RCT (cl) 1360			
Gilchrist (1987)[171]	Skills Enhancement Programme (B1,2,8,10bc)	10 sessions Indian researcher and indigenous leader					CT (sch) 102		RCT (sch) 102		
Gilchrist (1987)[113]	Gilchrist A (B1), B (9)				?						
Glicksman (1983)[98]	BoozeA (1c), B (B1a)	A: theatre B: didactic		CT 2 sch			CT 1000				
Gonzalez (1990)[186]	Gonzalez (b)	Peer focuses 2 h per week for semester								CT 176	
Goodstadt (1983)[172]	Toronto B (B1), C (B1,2), D (B1,4)	10 sessions over 10 days Researchers		CT 14 cl			RCT (cl) 540				
Goodstadt (1982)[220]	Toronto A (B1,2,4)	6 sessions Teacher		? 8 sch							
Graham (1990)[105]	SMART A (B1,3,8,10, 12), B (B1,2,3,5,6,7), C (B1,2,3,5,6,7,8,10,12)	12 sessions over 12 weeks Health professional		RCT 24 sch						RCT (sch) 5070	RCT 5070
Hansen (1987)[91]	Hansen (BC1,8c;B1,8c)	Researcher or health educator			CT 3 sch						
Hansen (1988)[104]	SMART A (B1,2,8,10,12ab), B (B1,2,3,5,6,7ab)	12 weeks Teachers, peer educators		RCT 8 sch			RCT (sch) 2863	RCT (sch) 2863			
Hansen (1988)[203]	TAPP (B1,2,3,4,5,6,8,10a)	15 sessions		CT 11 sch					RCT (sch) 1221 and 1707		

continued

Included studies	Programme name	Delivery	James (1991)[80]	Hansen (1992)[71]	Binyet (1993)[82]	Ennett (1994)[81]	Foxcroft (1995)[75]	Gorman (1995)[77]	Gorman (1996)[78]	White (1997)[76]	Peters (1997)[79]
Hansen (1991)[106]	AAPT A (B1,2c), B (B1,2,8c), C (B1,2,10c), D (B1,2,8,10c)	4 to 10 x 45 min sessions Trained research staff		RCT 3 sch			RCT (sch) 3011	RCT (cl) 3011		RCT (sch) 3011	RCT 2416
Harmon (1993)[160]	DARE (B1,2,3,6,7,8,9,12c)	17 sessions over 17 weeks Uniformed police officer				CT 602	CT (sch) 708			CT (sch) 708	CT 708
Hawthorne (1995)[189]	Life Education (B1,8a)	1 module per year for 5 years								CT 3019	
Hecht (1993)[144]	Drug Resistance Programme (B8a)	Compared 43 min live vs. film performance with and without 20 min discussion						RCT (cl) 465		RCT (cl) 461	RCT 465
Hirschman (1989) [131]	Hirschman (B1,8b)	3 x 45 min Video of peers			RCT 315						
Homel (1981)[544]	See Homel[114]	See Homel[114]	See Homel[114]								
Homel (1982)[114]	Health development (Ba)	5 school terms	CT 3170 p								
Hopkins (1988)[173]	HLAY (B1,2,6,7a)	Short-term – 15 sessions; long-term up to 5 x 15 sessions Teacher led		CT 12? Sch			CT (sch) 6808				
Horan (1982)[142]	Assertiveness Training A (B8), B (B1,8)	5 x 45 min sessions		RCT 36 p				RCT (p) 72		RCT 72	
Hurd (1980)[115]	Hurd (B1,8b)	5 sessions over 6 months Peer led			CT 1245						
Johnson (1986)[229]	Johnson (B1,8bc)	familiar or unfamiliar peers with researcher or researcher only			CT 3547						
Johnson (1990)[96]	STAR (BC1,2,3,8, 10ab), also called the Midwestern Prevention Project	10 sessions and 10 homework sessions over 3 years		RCT 4 sch			See Pentz[94]			RCT (sch) 1607	RCT 1105

continued

Included studies	Programme name	Delivery	James (1991)[80]	Hansen (1992)[71]	Binyet (1993)[82]	Ennett (1994)[81]	Foxcroft (1995)[75]	Gorman (1995)[77]	Gorman (1996)[78]	White (1997)[76]	Peters (1997)[79]
Jones (1990)[147]	Refusal Skills Training (B8a)	2–3 x 1 h sessions								RCT 42	
Kearney (1980)[216]	CESA #8 (B1,2,7a)	30 h Teacher		?							
Kim (1981)[219]	Ombudsman (B1,2,4,9,11,12)			?							
Kim (1989)[153]	Refusal Skills (B8a)	3 x 50 min								RCT (cl) 385	
Kim (1993)[187]	HLAY 2000 (B1,8,9a)	28 x 45 min lessons								RCT (cl) 228	
Kreutter (1991)[190]	LST (B1,3,5,6,7,8,9,10,12)									CT 216	
Krupka (1985)[87]	Krupka (BC1)	Exposure to patients in detox								CT 313	
Lloyd (1983)[210]	Smoking Prevention NSW (B1,4a)	9 sessions over 9 weeks 1 day in-service training for teachers	RCT 6400 p		? 6000						
Losciuto (1988)[93]	PRIDE (BC1,2,7,8,9a)	24 sessions Teacher and parent training		?					RCT 1084	CT 743	
Mackinnon (1991)[95]	STAR (BC1,2,3,8, 10,12ab), also called the Midwestern Prevention Project	10 sessions and 10 homework sessions					See Pentz[94]			CT 5008	
Malvin (1984)[146]	Malvin (B7,9a)	3 years' exposure to teachers trained in affective methods								CT 542	
Malvin (1985)[148]	Malvin (B11b)	12 x 45 min of peer tutoring or business training								RCT 50	
Manos (1986)[226]	DARE (B1,2,3,6,7,8,9,12c)	17 sessions over 17 weeks Uniformed police officer				CT 2009					

continued

Included studies	Programme name	Delivery	James (1991)[80]	Hansen (1992)[71]	Binyet (1993)[82]	Ennett (1994)[81]	Foxcroft (1995)[75]	Gorman (1995)[77]	Gorman (1996)[78]	White (1997)[76]	Peters (1997)[79]
Mathey (1991)[230]	Mathey (B1,8b)	Trained peers			CT 684						
McAlister (1980)[132]	CLASP (B3,8)	10 sessions and 10 homework sessions		CT 1 sch	CT 526			CT ?			
McCormick (1992)[228]	DARE (B1,2,3,6,7,8,9,12c)	17 sessions over 17 weeks Uniformed police officer				CT 943					
Miller (1989)[116]	Miller (B1,8a/b)	Peers or teachers			CT 540						
Mitchel (1984)[138]	Pennsylvania (B1,4)			CT 250 p							
Moskowitz (1983)[122]	Napa B (B1,2,4,5,8), C (B9,11,12), D (B9,12)	B: 12 x 45 min sessions C: cross-age tutoring D: student store		CT 1 sch					CT sch 687	See Mosko-witz[121]	
Moskowitz (1984)[174]	Napa B (B1,2,4,5,8c)	12 sessions over 12 weeks Research staff		RCT 16 cl			RCT (cl) 473		RCT (sch) 473		
Moskowitz (1984)[140]	Napa A (B1,2,4,6,12)			RCT 9 cl							
Moskowitz (1984)[121]	Napa B (B1,2,4,5,8)	12 sessions		RCT 16 cl					See Mosko-witz[122]	CT 552	
Murray (1989)[125]	Murray (B1,8b/c; B1,8; B1,3,8)	Peers or researchers			CT 7000						
Naccarella (1990)[86]	Kylie Mole (BCa)	2 months Resource materials for schools	CT 1212 p								
Newman (1984)[217]	Nebraska B (B1,2)			?							
Newman (1992)[175]	Resisting Pressure to Drink and Drive (B1,10a)	10 lessons including 5 x 20 min videos Teachers					RCT (sch) 87 cl	RCT (cl) 3500			RCT 3500

continued

Included studies	Programme name	Delivery	James (1991)[80]	Hansen (1992)[71]	Binyet (1993)[82]	Ennett (1994)[81]	Foxcroft (1995)[75]	Gorman (1995)[77]	Gorman (1996)[78]	White (1997)[76]	Peters (1997)[79]
O'Donnell (1995)[58]	Seattle Social Development Project (ABC2,8a)	12 x 45 min + 12 x 45 min								CT 177	
Pentz (1985)[231]	Pentz (B1,6ab)	Teachers and peers			? 1193						
Pentz (1989)[94]	STAR (BC1,2,3,8,10b) also called the Midwestern Prevention Project	10 sessions and 10 homework sessions		CT 42 sch			CT (sch) 5065 p				
Pentz (1989)[108]	STAR (BC1,2,3,8,10ab) also called the Midwestern Prevention Project	10 sessions and 10 homework sessions		CT 42 sch			See Pentz[94]			See Pentz[94]	
Pentz (1989)[111]	Policy (A)				?						
Pentz (1990)[110]	STAR, also called the Midwestern Prevention Project (B1,2,3,8,10)			CT 42 sch						CT (sch) 5065	
Perry (1989)[117]	See Perry[177]	See Perry[177]			CT 20 classes		See Perry[177]				
Perry (1988)[177]	WHO (B1,3,8,10a + b)	6 sessions (50–60 min per week) Peer versus teachers					RCT (sch) 4 country 2536 p				
Perry (1989)[176]	WHO (B1,3,8,10a + b)	6 sessions (50–60 min per week) Peer versus teachers	RCT 2536 p	? 25 sch			See Perry[177]	? 2229			
Perry (1996)[88]	Northland (BC1,3,8,9,10ab)	15+ sessions Home and community invlovement									RCT (1901)
Pipher (1982)[218]	Nebraska C (B1,2a)	11 h with teacher		CT 2 cl							
Powers (1987)[191]	Matrix Drug and Alcohol Programme (B1,2,7,9a)	10 x 1 h lessons								RCT 520	

continued

Included studies	Programme name	Delivery	James (1991)[80]	Hansen (1992)[71]	Binyet (1993)[82]	Ennett (1994)[81]	Foxcroft (1995)[75]	Gorman (1995)[77]	Gorman (1996)[78]	White (1997)[76]	Peters (1997)[79]
Reilly (1988)[212]	Peer support NSW (B8,9,11b)	Year 11 with groups of year 7 students over 6 months	CT 1511								
Ringwalt (1991)[143]	DARE (B1,2,3,6,7,8,9,12c)	17 sessions over 17 weeks Uniformed police officer		RCT 10 sch		RCT 1270	RCT (sch) 1402			RCT (sch) 1270	RCT 1270
Rosenbaum (1994)[161]	DARE (B1,2,3,6,7,8,9,12c)	17 sessions over 17 weeks Uniformed police officer					CT (sch) 1800				CT 1584
Sarvela (1987)[193]	Sarvela (B1,2,11a)	'8.30 Monday morning' package								CT 242	
Scaggs (1985)[178]	Substance Abuse Awareness Programme Prevention Model (B1,2,4,10a)	45 min per day for 15 days					RCT (cl) 121				
Schaps (1982)[141]	Napa A (B1,2,4,6,12)			RCT 9 sch							
Schaps (1986)[192]	7 Napa programmes	12 x 45 min Some teacher training								CT 2500	
Schlegel (1984)[215]	Waterloo A (B1), B (B1,4), C (B1,2,3,4)			RCT 13 cla							
Schinke (1986)[118]	Schinke (B1b; B1,2,9b)	Peers			CT 65						
Schinke (1988)[139]	Bicultural Competence Skills Training Programme (B1,6,8,9,11)	22 sessions							RCT (sch) 102	RCT 137	
Sexter (1984)[59]	Sexter (A?BCb)	Included parent effectiveness network and humanistic education approaches over 1 year								CT 1505	
Shope (1992)[165]	AMPS (B1,8a)	7 sessions over 2 years Teacher led					See [163]				RCT 1505

continued

Included studies	Programme name	Delivery	James (1991)[80]	Hansen (1992)[71]	Binyet (1993)[82]	Ennett (1994)[81]	Foxcroft (1995)[75]	Gorman (1995)[77]	Gorman (1996)[78]	White (1997)[76]	Peters (1997)[79]
Shope (1994)[204]	E-AMPS (B1,2,8,10a)	8 + 5 + 4 sessions over 3 years							RCT (sch) 3704		RCT 1725
Smart (1976)[194]	Smart (b)	Peer training in 6 periods								CT 393	
Snow (1992)[182]	Adolescent Decision Making Programme (B1,2,8,9)	12 sessions						See Gersick[200]		CT 393	RCT 1075
Stephenson (1988)[83]	Life Education Centre (C1c)	1 h visit to caravan	CT 2515 p								
Stead (1987)[129]	Skylark Puppet Show (B1,9ac)	30 min session + teacher follow-up Puppet show	CT 2500 ext p								
Thompson (1988)[85]	Primary School Drug Education (ABac)	6 month cross-curricular trained facilitator for teachers	CT 7 sch								
Vartiainen (1986)[119]	Vartiainen (B1,8bc; B1,8a)	2 years, 10 sessions with peers or 5 with teachers			CT 11 sch						
Walker (1990)[227]	DARE (B1,2,3,6,7,8,9,12c)	17 sessions over 17 weeks Uniformed police officer				CT 162					
Weiss (1987)[188]	Hashish and Marijuana Programme (B8,9)	1 h per week for 18 weeks								CT 308	
Werch (1991)[89]	Keep a Clear Mind (BC9)	4 weeks take home programme								RCT 511	
Werch (1996)[208]	STARS (B1,3,5,8bc)	2 sessions over 2 weeks Health professionals and peers									RCT 104
Wiener (1993)[90]	Wiener (BC1,2)	Drug-free student clubs and teen retreats								CT 481	

continued

Included studies	Programme name	Delivery	James (1991)[80]	Hansen (1992)[71]	Binyet (1993)[82]	Ennett (1994)[81]	Foxcroft (1995)[75]	Gorman (1995)[77]	Gorman (1996)[78]	White (1997)[76]	Peters (1997)[79]
Wilhelmsen (1994)[179]	ABA (B1, 4,610ab)	10 sessions over 2 weeks Highly specified or less role structured					RCT (sch) 915				RCT 909
Williams (1968)[180]	Massachusetts programme (B1)	5 sessions with teacher					RCT (p) 205				
Wills (1985)[232]	Decision Skills Curriculum (B1,2,4,6,8,9ac)	2 terms Health educator and class teacher			BA? 800						
Wilton (1980)[209]	Alcohol Education Qns A (B1a), B (B1,2,4d)	2 weeks A: teacher led B: discussions	CT 200 p								
Wragg (1986)[149]	Drama for Drug Education (B1,2,4,8,9)	8 sessions; 1 h per week. Video feedback A: drama B: video	CT 51?							RCT 64	
Wragg (1990)[145]	Drama for Drug Education (BC1,2,4,8,9)	8 sessions; 1 h per week. Video feedback. Parental involvement A: drama B: video	CT 619							RCT 619	
Wysong (1994)[185]	DARE (B1,2,3,6,7,8,9,12c)	Uniformed police officer								CT 623	

Included studies	Programme or author's name (programme content)	Delivery	Levy (1980)[239]	Contento (1992)[238]	Resnicow (1993)[237]	Resnicow (1993)[236]	Keays (1993)[240]	Contento (1995)[235]	Roe (1997)[233]	Willemse (1997)[234]
Adeniran (1988)[282]	Adeniran (running)	8 weeks					BA 55			
Adeniran (1988)[292]	Adeniran (running)						CT 68			
Alexandrov (1988)[283]	Alexandrov (BC1a)	3 years Teacher			CT 4213					
Alexandrov (1988)[279]	Alexandrov (BC1c)	1 session + lectures, 1 year10% highest risk had single session individually with parent							CT 1005	
Angelico (1992)[324]	Angelico (BC1a)	5 years Teacher			BA 150					
Arbeit (1992)[49]	Heart Smart (ABC1,7a)	15–30 h, 1 year ?						RCT 4 sch 530	RCT 4 sch 530	
Baker (1972)[333]	Baker (B1)		CT 265							
Bell (1973)[252]	Bell (B1)		CT 1500							
Boone (1976)[342]	Adapted Extension Services Youth Nutrition Lesson Series (AB1)		CT 1368							
Boysen (1972)[334]	Boysen (B1)		CT 265							
Burnett (1989)[257]	Student Health Behaviour Survey (B1)	Computer feedback group: 3 individualised feedback letters over 12 weeks + 14 health tip sheets Health tips group: 14 sheets only						RCT 3 sch 77	CT 77	

continued

Nutrition and exercise: primary studies included in reviews contd

Included studies	Programme or author's name (programme content)	Delivery	Levy (1980)[239]	Contento (1992)[238]	Resnicow (1993)[237]	Resnicow (1993)[236]	Keays (1993)[240]	Contento (1995)[235]	Roe (1997)[233]	Willemse (1997)[234]
Bush (1989)[274]	Know Your Body (BC1a)	5 years Teacher		RCT 9 sch 1141	RCT 216	RCT 9 sch 1063				
Bush (1989)[287]	Know Your Body (BC1,2,8a)?	1.5 h session per week for 2 years Teacher			RCT 9 sch 1063		RCT 9 sch 1041	RCT 9 sch 1041		
Byrd-Bredbenner (1982)[322]	Nutrition in a Changing World (B1a)	3–6 weeks/10 lessons Teacher		CT 397				CT 362		
Byrd-Bredbenner (1984)[248]	Nutrition in a Changing World (AB1a)	10 lessons, 3–6 weeks Teacher						CT 748		
Byrd-Bredbenner (1988)[307]	Nutrition in a Changing World (B1a)	5–6 weeks Teacher		CT 600				CT 600		CT > 600
Casper (1977)[335]	Casper (B1)		CT 45							
Chethik (1976)[326]	Chethik (B1ac)		? design ? number							
Clark (1975)[336]	Clark (A5)		? design ? number							
Coates (1981)[314]	Heart Healthy (BC1,5)	8 x 45 min over 4 weeks						BA 161		
Coates (1985)[47]	Great Sensations (ABC1,5ac)	6 sessions, 4 weeks Researcher		CT 284				CT 284		RCT 284
Cohn (1972)[327]	Cohn (A?)		? design ? number							
Connor (1986)[313]	Heart Health Education Programme (B1a)	After school, 2 x 30 min lessons per week over 12 weeks Teachers						RCT 4 sch 55		

continued

Included studies	Programme or author's name (programme content)	Delivery	Levy (1980)[239]	Contento (1992)[238]	Resnicow (1993)[237]	Resnicow (1993)[236]	Keays (1993)[240]	Contento (1995)[235]	Roe (1997)[233]	Willemse (1997)[234]
Cooper (1975)[296]	Cooper (aerobic programme)	15 weeks					CT 778			
Devine (1992)[303]	Nutrition for Life (B1a)	Median time 3 h Teachers						Survey 1863		CT 1863
Domel (1993)[267]	Gimme 5 (A?BC?1,2,5a)	18 sessions over 6 weeks Teacher						RCT 2 sch 301	CT 346	CT 301
Duncan (1983)[297]	Duncan (physical fitness)	9 months					CT ? number			
Dwyer (1983)[276]	Dwyer (physical fitness)	Daily, 14 weeks					CT ? number			
Ellison (1989)[265]	Ellison (A)	1 year							BA 774	
Garrett (1978)[337]	Garrett (A)		BA 1010							
George (1971)[328]	George (Ba)		BA 1 class							
German (1981)[315]	German (B1a)	10 lessons, 2 weeks Teacher						CT 137		
Gillespie (1984)[268]	Nutrition Education and Training (AB1a)	Periodic classes and lunchroom activities, 6 months Teacher		CT 1157				CT 1157		
Gillam (1978)[290]	Gil1am (physical activity)	40 min per day for 6 weeks; 4 sessions a week for 12 weeks Special instructor					BA 14			

continued

Nutrition and exercise: primary studies included in reviews contd

Included studies	Programme or author's name (programme content)	Delivery	Levy (1980)[239]	Contento (1992)[238]	Resnicow (1993)[237]	Resnicow (1993)[236]	Keays (1993)[240]	Contento (1995)[235]	Roe (1997)[233]	Willemse (1997)[234]
Gillam (1980)[344]	Gillam (fitness)	12 weeks					CT 23			
Goode (1976)[293]	Goode (large-muscle activity + PE programme)	6 min per day added to PE for 4 months					CT ? number			
Graves (1982)[249]	Nutrition in a Changing World (AB1a)	9 weeks and lunch room activities Teacher		CT 42 classes						
Green (1991)[316]	Green (B1a)	3 x 55 min Teacher						RCT 64		
Head (1974)[329]	Head (B1?)		CT 4700							
Hearn (1992)[253]	Grade 3: Hearty Heart (C1) Grade 4: Stowaway to Planet Strongheart (C1,5)	Hearty Heart: 5 weekly take home packets Stowaway to Planet Strongheart: 6 weekly take-home packets						BA 554 families		
Hofman (1987)[277]	Know Your Body (B1a)						BA 2061			
Holund (1990)[263]	Holund (BCab)	3 weeks, 25–30 sessions Teachers and peers								CT 114
Hopper (1992)[266]	Hopper (B1a; (BC1a)	School only: 1 h per week for 6 weeks School + home: as above + weekly home activities							RCT 6 classes 132	
Howison (1988)[317]	Secrets of Success (B1,2,5a)	10 lessons Teachers						BA 934		
Jenkins (1975)[332]	Mulligan Stew film series (B1)		CT 104							

continued

Included studies	Programme or author's name (programme content)	Delivery	Levy (1980)[239]	Contento (1992)[238]	Resnicow (1993)[237]	Resnicow (1993)[236]	Keays (1993)[240]	Contento (1995)[235]	Roe (1997)[233]	Willemse (1997)[234]
Jensen (1985)[273]	Jensen (AC)	4 weeks School lunch managers								RCT 1743
Johnson (1986)[298]	Johnson (physical activity)	5 days per week versus 2 and 3 days per week					CT 743			
Kelder (1995)[318]	Class of 89 study including Lunch Bag and Slice of Life (BC1,8?b)	5 years, community activities School: Lunch Bag – 1 session; Slice of Life 10 sessions						CT 3445		
Killen (1988)[269]	Adolescent Heart Health (B1,2,5,8c)	20 x 1 h over 7 weeks, specialist teachers		RCT 4 sch 1447				RCT 4 sch 1447	RCT 4 sch 1447	
Killen (1989)[278]	Adolescent Heart Health (B1,c)	20 sessions, 7 weeks Researcher			RCT 1170					
Killen (1993)[319]	Killen (B1,8?a)	18 lessons Teacher						RCT Classes in 4 sch 967		
King (1988)[305]	Adolescent Heart Health (B1,C,5c)	5 x 1 h for 3 weeks Health professional						RCT Classes in 2 sch 218	RCT 12 classes 218	RCT 12 classes 218
Kirks (1982)[241]	Kirks (B1a; BC1a)	4 months Teacher						RCT 9 sch 421		
Kirks (1986)[308]	Kirks (B1a; BC1a (follow-up))	4 months Teacher						RCT 9 sch 111		

continued

Nutrition and exercise: primary studies included in reviews contd

Included studies	Programme or author's name (programme content)	Delivery	Levy (1980)[239]	Contento (1992)[238]	Resnicow (1993)[237]	Resnicow (1993)[236]	Keays (1993)[240]	Contento (1995)[235]	Roe (1997)[233]	Willemse (1997)[234]
Klepp (1993)[254]	Klepp (BCaB)	4 months Teachers and peers								CT 486
La Porte (1989)[311]	La Porte(BCvB)	4 sessions, 4 weeks								CT 50
Lewis (1988)[302]	Food ...Your Choice (B1a)	17–22 sessions, 1 year Teacher		BA 1699				BA 1476		
Lindholm (1984)[320]	Lindholm (B1b)	Peer led						BA 97		
Lionis (1991)[246]	Know Your Body (BC1a)	1 year, 10 x 2 h Teacher			CT 148				CT 131	
Lovett (1970)[338]	Lovett (B1?)		CT 1270							
Luepker (1988)[309]	Hearty Heart (BC1a) + Minnesota Home Team (C)	15 sesions over 5 weeks Teacher Minnesota Home Team: 5 mailed packets in 5 weeks						CT? 1839		
Luepker (1996)[48]	CATCH (ABC1a)	15–24 x 30 min per year, 3 years Teacher							RCT 96 sch 5106	
Lussier (1977)[294]	Lussier (distance running)	10–35 min (progressive) 2–3 x week for 12 weeks					CT 26			
MacConnie (1982)[291]	MacConnie (physical activity)	25 min/4 times a week for 8 months					CT 59			
Marcus (1987)[321]	Know Your Body (B1a)	2 x 45 min per week for 2 years Teacher		CT 18 sch				CT 1508		

continued

Included studies	Programme or author's name (programme content)	Delivery	Levy (1980)[239]	Contento (1992)[238]	Resnicow (1993)[237]	Resnicow (1993)[236]	Keays (1993)[240]	Contento (1995)[235]	Roe (1997)[233]	Willemse (1997)[234]
McDonald (1981)[301]	Food ...Your Choice (B1a)	8–17 sessions, 1 and 2 years Teacher		CT 514 917				CT 514 917		
McKay (1985)[60]	McKay (ABC)	6 sessions, 4 weeks								CT 78
Moody (1972)[281]	Moody (walking and running)	15 or 29 weeks					BA 40			
Nader (1989)[244]	Family Heart Project (BC1,2,8a)	After school 90 min per week for 12 weeks + 9 months of monthly and bimonthly sessions						RCT 12 sch 206 families: 323 children 300 adults		
Nader (1992)[245]	Family Health Project (C1,2,5 + exercise)	1.5 h evening session per week, 12 weeks + 6 maintenance sessions over 9 months							CT 206 families: 323 children 300 adults	
Parcel (1989)[258]	Go for health (AB1,5a)	30 min + 4 x 10 min follow-up per week, 8 or 12 weeks, 2 years Teacher		CT 4 sch				CT 294	CT 'number unclear'	
Perry (1985)[247]	Hearty Heart (BC1,5a)	15 sessions for 5 weeks Teacher		RCT 31 sch 1827			371	CT		
Perry (1987)[259]	Slice of Life (B1,5a/b/c)	10 sessions for 1 term Peer or researcher or teacher led		RCT 10 classes 270				RCT 10 classes 270	RCT 10 classes 170	
Perry (1988)[242]	Hearty Heart (BC1a) + Minnesota Home Team (C)	15 sessions over 5 weeks Teacher Minnesota Home Team: 5 mailed packets in 5 weeks						CT? 1839		CT 1827

continued

Nutrition and exercise: primary studies included in reviews contd

Included studies	Programme or author's name (programme content)	Delivery	Levy (1980)[239]	Contento (1992)[238]	Resnicow (1993)[237]	Resnicow (1993)[236]	Keays (1993)[240]	Contento (1995)[235]	Roe (1997)[233]	Willemse (1997)[234]
Perry (1989)[243]	Hearty Heart (B1,5a; BC1,5a)	15 sessions, 5 weeks Teacher						CT? 1839	RCT 4 sch 2250	CT 2250
Petchers (1987)[300]	Chicago Heart Health Curriculum Body Power Nutrition Module (B1,4a; BC1,4a)	2 x 45 min per week, 5–6 weeks Teachers						RCT 26 sch 647		
Picardi (1976)[330]	Picardi 330 (B1 and fed rats)		? design ? number							
Resnicow (1992)[264]	Know Your Body (A?BC?1a)	30–45min/week, 3 years Teacher			CT 1209	CT 5 sch 2973		CT 2473	CT 2973	
Resnicow (1993)[304]	Know Your Body (B1a)	6 sessions Teacher						CT 1166		
Roth (1976)[331]	Roth (B1 + fed rats)		CT 1447							
Savage (1986)[289]	Savage (physical training)	10 weeks					CT 30			
Shannon (1982)[250]	Nutrition in a Changing World (AB1a)	9 weeks Teacher		CT 42 classes				CT 42 classes		
Shannon (1988)[251]	Nutrition in a Changing World (AB1a)	9–12 weeks per year for 3 years Teacher		RCT 35 sch 1707				Part RCT (10 of 12 sch) 1707		Part RCT 35 sch (10 random allocation)
Shoup (1976)[339]	Shoup (B1b)	7 weeks	BA 1 class							
Siegal[343]	Siegal (fitness programme)	10					CT 136			

continued

Included studies	Programme or author's name (programme content)	Delivery	Levy (1980)[239]	Contento (1992)[238]	Resnicow (1993)[237]	Resnicow (1993)[236]	Keays (1993)[240]	Contento (1995)[235]	Roe (1997)[233]	Willemse (1997)[234]
Simons-Morton (1991)[306]	Children's Active Physical Education + diet/physical activity curriculum (B1;AB1)? or (AB1,5a)?	5 x 6–8 week units		CT 4 sch			CT ? number		CT 4 sch Go For Health	
Sinclair (1983)[295]	Sinclair (physical activity)	30 min per day for 2 years					CT 462			
Snyder (1992)[270]	Lunchpower! (AC)	At least 5 months							BA 34 sch	
St. Pierre (1981)[323]	Nutrition Education and Training (AB1a)	10 weeks and lunchroom activities Teacher		RCT 98 sch 2351				RCT 98 sch		
Taggart (1990)[288]	Know Your Body (BC?1a)					RCT 9 sch 1063				
Tamir (1990)[280]	SEGEV (based on KYB) (BC1,2?a)	15–20 h curriculum over 2 years Teacher			CT 406				CT 829	
Tell (1987)[286]	Tell (BC1a)	2 years Teacher			Part RCT 4 of 6 sch 562					
Tuckman (1986)[284]	Tuckman (running)	30 min 3 per week for 12 weeks					CT ? number			
Tuttle (1954)[341]	Tuttle (breakfast programme) (A)		? design 7							
Vandongen (1995)[262]	Vandongen (B1a; BC1a; C1a)	10 h over 1 year Teacher Family activity packs							RCT 30 sch 1147	

continued

Nutrition and exercise: primary studies included in reviews contd

Included studies	Programme or author's name (programme content)	Delivery	Levy (1980)[239]	Contento (1992)[238]	Resnicow (1993)[237]	Resnicow (1993)[236]	Keays (1993)[240]	Contento (1995)[235]	Roe (1997)[233]	Willemse (1997)[234]
Walter (1985)[275]	Know Your Body (B1a)						RCT 14 sch 2283			
Walter (1987)[260]	Know Your Body (BC?1a)					RCT 37 sch 2474				
Walter (1988)[255]	Know Your Body (BC?1a)	1 x 10 h? session per week for 5 years Teacher			RCT 1700	RCT 37 sch 2474		37 sch	RCT 2283	
Walter (1989)[256]	Know Your Body (BC?1a)					RCT 37 sch 2474				
Walter (1989)[261]	Know Your Body (BC1,2,8?a)	5–6 years, 2 x 45 min sessions per week + family activities and seminars Teacher; screening		RCT 37 sch 3388		RCT 37 sch 2474		RCT 37 sch 3388		
Wang (1975)[340]	Wang (B1a)	Film and or instruction	CT 56							
Wearring (1981)[299]	Wearring (PE classes and PE/social activities)	Daily PE and 2 days PE + 1 social session/ week for 2 years					CT ? number			
Whitaker (1993)[271]	Whitaker (A)	School lunch changes over 8 months							BA 16 sch	
Whitaker (1994)[272]	Whitaker (AC1)	Information about school lunches 4 months							RCT 16 sch	RCT 16 2445

continued

Nutrition and exercise: primary studies included in reviews contd

Included studies	Programme or author's name (programme content)	Delivery	Levy (1980)[239]	Contento (1992)[238]	Resnicow (1993)[237]	Resnicow (1993)[236]	Keays (1993)[240]	Contento (1995)[235]	Roe (1997)[233]	Willemse (1997)[234]
White (1988)[312]	White (B1,5c)	5 x 50 min sessions over 3 weeks Researcher						RCT 2 sch 159		
Worsley (1987)[285]	Body Owner's Programme (B1a + physical activity)	50 min per day					CT?			
Young (1993)[46]	Young (ABC)	1.5 years								CT 158

Sexual health: studies included in reviews

Included studies	Programme or author's name (programme content)	Delivery	Oakley (1994)[67]	Dicenso (1995)[345]	Kirby (1995)[347]	Peersman (1996)[346]
Anderson (1990)[545]	(1989) Secondary School Student Health Risk Survey				Survey 8098	
Ashworth (1992)[380]	A letter to Brian/Don't Forget Sherry (Bc)	1 h lesson and discussion groups led by AIDS educators using video	RCT 1194			RCT 1194
Barth (1992)[353]	Reducing Risk Curriculum (B1,8?a)	15 sessions		x		CT 46 classes
Barth (1992)[381]	See Barth[353]	See Barth[353]		x		See Barth[353]
Bellingham (1993)[546]	See Gilles[386]	See Gilles[386]	See Gilles[386]			
Brown (1991)[385]	Brown (B1ad)	Talks, group discussions and handouts	CT 2709			
Caceres (1994)[366]	Caceres (BC1,8a)	7 weekly sessions Trained teachers				RCT 1213
Christopher (1990)[352]	Success Express (B4,5,7,8a)	6 sessions Teacher led		CT 528	CT 528	CT 528
DiClemente (1989)[382]	DiClemente (B1)	3 day intervention	CT 539			CT 539
Edwards (1980)[364]	St. Paul School-based Clinics (A)				BA 1000	
Eisen (1990)[369]	Teen Talk (B1,2,4,9c)	8–12 h implemented by 6 family planning service agencies and 1 school district		RCT 1288?	RCT 1288?	
Eisen (1992)[547]	See Eisen[369]	See Eisen[369]		See Eisen[369]		
Eisen (1992)[548]	See Eisen[369]	See Eisen[369]		See Eisen[369]		
Frappier (1981)[373]	Frappier (B1c)	40 min every week for 10 months		BA 1100		

continued

Sexual health: studies included in reviews contd

Included studies	Programme or author's name (programme content)	Delivery	Oakley (1994)[67]	Dicenso (1995)[345]	Kirby (1995)[347]	Peersman (1996)[346]
Furstenberg (1985)[549]	(1981) National Survey of Children				Survey 469	
Gibson (1987)[374]	Teen Choice Programme (B4,7,8d)	1–2 semesters of small group activities		BA 588		
Gilles (1990)[386]	Streetwize UK (B1a)	Includes comic for young people	CT 184			
Hamalainen (1992)[383]	Hamalainen (B1)	Included condom demonstration	RCT 324			RCT 324
Handler (1987)[375]	Peer Power Project (BC1,2,5,7,9,11c)	1 h per week during school year Peer-led programme Links to clinic and supportive adult		RCT 63		
Herz (1984)[384]	Family Life Education Programme (B1,5)	40 min per week over 15 weeks				CT 56
Herz (1986)[550]	See Herz[384]	See Herz[384]				See Herz[384]
Howard (1990)[371]	Postponing Sexual Involvement (B4,8,10b); Human Sexuality (B1,2a)	Postponing Sexual Involvement: 5 h; peer led Human Sexuality: 5 h		CT 536	CT 536	
Howard (1992)[551]	See Howard[371]	See Howard[371]		See Howard[371]		
Howard (1992)[552]	See Howard[371]	See Howard[371]		See Howard[371]		
Huszti (1989)[387]	AIDS: Acquired Immune Deficiency Syndrome (AIDS:AIDS) (B1)	A: lecture in science class B: video	RCT 448			
Jemmott (1992)[359]	Be Proud, Be Responsible (B1?)	Skills training and group discussion	RCT 157		RCT 157	RCT 157
Jorgensen (1991)[372]	Project taking charge (AC2)	30 sessions in home economics class 3 evening sessions for parents, children and teachers		RCT 91		

continued

Sexual health: studies included in reviews contd

Included studies	Programme or author's name (programme content)	Delivery	Oakley (1994)[67]	Dicenso (1995)[345]	Kirby (1995)[347]	Peersman (1996)[346]
Jorgensen (1993)[388]	Project taking charge (BC1,4,9a)	30 sessions in home economics class 3 evening sessions for parents, children and teachers			RCT 91	
Kipke (1993)[394]	AIDS Risk Reduction and Skills Training (ARREST) (B1,2,8)	3 x 90 min sessions After-school programme			RCT 81	
Kirby (1985)[392]	11 untitled programmes in USA (B1a)	5 h to 1 term			CT 2589	
Kirby (1989)[553]	See Kirby[363]	See Kirby[363]		See Kirby[363]		
Kirby (1991)[363]	6 school-based clinics (A)			CT 824–1360	CT 824–1360	
Kirby (1991)[370]	Reducing the Risk (B1,7,8a)	15 sessions in health education classes		CT 758	CT 758	
Kirby (1992)[554]	See Kirby[363]	See Kirby[363]		See Kirby[363]		
Kirby (1993)[395]	St. Paul School-based Clinics (A)	14 sessions in special classes			CT 1838–2988	
Kisker (1994)[354]	School clinics (A)				CT 3909	
Klepp (1994)[368]	Ngoa (BC1,8bc)	Peer- and professional-led programme incorporating art and drama	RCT 18 sch			RCT 18 sch
Levy (1995)[360]	See Weeks[365]	See Weeks[365]			x	See Weeks[365]
Levy (1995)[555]	See Weeks[365]	See Weeks[365]				See Weeks[365]
Main (1994)[362]	Get Real about AIDS (B1,8,9)	15 sessions Teacher led; teachers received 40 h of training	CT 979		CT 979	CT 979
McEwan (1991)[350]	Body talk (B1)	Play and workshop	BA 140			

continued

Sexual health: studies included in reviews contd

Included studies	Programme or author's name (programme content)	Delivery	Oakley (1994)[67]	Dicenso (1995)[345]	Kirby (1995)[347]	Peersman (1996)[346]
Michaud (1992)[351]	Michaud (B1c)	Exhibition supervised by school nurses	CT 1422			
Mitchell-Dicenso (1993)[556]	See Thomas[356]	See Thomas[356]		See Thomas[356]		
Moberg (1990)[358]	Project Model Health (B3,8,10)	32 h taught by college age role models		BA 265	BA 265	
Philliber (1992)[376]	Teen Outreach Programme (BC1,4,9)	Weekly sessions delivered by mentor		RCT 168?		
Ralph (1983)[377]	Ralph (A)	Youth clinic located on high school campus		BA		
Roosa (1990)[390]	Success Express (BC4,5,6,7,8a)	6 sessions in health education classes; also sessions for parents			CT 528	x
Schaalma (1994)[367]	Schaalma (B1,4,8,10a)	Included video	RCT 51 sch			RCT 51 sch
Sellers (1994)[355]	School and Community HIV?AIDS Education and Condom Availability Programme (A?BC)	18 months			CT 536	
Slade (1989)[378]	Life Outcome Perceptions (B1a)	1 h session		RCT 88		
Smith (1990)[379]	Teen Incentive Model (AB1,2,7,8,9c)	8 weekly small group sessions; 6 week career mentorship programme; role plays		RCT 120		
Smith (1994)[361]	Teen Incentive Model (B1,7,11c)	8 weekly small group sessions; 6 week career mentorship programme; role plays			RCT 120	
Thomas (1992)[356]	McMaster Teen Programme (B1,2,8,9)	10 sessions in health classes; small groups		RCT 3290	RCT 3290	RCT 3290

continued

Sexual health: studies included in reviews contd

Included studies	Programme or author's name (programme content)	Delivery	Oakley (1994)[67]	Dicenso (1995)[345]	Kirby (1995)[347]	Peersman (1996)[346]
Vincent (1987)[55]	School and Community Programme for Sexual Risk Reduction among Teens (ABC1,2,4,5,7,9ac)	2/3 school staff given sex education training; included peer education		CT 710	CT 710	
Walker (1992)[393]	STEP (BC2,9,11c)	36 sessions divided equally between 2 summers; 90 h of half time work at minimum wage, 90 h academic recitation and 5–15 h support during the school years			RCT 4800	
Walker (1993)[349]	AIDS Prevention for Adolescents in Schools (B1,2,4,8,10a)	6 sessions in general health education classes	CT 867		CT 867	CT 867
Warren (1994)[391]	Skills for Healthy Relationships (B1,8,9ab)				CT 2323	
Weeks (1995)[365]	Youth AIDS Prevention Project (YAPP) (BC1,8,9)	15 sessions over 2 years taught by health educators				RCT 2318
Young (1992)[389]	Living Smart (B1,2,4,5,7,9a)	24 sessions			CT 209	
Zabin (1986)[357]	Self Center (A1,11c)	Clinic staff made presentations at least once year to each home room			CT 6596	

Included studies	Programme or author's name (programme content)	Delivery	Macmillan (1994)[396]	Daro (1994)[397]	Miltenberger (1996)[398]
Blumberg (1991)[414]	Role-play programme and Child Abuse Primary Prevention Programme both (B1,8)	1 h		RCT 264	
Conte (1985)[408]	Conte (B1,8c)	3 h sessions Sheriff	RCT 40	RCT 40	
Fryer (1987)[399]	Fryer + Children Need to Know (B1,8)	8 x 20 min	RCT 48	RCT 44	CT 23
Harvey (1988)[400]	Good Touch-Bad Touch (B1,8c)	3 x 30 min Intervenor with college degree	RCT 90	RCT 71	
Hazzard (1990)[401]	Feeling Yes, Feeling No (B1,8a/c)	1 h/day for 3 days; 6 h workshop for teachers Mental health professional		RCT 11 sch 558	
Hazzard (1991)[406]	Feeling Yes, Feeling No (B1,8a/c)	1 h/day for 3 days; 6 h workshop for teachers Mental health professional	RCT 485	RCT 6 sch 399	
Kolko (1987)[409]	Kolko (B1c)	2 x 90 min sessions Adult volunteer (in-service training)	CT 349/335/15 (children/parents/teachers		
Kolko (1989)[407]	Kolko (B1c)	Community volunteers	CT 337/15 (children/teachers)		
Krazier (1989)[404]	Krazier (B1,8)		CT 670		
Nelson (1985)[415]	You're in Charge (B1,8)	2 x 5 min skits + video and discussion		RCT 16 sch 931	
Nibert (1989)[413]	Nibert (B1,8c)	3 x 20 min sessions Teacher	CT 116		

continued

Personal safety: primary studies included in reviews contd

Included studies	Programme or author's name (programme content)	Delivery	Macmillan (1994)[396]	Daro (1994)[397]	Miltenberger (1996)[398]
Poche (1988)[405]	Poche (B1,8a/c)	1 session of 25/45/60 min Teacher/police officer; video used	RCT 74		CT 74
Saslawsky (1986)[403]	Touch (B1c)	1 x 50 min Graduate	RCT 67	RCT 67	
Tutty (1992)[410]	Tutty (B1)	45 min session	CT 501		
Wolfe (1986)[412]	You're in Charge (B1c)	1 h session Medical student	RCT 290	RCT 12 classes 290	
Woods (1986)[416]	Talking About Touching (BC1,2,8); Spiderman book	15 min/day for 3 weeks		RCT 150 classes 4500	
Wurtele (1986)[411]	Wurtele (B1c; B1,8c)	3 x 50–60 min Graduate	RCT 71	RCT 71	
Wurtele (1987)[417]	Wurtele (B1,8)	50 min session		RCT 2 sch	

Included studies	Programme or author's name (programme content)	Delivery	Klassen (1995)[418]	Speller (1995)[420]	Towner (1995)[419]
Ampofo-Boateng (1992)[432]	Ampofo-Boateng (B)	Comparing roadside and classroom training			RCT?
Antaki (1986)[448]	Antaki (B1c)	Road safety officers using Tufty materials		CT 31 sch	CT 31 sch
Bergman (1990)[557]	See Morris[437]	See Morris[437]			See Morris[437]
Boxall (1988)[421]	Boxall (A)	Staffed versus unstaffed crossing			CT 112 sites
Daddenberg (1993)[441]	Dannenberg (BC1)		CT 151		
Demetre (1992)[430]	Demetre (B1)	Pretend road			BA
DiGuiseppi (1989)[437]	DiGuiseppi (ABC1)	School and mass media campaign; helmet discount scheme			CT 2 cities
Eckelt (1985)[454]	Eckelt (B1)	1 h		BA	BA 299
Fortenberry (1982)[426]	Fortenberry (B1)		BA 1074		
Grant (1992)[456]	Learn Not to Burn (Bc)	Materials produced by fire service		BA 30 sch	RCT 30 sch
Gregersen (1994)[434]	Children's Traffic Club (BC1)				CT 2171
Harland (1994)[427]	Lets Decide Walk Wise (B1a,c)	6 practical sessions in local roads and classroom training			CT 11 sch
Lewis (1994)[457]	Learn Not to Burn (B1)	Brief presentation to large groups			BA 17 sch

continued

Accident prevention: primary studies included in reviews contd

Included studies	Programme or author's name (programme content)	Delivery	Klassen (1995)[418]	Speller (1995)[420]	Towner (1995)[419]
Linares (1979)[452]	Linares (B)	Single multimedia lecture			BA 67
Lonero (1973)[444]	Lonero (B1)		CT 545		
Lund (1986)[447]	Lund (B1) and on road training	67 h + 3.3 on-road training or 20 h + 1 h on road	RCT 10,958		
McLoughlin (1982)[453]	See McLoughlin[442]	See McLoughlin[442]			See McLoughlin[442]
Malenfant (1989)[61]	Courtesy promotes safety (ABC)				BA 3 cities
McKnight (1986)[460]	McKnight (B1b)	9 h		RCT 667	
McLoughlin (1979)[442]	Project Burn Prevention (BC)	Mass media school and community campaign			CT 2 communities
McLoughlin (1982)[453]	See McLoughlin[442]	See McLoughlin[442]			See McLoughlin[442]
Morris (1991)[436]	Morris (B;AB (subsidy scheme))	Helmet discount scheme	RCT 50	RCT ?	RCT 3 sch
Morrow (1989)[443]	May is Buckle-up Month (BC)	1 month	BA 147		BA 422
Morton (1979)[558]	Morton (A)	Mouth guards provided			BA 272
Neuwelt (1989)[445]	Neuwelt (Bc)	Films and experts	CT 693		CT 7 sch
Nielson (1990)[62]	Nielson (ABC)				BA
Nishioka (1991)[431]	Nishioka (B)	2 degrees of verbal instruction on simulated road	RCT 47		BA? 164

continued

Accident prevention: primary studies included in reviews contd

Included studies	Programme or author's name (programme content)	Delivery	Klassen (1995)[418]	Speller (1995)[420]	Towner (1995)[419]
Parkin (1993)[438]	Be Bike Smart Week (ABc)	Helmet discounts	CT 1806	CT 22 sch	CT 1100
Pendergrast (1992)[439]	Pendergrast (AB)	Education and bicycle club discount scheme; parent–teacher associations involved	CT 575	CT 1168	CT 679
Penna (1994)[428]	Streets Ahead (BC)				CT 1188
Preusser (1984)[422]	Willy Whistle Campaign (BC1)	Schools and mass media			CT 8000 observations
Preusser (1988)[423]	And Keep Looking (BC1)	Schools and mass media	BA 364		CT
Puczynski (1992)[63]	Puczynski (ABC)	Year-long media campaign; helmet distribution	CT 264	CT ?	CT 2 sch
Rivara (1991)[424]	Rivara (BC)	One-to-one real life demonstration; parent and child activity work books	BA 137	BA 229	BA 230
Roberts (1986)[451]	Rob (BC)	Rewards procedures; parent volunteers			BA 464
Robertson (1978)[446]	Robertson (B)		CT 35,600	CT ?	
Stutts (1990)[440]	Basics of Bicycling and on bike training (B)	6–10 classes and training	CT 312		
Thompson (1992)[458]	Tho1 (B1)	One-off slide show presentation			BA 119
Thomson (1992)[433]	Thomson (B1)	6 x 30 min sessions Comparison of roadside and class room training using table top model			RCT 30

continued

Accident prevention: primary studies included in reviews contd

Included studies	Programme or author's name (programme content)	Delivery	Klassen (1995)[418]	Speller (1995)[420]	Towner (1995)[419]
Tziotis (1994)[449]	Safe Routes to School (AB)				CT 8 cities
Van Schagen (1994)[450]	van Schagen (B1)	A: theory and traffic training ground B: training ground			RCT 49
Varas (1988)[455]	Varas (Bc)	1 h, fire service and school nurse		BA 69 sch	BA 69 sch
Wright (1995)[435]	Think First Programme (B1)	1 h lecture to large group			CT 7 sch
Yeaton (1978)[425]	Yeaton (Bc)	One-to-one real life demonstration by school crossing patrols			BA 24
Young (1987)[429]	Young (B)	One-to-one training on simulated road			BA? 38

Included studies	Programme or author's name (programme content)	Delivery	Tilford (1997)[461]	Ploeg (1996)[462]
Battaglia (1990)[470]	Mental health Awareness Week programme (MHAWP) (B1c)	45 min presentations by psychiatry residents during week	CT 1662	
Bonaguro (1988)[471]	Bonaguro(BC7,9ac), 4 projects	8–10 h over 10–13 weeks 3 projects on weekly basis, 1 spent 10 consecutive days in classroom; community agencies involved in 3 projects	BA 161	
Ciffone (1993)[476]	Ciffone (B1ac)	School health teacher and social worker: day 1 ?; day 2, 55 min		CT 324
Dubow (1993)[472]	I Can Do Programme (ICDP) (B1,2,6)	13 x 45 min sessions divided into 6 units Co-led by 2 clinical psychology students	RCT 88	
Fertman (1992)[473]	Personal Empowerment Programme (B1,2,5,6,8,9)	Week-long summer workshop + 2 x 5 h follow-up sessions	RCT 52	
Hains (1990)[474]	Cognitive Stress Reduction Programme (B6)	Each of 3 phases begins with 1 h group discussion followed by 2 individual sessions	RCT 24	
Hazell (1993)[465]	Postvention Group Counselling (B11c)	90 min session within 1 week of suicides Psychiatrist + staff		CT 126
Henderson (1992)[466]	Stress Management Programme (SMP) (B6,8,9)	45 min twice a week for 4 weeks + 1 session Graduate assistants from university	RCT 65	
Kalafat (1994)[477]	Kalafat (B1a)	3 x 45 min session in 1 week Health teacher with experience and training		CT 253
Klingman (1993)[463]	Klingman or Psychological Education Curriculum (B1,6,9c)	50 min a week for 12 weeks Experienced school counsellors and psychologists given 3 h training	RCT 237	RCT 237
Nelson (1987)[478]	Nelson (BC1)	4 h		CT 370
Nelson (1988)[475]	Nelson (B1,7,9,11ab)	A: 18 x 1 h B: 18 x 1 h + peer pairing, self-monitoring and daily dialoguing	RCT A: 101 B: 62	

continued

Psychological aspects: primary studies included in reviews contd

Included studies	Programme or author's name (programme content)	Delivery	Tilford (1997)[461]	Ploeg (1996)[462]
Orbach (1993)[464]	Orbach (B6c)	7 weekly 2 h sessions School counsellor or psychologist with special training		CT 292
Overholser (1989)[467]	Samaritans of Rhode Island Curriculum (B1a)	5 meetings		CT 471
Shaffer (1991)[479]	Shaffer (B1,2ac)	3 sessions of 4, 3 and 1.5 h 'Professionals and educators' with experience of teaching the course and regular teachers.		CT 1438
Spirito (1988)[468]	Samaritans of Rhode Island Curriculum (B1a)	6 weeks, total 8 h School teachers with training		CT 473
Stacey (1985)[469]	Developing Understanding of Self and Others DUSO (BC1,2,7,9a)	3 x 30–45 min sessions per week for 15 weeks	BA 71	

Included studies	Programme or author's name (programme content)	Delivery	Sprod (1996)[481]	Kay (1997)[480]
Albandar (1994)[500]	Albandar (BC1;B1)	No details	CT? 185	RCT 227
Albandar (1995)[493]	Albandar (BC1?), see Albander[500]	No details		RCT 227
Arnold (1984)[496]	Natural Nashers (?)	No details		CT 180
Axelsson (1987)[501]	Axelsson (?)	2–3 monthly; 6 years		RCT 222
Barrie (1989)[483]	Barrie (B1 + brushing)	Supervised brushing once or twice		CT 460
Blinkhorn (1981)[525]	Blinkhorn (hygiene instruction + fluoride treatment versus B1 + fluoride tablet)	No details		CT 1067
Blinkhorn (1987)[502]	Blinkhorn (BC1ac)	No details of duration; involved teachers, parents, project workers, therapists		CT 497
Brown (1980)[490]	Brown (brushing)	No details		BA 52
Brown (1990)[532]	Brown (B1c + dental exam and polish)	4 x 1 h lessons including examination Dentists	CT 192	
Carlsson (1988)[531]	Carlsson (B1c + treatment + + fluoride toothpaste and brushes)	Lessons (number?) + monthly sessions Dentist, dental assistant	CT ?	
Craft (1981)[494]	Craft (B1) Natural Nashers (BC1a), see Sprod[481]	No details of duration Teachers	CT 4500	CT 1234
Craft (1981)[494]	Craft (B1a)	No details of duration Teachers		CT 1491
Craft (1981)[494]	Yours for Life (B1a + hygienist instruction)	No details of duration Teachers, hygienists x 4/year		CT 1067

continued

Personal hygiene: primary studies included in reviews contd

Included studies	Programme or author's name (programme content)	Delivery	Sprod (1996)[481]	Kay (1997)[480]
Craft (1984)[497]	Craft (B1a)	No details of duration Teachers		CT 410
Craft (1984)[497]	Craft (B1a)	No details of duration Teachers		CT 1234
Craft (1984)[497]	Natural Nashers (?)	No details		CT 1591
Craft (1984)[498]	Natural Nashers (?)	No details		CT 410
Croft (1980)[489]	Croft (disclosure + brushing; flossing for older children)	Daily		BA 780
Davis (1982)[503]	Davis (B1ac)	No details of duration Teacher, dental professional		CT 91
Dowey (1987)[504]	Dowey (B1a + computer games)	No details		RCT 203
Dulac (1983)[505]	Dulac (BC1)	No details		RCT 134
Ehudin (1983)[506]	Ehudin (B1ab)	No details of duration Older children instructed and then taught younger peers		CT 275
Emier (1980)[487]	Emier (B1 + brushing or BC1)	Second group had 4 home visits		CT 61
Fuller (1991)[529]	Sugar clock (B1)	No details	BA ?	
Hartshorne (1989)[508]	Hartshorne (BC1)	No details		RCT 134
Hodge (1987)[524]	Teeth for Life (B1c + brushing)	Four weekly sessions of 1 h Dental educators	CT (quasi-random) 270+	CT 360

continued

Personal hygiene: primary studies included in reviews contd

Included studies	Programme or author's name (programme content)	Delivery	Sprod (1996)[481]	Kay (1997)[480]
Holund (1990)[488]	Holund (brushing + reward)	Monthly		BA 344
Holund (1990)[509]	Holund (?)	No details	See below	CT 114
Holund (1990)[509]	Learning by teaching (B1b)	No details of duration Peers	CT ?	See above
Holund (1990)[263]	Holund (brushing)	Monthly	See below	BA 344
Holund (1990)[263]	Learning by Teaching (B1b)	No details of duration Peers	CT ?	See above
Horowitz (1980)[492]	Horowitz (plaque removal)	Twice daily for 4 years		RCT 279
Horowitz (1990)[528]	Horowitz (plaque removal)	Twice daily for 4 years		RCT 279
Houle (1982)[510]	Houle (B1ac)	No details of duration Teacher, hygienist		CT 232
Ivanovic (1990)[482]	Ivanovic (A1 + brushing/flossing)	No details of duration School-based clinic		CT 240
Jodaiken (1981)[511]	Jodaiken (B1a)	No details of duration Teachers instructed by dentist		BA 114
Julien (1994)[512]	Julien (BC1)	No details of curriculum duration Workshop for parents and teachers		CT 316
Kallio (1990)[513]	Kallio (B1a)	No details of duration Teachers		CT 1167
Kerebel (1985)[485]	Kerebel (BC1 + brushing and fluoride)	Daily brushing + 'regular' fluoride treatment		CT ?

continued

Personal hygiene: primary studies included in reviews contd

Included studies	Programme or author's name (programme content)	Delivery	Sprod (1996)[481]	Kay (1997)[480]
Lachapelle (1989)[514]	Lachapelle (B1)	Single presentation		CT 666
Laiho (1993)[499]	Laiho (B1a/b)	Single presentation Teachers (?) or older peers compared		CT 458
Lalloo (1994)[527]	Lalloo (brushing + dental exam)	Daily brushing + annual dental care Dentists, dental hygienists, teachers	CT ?	CT 212
Lee (1980)[515]	Lee (?)	No details		RCT 55
McIntyre (1985)[484]	McIntyre (B1ac + brushing)	Daily supervised brushing, weekly visits by dental health workers Teachers	CT ?	CT 310
Melsen (1980)[516]	Melsen (B + self-monitoring/discussions)	No details		CT 164
Messer (1987)[491]	Learning by Teaching (B1b)	No details of duration Learning by teaching younger peers		BA 6
Murray (1981)[517]	Murray (B1)	Video presentation		CT 10
Peterson (1981)[518]	Peterson (BC1)	5 lessons + home assignments		BA 476
Peterson (1982)[519]	Peterson (B1)	No details		CT 460
Schou (1991)[559]	Schou (B1)	1 lesson		BA 874
Schou (1994)[495]	Schou (hygiene instruction + toothbrush)	20 min sessions (number not given) Dentists, teachers	BA 342	BA 342
Sogaard (1987)[520]	Sogaard (B1)	1 week		CT 1041

continued

Personal hygiene: primary studies included in reviews contd

Included studies	Programme or author's name (programme content)	Delivery	Sprod (1996)[481]	Kay (1997)[480]
Sogaard (1988)[521]	Sogaard (B1)	1 week		CT 1041
Ter Horst (1989)[522]	ter Horst (B1)	Film	CT (quasi-random) 425	CT 425
Towner (1984)[507]	Gleam Team (?)	No details		BA 59
Walsh (1985)[530]	Walsh (B1c + brushing/flossing)	Four 1 h sessions Dental hygienist	CT (quasi-random) 639	
Weisenberg (1980)[526]	Weisenberg (B1 + fluoride)	No details		BA 214
Wight (1988)[486]	Wight (B1a/c ? + fluoride)	No details of duration Teacher or dental hygienist	CT ?	CT 1067
Wright (1984)[523]	Wright (B1)	No details		CT 600

Appendix 7

Rejected reviews

Reasons for rejection: **S**, no search; **D**, no study details; **P**, no programme content details; **Q**, no quality assessment; **E**, no experimental studies; **R**, no results; **sel**, selective review.

Aggleton P. Sexual behaviour and HIV\AIDS: a review of the effectiveness of health education and health promotion. Utrecht: Dutch Centre for Health Promotion and Health Education, 1994. **Sel**

Alexander R Jr, CM Curtis. A critical review of strategies to reduce school violence. *Social Work Educ* 1995;**17**(2):73–82. **SDPQER**

Ampofo Boateng K, Thomson JA. Child pedestrian accidents: a case for preventive medicine. Special issue: traffic injury prevention. *Health Educ Res* 1990;**5**(2):265–74. **SDPQE**

Anderson K. Young people and alcohol, drugs and tobacco. *WHO Reg Publ Eur Ser* 1995;**66**:1–83. **SDPQER**

Andrien M. Nutrition: a review of the effectiveness of health education and health promotion. Utrecht: Dutch Centre for Health Promotion and Health Education, 1994. **Sel**

Anonymous School Safety: promising initiatives for addressing school violence. Subcommittee on Children and Families, US Senate, 1995. **SPQE**

Bagnall G, Plant M. Education on drugs and alcohol: past disappointments and future challenges. *Health Educ Res* 1987;**2**(4):417–22. **SDPQER**

Bangert-Drowns RL. The effects of school-based substance abuse education–meta-analysis. *J Drug Educ* 1988;**18**(3):243–64. **P**

Barnea Z. A critical and comparative review of the prevention of drug and alcohol abuse in Israel. *J Drug Educ* 1989;**19**(1):59–81. **S**

Battjes RJ. Prevention of adolescent drug abuse. *Int J Addict* 1985;**20**(6–7):1113–34. **S**

Beelmann A, Pfingsten U, *et al.* Effects of training social competence in children: a meta-analysis of recent evaluation studies. *J Clin Child Psychol* 1994;**23**(3):260–71. **DP**

Berberian RM, Gross C, *et al.* The effectiveness of drug education programs: a critical review. *Health Educ Monogr* 1976;**4**(4):377–98. **S**

Borders LD, Drury SM. Comprehensive school counseling programs – a review for policy-makers and practitioners. *J Counsel Dev* 1992;**70**(4): 87–498. **DQ**

Botvin GJ, Botvin EM. Adolescent tobacco, alcohol, and drug abuse: prevention strategies, empirical findings, and assessment issues. *J Dev Behav Pediatr* 1992;**13**(4): 290–301. **SD**

Botvin G, Willis T. Personal and social skills training: cognitive-behavioral approaches to substance abuse prevention. *NIDA Res Monog Ser* 1985;**63**:8–49. **S**

Braucht G, Braucht B. Prevention of problem drinking among youth: evaluation of educational strategies. In: Miller P, Nirenberg T, editors. Prevention of alcohol abuse. New York: Plenum Press, 1984;253–79. **S**

Braucht GN, Follingstad D, *et al.* Drug education. A review of goals, approaches and effectiveness, and a paradigm for evaluation. *Q J Studies Alcohol* 1973;**34**(4):1279–92. **SDPQ**

Brindis C, Sanghvi R. School-based health clinics: remaining viable in a changing health care system. *Annu Rev Public Health* 1997;**18**:567–87. **SDPQER**

Brown LF. Research in dental health education and health promotion: a review of the literature. *Health Educ Q* 1994;**21**(1):83–102. **D**

Bruvold WH. A meta-analysis of the California school-based risk reduction program. *J Drug Educ* 1990; **20**(2):139–52. **SDP**

Bruvold W, Rundall T. A meta-analysis and theoretical review of school-based tobacco and alcohol intervention programs. *Psychol Health* 1988;**2**:53–78. **SP**

Bruvold WH. A meta-analysis of adolescent smoking prevention programs. *Am J Public Health* 1993;**83**(6):872–80. **DP**

Bukoski W. School-based substance abuse prevention: a review of program research. 95–115. **SDQ**

Butterworth MD, Fulmer KA. The effect of family violence on children: intervention strategies including bibliotherapy. *Aust J Marriage Fam* 1991;**12**(3):170–82. **SQER**

Carlini-Cotrim B. An overview on drug abuse prevention in Brazilian schools. *Drugs Educ Prevent Policy* 1994;**1**(3):275–88. **DP**

Carroll LA, Miltenberger RG, *et al.* A review and critique of research evaluating child sexual abuse prevention programs. *Educ Treat Child* 1992;**15**(4):335–54. **SQ**

Christopher JS, Nangle DW, *et al.* Social-skills interventions with adolescents. Current issues and procedures. *Behav Modif* 1993;**17**(3):314–38. **SDQ**

Coben JH, Weiss HB, *et al.* A primer on school violence prevention. *J Sch Health* 1994;**64**(8):309–13. **SDQER**

Compas B, Phares V, *et al.* Stress and coping preventive interventions for children and adolescents. In: Bond L, Compas B, editors. Primary prevention and prevention in the schools. London: Sage, 1989;319–40. **SDPQ**

Comptroller General of the US. The National School Lunch Program – is it working? Report to the Congress of the US, Washington DC, 1977. **SDER**

Cowen E. Primary prevention: children and the schools. *J Child Contemp Soc* 1982;**14**(2–3):57–68. **SDPQER**

Denham S, Almeida M. Children's social problem solving skills, behavioural adjustment and interventions: a meta-analysis evaluating theory and practice. *J Appl Dev Psychol* 1987;**8**:391–409. **SDPQER**

DeRidder LM. Teenage pregnancy: etiology and educational interventions. *Educ Psychol Rev* 1993;**5**(1):87–107. **SDPQER**

Dielman T. School-based research on the prevention of adolescent alcohol use and misuse: methodological issues and advances. *J Res Adolesc* 1994;**4**(2):271–93. **SDQ**

Dies RR, Burghardt K. Group interventions for children of alcoholics: prevention and treatment in the schools. *J Child Adolesc Group Therapy* 1991;**1**(3):219–34. **SDPQER**

Downey AM, Cresanta JL, *et al.* Cardiovascular health promotion in children: "Heart Smart" and the changing role of physicians. *Am J Prevent Med* 1989;**5**(5):279–95. SPQ

Dowswell T, Towner E, *et al.* Preventing childhood unintentional injuries. What works? A literature review. *Injury Prevent* 1996;**2**:140–9. **DPQER**

Dusenbury L, Falco M. Eleven components of effective drug abuse prevention curricula. *J Sch Health* 1995;**65**(10):420–5. **DQ**

Dusenbury L, Falco M, *et al.* A review of the evaluation of 47 drug abuse prevention curricula available nationally. *J Sch Health* 1997;**67**(4):127–32. **DR**

Elder J, Stern R, *et al.* Contingency-based strategies for preventing alcohol, drug and tobacco use: missing or unwanted components of adolescent health promotion? *Educ Treat Child* 1987;**10**(1):33–47. **R**

Elias M, Branden L. Primary prevention of behavioral and emotional problems in school aged populations. *Sch Psychol Rev* 1988;**17**(4):581–92. **SDPQER**

Favorini A, Pryor C. Family-school alliances: a centerpiece strategy for alcohol and drug prevention programs. *Soc Work Educ* 1994;**16**(3):155–70. **SDPQER**

Flaherty LT, Weist MD, *et al.* School-based mental health services in the United States: history, current models and needs. *Community Mental Health J* 1996;**32**(4):341–52. **S**

Flay BR. What we know about the social influences approach to smoking prevention: review and recommendations. *NIDA Res Monogr* 1985;**63**:67–112. **S**

Flay BR. Psychosocial approaches to smoking prevention: a review of findings. *Health Psychol* 1985;**4**(5):449–88. **S**

Flood M, Greenspan S, *et al.* School-based services for pregnant and parenting adolescents. *Special Services Schools* 1985;**2**(1):27–44. **SDQER**

Frost JJ, Forrest JD. Understanding the impact of effective teenage pregnancy prevention programs. *Family Plan Perspect* 1995;**27**(5):188–95. **S**

Golner J. Mental health intervention in the schools. *Soc Work Educ* 1983;**6**(1):15–31. **SDPQER**

Goodstadt M. Drug education – a turn on or a turn off? *J Drug Educ* 1980;**10**(2):89–99. **SD**

Gorman D. Using theory and basic research to target primary prevention programs: recent developments and future prospects. *Alcohol* 1992;**27**(6):583–94. **SQ**

Grant M. The moderating influence: a review of trade sponsored alcohol education programmes. *Br J Addict* 1984;**79**:275–82. **DQ**

Green LW, Iverson DC. School health education. *Annu Rev Public Health* 1982;**3**:321–38. **SDPR**

Gresham F. Utility of cognitive behavioural procedures for social skills training with children: a review. *J Abnorm Child Psychol* 1985;**13**:411–23. **SDPR**

Greydanus DE, Pratt HD, *et al.* Sexuality education-programs for youth – current state of affairs and strategies for the future. *J Sex Educ Ther* 1995;**21**(4):238–54. **SDPQER**

Gritz ER. Reaching toward and beyond the year 2000 goals for cigarette smoking. Research and public health priorities. *Cancer* 1994;**74**(4 Suppl):1423–32. **SDPQER**

Gurney P. Self-esteem in the classroom: II. Experiments in enhancement. *Sch Psychol Int* 1987;**8**:21–9. **S**

Haffner D, Casey S. Approaches to adolescent pregnancy prevention. *Semin Adolesc Med* 1986;**2**(3):259–67. **SDPQER**

Hajzler DJ, Bernard ME. A review of rational-emotive education outcome studies. *Sch Psychol Q* 1991;**6**(1):27–49. **P**

Hansen W. School-based alcohol prevention programs. *Alcohol Health Res World* 1993;**17**(1):54–63. **SDQ**

Hanson D. The effectiveness of alcohol and drug education. *J Alcohol Drug Educ* 1982;**27**(2):1–13. **SDPQER**

Harris J, Cale L. How healthy is school PE? A review of the effectiveness of health-related physical education programmes in schools. *Health Educ J* 1997;**56**:84–104. **SP**

Hawkins J, Hayes E, *et al.* School nursing in America – 1902–1994: a return to public health nursing. *Public Health Nurs* 1994;**11**(6):416–25. **SDQ**

Hazell P, King R. Arguments for and against teaching suicide prevention in schools. *Aust N Z J Psychiatr* 1996;**30**(5):633–42. **S**

Hertzman C, Wiens M. Child development and long-term outcomes: a population health perspective and summary of successful interventions. *Soc Sci Med* 1996;**43**(7):1083–95. **S**

Haagwood K, Elwin HD. Effectiveness of school-based mental health services for children: a 10 year research review. *J Child Family Studies* 1997;**6**:435–51. **Sel**

Hodgson R, Abbasi T. Effective mental health promotion: literature review, Health Promotion Wales. 1995. **D**

Hosman C, Veltman N. Prevention of mental health. Utrecht: Dutch Centre for Health Promotion and Health Education, 1994. **Sel**

Hudley C, Graham S. School-based interventions for aggressive Africa-American boys. *Appl Prevent Psychol* 1995;**4**(3):185–95. **S**

Hundley M, Bratton S. Adolescent loss and the school community: don't let them slip through your fingers. *TCA J* 1994;**22**(1):10–22. **SDPQER**

Iammarino NK, Weinberg AD, *et al.* The state of school heart health education: a review of the literature. *Health Educ Q* 1980;**7**(4):298–320. **DPQR**

Jackson AW, Felner AD, et al. Adolescent development and educational policy: strengths and weaknesses of the knowledge base. *J Adolesc Health* 1993;**14**(3):172–89. **SDQE**

Kalichman SC. HIV-AIDS prevention videotapes: a review of empirical findings. *J Primary Prevent* 1996;**17**(2):259–79. **P**

Kay EJ, Locker D. Is dental-health education effective – a systematic review of current evidence. *Community Dent Oral Epidemiol* 1996;**24**(4):231–35. **PR**

Kendrick D, Marsh P. The effectiveness of intervention programmes in reducing accidental injuries to children and young people. Nottingham: Trent Regional Health Authority, 1994. **DPQE**

Kinder BN, Pape NE, *et al.* Drug and alcohol education programs: a review of outcome studies. *Int J Addict* 1980;**15**(7):1035–54. **S**

Kirby D. The effects of school sex education programs: a review of the literature. *J Sch Health* 1980;**50**(10):559–63. **S**

Kirby D. School-based programs to reduce sexual risk-taking behaviors. *J Sch Health* 1992;**62**(7):280–7. **S**

Kolko D. Educational programs to promote awareness and prevention of child sexual victimisation: a review and methodological critique. *Clin Psychol Rev* 1988;**8**:195–209. **SQ**

Kozlowski LT, Coambs RB, *et al.* Preventing smoking and other drug use: let the buyers beware and the interventions be apt. *Can J Public Health* 1989;**80**(6):452–6. **SDPQR**

Kroger C. Drug abuse: a review of the effectiveness of health education and health promotion. Utrecht: Dutch Centre for Health Promotion and Health Education, 1994. **Sel**

Kumpfer K. Prevention of alcohol and drug abuse: a critical review of risk factors and prevention strategies. In: Schaffer D, Phillips I, Enzer N, editors. Prevention of mental disorders, alcohol and other drug use in children and adolescents. OSAP Prevention Monograph 2. Rockville, MA: US Department of Health and Human Services, 1989. **SDQ**

Lachance L. Substance abuse prevention in the schools. Ann Arbor, MI: ERIC Clearinghouse on Counseling and Personnel Services, 1985. **SPQER**

Lagana L, Hayes DM. Contraceptive health programs for adolescents: a critical review. *Adolesc* 1993;**28**(110): 347–59. **SDQ**

Larson J. Violence prevention in the schools: a review of selected programs and procedures. *Sch Psychol Rev* 1994;**23**(2):151–64. **SDQER**

Le Croy C. Social skills training with adolescents: a review. *Child Youth Services* 1982;**5**:91–116. **S**

Lemle R. Primary prevention of psychological disorders in elementary and intermediate schools. *J Clin Child Psychol* 1976;Fall:26–32. **S**

Levy SR, Iverson BK, *et al.* Adolescent pregnancy programs and educational interventions: a research synthesis and review. *J R Soc Health* 1983;**103**(3): 99–103. **DP**

Logan BN. Adolescent substance abuse prevention: an overview of the literature. *Fam Community Health* 1991;**13**(4):25–36. **SDPQER**

Lynagh M, Schofield MJ, *et al.* School health promotion programs over the past decade: a review of the smoking, alcohol and solar protection literature. *Health Promotion Int* 1997;**12**(1):43–60. **PQ**

McKay A. Research supports broadly-based sex education. *Can J Hum Sex* 1993;**2**(2):89–98. **SQ**

McLaughlin TF, Vacha EF. School programs for at-risk children and youth: a review. *Educ Treat Child* 1992;**15** (3):255–67. **DPQER**

Mann R, Vingilis E, *et al.* School-based programmes for the prevention of drinking and driving: issues and results. *Accident Anal Prev* 1986;**18**(4):325–37. **S**

Matzen JL. Assessment of human immunodeficiency virus/acquired immunodeficiency syndrome audiovisual materials designed for grades 7 through 12. *J Pediatr Nurs* 1995;**10**(2):114–20. **SDQ**

May C. Research on alcohol education for young people: a critical review of the literature. *Health Educ J* 1991;**50**:195–9. **SDQ**

May PA, Moran JR. Prevention of alcohol misuse: a review of health promotion efforts among American Indians. *Am J Health Promotion* 1995;**9**(4):288–99. **DPQER**

Mayer GR. Preventing antisocial behavior in the schools. *J Appl Behav Anal* 1995;**28**(4):467–78. **SDPQER**

Michaud PA. [Are accidents accidental? Prevention of injuries in children and adolescents.] *Rev Epidemiol Sante Publique* 1992:**40**(6):391–409. **SD**

Milgram G. A historical review of alcohol education research and comments. *J Alcohol Drug Educ* 1976;**21**:1–16. **SDQ**

Milgram G. Alcohol and drug education programs. *J Drug Educ* 1987;**17**(1):43–57. **SDQ**

Mittelmark MB, Hunt MK, *et al.* Realistic outcomes: lessons from community-based research and demonstration programs for the prevention of cardiovascular diseases. *J Public Health Policy* 1993;**14**(4):437–62. **SDQ**

Moote GT, Wodarski JS. The acquisition of life skills through adventure-based activities and programs: a review of the literature. *Adolesc* 1997;**32**(125):143–67. **P**

Moskowitz JM. The primary prevention of alcohol problems: a critical review of the research literature. *J Studies Alcohol* 1989;**50**(1):54–88. **SDQ**

Noakes TD. Fatal cycling injuries. *Sports Med* 1995;**20**(5): 348–62. **SDQ**

Norman E, Turner S. Adolescent substance abuse prevention programs: theories, models and research in the encouraging 80's. *J Primary Prevent* 1993;**14**(1):3–20. **SDQ**

Nozu Y, Tsunoda H. [A review of studies on school-based smoking prevention programs.] *Nippon Koshu Eisei Zasshi* 1992;**39**(6):307–18. **P**

Oakley A, Fullerton D, *et al.* Behavioural interventions for HIV/AIDS prevention. *Aids* 1995;**9**(5):479–86. **DP**

Oakley A, Fullerton D, *et al.* Sexual health education interventions for young people: a methodological review. *BMJ* 1995;**310**(6973):158–62. **DP**

Oei TP, Fea A. Smoking prevention program for children: a review. *J Drug Educ* 1987;**17**(1):11–42. **SQER**

Offord DR, Bennett KJ. Conduct disorder: long-term outcomes and intervention effectiveness. *J Am Acad Child Adolesc Psychiatry* 1994;**33**(8):1069–78. **SDQ**

Ogilvy C. Social skills training with children and adolescents: a review of evidence on effectiveness. *Educ Psychol* 1994;**14**(1):73–83. **SDPQER**

Olsen L, Redican KJ, *et al.* The school health curriculum project: a review of research studies. *Health Educ* 1980;**11**(1):16–21. **SDPQR**

Peckham S. Preventing unintended teenage pregnancies. *Public Health* 1993;**107**:125–33. **SDPQER**

Pellow R, Jengeleski J. A survey of current research studies on drug education programs in America. *J Drug Educ* 1991;**21**(3):203–10. **SDPQER**

Perry C, Kelder S. Prevention. *Annu Rev Addict Res Treat* 1992:453–72. **SDQ**

Perry CL, Kelder SH. Models for effective prevention. *J Adolesc Health* 1992;**13**(5):355–63. **SDQ**

Peters L, Paulussen T. School health: a review of the effectiveness of health education and health promotion. Utrecht: Dutch Centre for Health Promotion and Health Education, 1994. **Sel**

Pickens K. The effects of anti-smoking education: a review of research 1970–1983. Wellington: New Zealand Council for Educational Research, 1984. **DPR**

Pickover B, Barbrack C, *et al.* Preventive and educative programs within the high school. *Sch Psychol Rev* 1982;**11**(4):399–408. **SDPQER**

Pless I, Arsenault L. The role of health education in the prevention of injuries to children. *J Soc Issues* 1987;**43**(2):87–103. **D**

Ponzio R-C, Peterson K-D, *et al.* A Program portfolio/panel review evaluation of 4-h sponsored community-based, social action projects for at-risk youth. *J Res Dev Educ* 1994;**28**(1):55–65. **SDPQ**

Powell KE, Muir-McClain L, *et al.* A review of selected school-based conflict resolution and peer mediation projects. J Sch Health 1995;65(10):426–31. **S**

Price R, Cowen E, *et al.* The search for effective prevention programs: what we have learned along the way. *Am J Orthopsychiat* 1989;**59**(1):49–58. **SQ**

Prout H, DeMartino R. A meta-analysis of school-based studies of psychotherapy. *J Sch Psychol* 1986;**24**:285–92. **DP**

Rae Grant NI. Preventive interventions for children and adolescents: where are we and how far have we come? Special issue: prevention: focus on children and youth. *Can J Community Mental Health* 1994;**13**(2):17–36. **SD**

Randall D, Wong M. Drug education to date: a review. *J Drug Educ* 1976;**6**(1):1–21. **S**

Reid D, M. D Can school health education be more effective. *Health Educ J* 1986;**45**:7–13. **SDPQR**

Reid D, McNeill A, *et al.* Reducing prevalence of smoking in youth in Western countries: an international review. *Tobacco Control* 1995;**4**:266–77. **SDQ**

Resnicow K, Botvin G. School-based substance use prevention programs: why do effects decay? *Prevent Med* 1993;**22**:484–90. **SQ**

Ringwalt C. Past and future directions of the D.A.R.E. Program: an evaluation. Durham, NC: Research Triangle Institute, 1994. **D**

Rooney BL, Murray DM. A meta-analysis of smoking prevention programs after adjustment for errors in the unit of analysis. *Health Educ Q* 1996;**23**(1):48–64. **DP**

Rossi JS, Blais LM, *et al.* Preventing skin cancer through behavior change. Implications for interventions. *Dermatol Clinics* 1995;**13**(3):613–22. **SDPQER**

Rothman A, Byrne N. Health education for children and adolescents. *Rev Educ Res* 1981;**51**(1):85–100. **SR**

Rundall TG, Bruvold WH. A meta-analysis of school-based smoking and alcohol use prevention programs. *Health Educ Q* 1988;**15**(3):317–34. **SD**

Schaps E, Churgin S, *et al.* Primary prevention research: a preliminary review of program outcome studies. *Int J Addict* 1980;**15**(5):657–76. **D**

Schinke S, Gilchrist L. Preventing substance abuse with children and adolescents. *J Consult Clin Psychol* 1985;**53**(5):596–602. **S**

Schou L, Locker D. Oral Health: a review of the effectiveness of health education and health promotion. Utrecht: Dutch Centre for Health Promotion and Health Education, 1994. **Sel**

Secretary of Health and Human Services. Alcohol and health. US Dept of Health and Human Services: Public Health Service, National Institutes of Health, National Institute on Alcohol Abuse and Alcoholism, 1993. **SDQ**

Shaffer D, Garland A, *et al.* Preventing teenage suicide: a critical review. *J Am Acad Child Adolesc Psychiatry* 1988;**27**(6):675–87. **SDPQR**

Shamai S, Coambs RB. The relative autonomy of schools and educational interventions for substance abuse prevention, sex education, and gender stereotyping. *Adolesc* 1992;**27**(108):757–70. **SDPQER**

Shayne V, Kaplan B. AIDS education for adolescents. *Youth Soc* 1988;**20**(2):180–208. **SDPQER**

Silvestri B, Flay BR. Smoking education: comparison of practice and state-of-the-art. *Prevent Med* 1989; **18**(2):257–66. **SDQER**

Sisk J, Hewitt M, *et al.* How effective is AIDS education? AIDS related issues staff Paper 3. Washington DC: Congress of the US, Office of Technology Assessment, 1988. **SP**

Slama K. Tobacco control: a review of the effectiveness of health education and health promotion. Utrecht: Dutch Centre for Health Promotion and Health Education, 1994. **Sel**

Smelson DA. Adolescent substance abuse prevention. *New Jersey Med* 1993;**90**(11):845–8. **SDPQER**

Smith GH. Intervention strategies for children vulnerable for school failure due to exposure to drugs and alcohol. *Int J Addict* 1993;**28**(13):1435–70. **SDQ**

Smith C, Moore L, *et al.* Community-based cardiovascular disease prevention: a review of the effectiveness of health education and health promotion. Utrecht: Dutch Centre for Health Education and Health Promotion, 1994. **Sel**

Srebnik DS, Elias MJ. An ecological, interpersonal skills approach to drop-out prevention. *Am J Orthopsychiatry* 1993;**63**(4):526–35. **SDQ**

St. Pierre R. An evaluation of the nutrition education and training program: project. Cambridge, MA: Abt Associates, 1981. **S**

Staulcup H, Kenward K, *et al.* A review of federal primary alcoholism prevention projects. *J Studies Alcohol* 1979;**40**(11):943–68. **P**

Stead M, Hastings G. Developing options for a programme on adolescent smoking in Wales. Cardiff: Health Promotion, 1995. **DPQ**

Stead M, Hastings G, *et al.* Preventing adolescent smoking: a review of options. *Health Educ J* 1996;**55**(1):31–54. **Q**

Stephen KW. Systemic fluorides: drops and tablets. *Caries Res* 1993;**27**(Suppl 1):9–15. **S**

Stewart M, Reid G, *et al.* Fostering children's resilience. *J Pediatr Nurs: Nurs Care Child Fam* 1997;**12**(1):21–31. **SDPQER**

Stout JW, Rivara FP. Schools and sex education: does it work? *Pediatr* 1989;**83**(3):375–9. **P**

Swadi H, Zeitlin H. Drug education to school children: does it really work? *Br J Addict* 1987;**82**:741–6. **SPQ**

Sylva K. School influences on children's development. *J Child Psychol Psychiatr Allied Disciplines* 1994;**35**(1): 135–70. **SDQ**

Thomas SP, Groer MW, *et al.* Physical health of today's school children. Special issue: school-related health and safety: I. *Educ Psychol Rev* 1993;**5**(1):5–33. **SDQ**

Thompson EL. Smoking education programs 1960–1976. *Am J Public Health* 1978;**68**(3):250–7. **DP**

Tobler N. Meta-analysis of 143 adolescent drug prevention programs: quantitative outcome results of program participants compared to a control or comparison group. *J Drug Issues* 1986;**16**(4):537–67. **DP**

Tobler NS. Drug prevention programs can work: research findings. *J Addict Dis* 1992;**11**(3):1–28. **SP**

Tolan P, Guerra N. What works in reducing adolescent violence: an empirical review of the field. Boulder, CO: Center for the Study and Prevention of Violence, 1994. **DP**

Tucker A. Elementary school children and cigarette smoking: a review of the literature. *Health Educ* 1987;**18**(3):18–27. **Q**

Visser AP, van Bilsen P. Effectiveness of sex education provided to adolescents. *Patient Educ Counsel* 1994;**23**(3):147–60. **P**

Vuylsteek K. Health Education: smoking, alcoholism, drugs. Review of selected programmes for school children and parents. Copenhagen: WHO, Regional Office for Europe, 1979. **Q**

Walker JG, McLaughlin TF. Self-contained versus resource room classroom placement on the achievement of mildly mentally handicapped children: a review. *J Instruct Psychol* 1992;**19**(3):214–25. **SDPR**

Wallack L, Corbett K. Alcohol, tobacco and marijuana use among youth: an overview of epidemiological, program and policy trends. *Health Educ Q* 1987;**14**(2):223–49. **SDQ**

Wassef A., Collins ML, *et al.* In search of effective programs to address students' emotional distress and behavioral problems. Part II: critique of school- and community-based programs. *Adolesc* 1995;**30**(120):757–77. **SQ**

Weiss BD. Bicycle-related head injuries. *Clin Sports Med* 1994;**13**(1):99–112. **SDPQER**

Williams M, Keene J. Drug prevention and the police in the UK – a review of recent research studies. *Drugs Educ Prevent Policy* 1995;**2**(3):225–41. **Q**

Wilson-Brewer R, Spivak H. Violence prevention in schools and other community settings: the pediatrician as initiator, educator, collaborator, and advocate. *Pediatr* 1994;**94**(4 Pt 2):623–30. **SDQ**

Wurtele SK. School-based sexual abuse prevention programs: a review. *Child Abuse Negl* 1987;**11**(4): 483–95. **S**

Yanai J, Weiss S. Drug-abuse primary prevention research and programs among Jewish Youth in Israel – a review. *Drugs Educ Prevent Policy* 1994;**1**(1):49–58. **SDPQR**

Yauman BE. School-based group counseling for children of divorce: a review of the literature. *Elementary Sch Guidance Counsel* 1991;**26**(2):130–8. **SDQER**

Health Technology Assessment panel membership

This report was identified as a priority by the Primary and Community Care Panel.

Acute Sector Panel

Current members

Chair:
Professor Francis H Creed
University of Manchester

Professor Clifford Bailey
University of Leeds

Ms Tracy Bury
Chartered Society of Physiotherapy

Professor Collette Clifford
University of Birmingham

Dr Katherine Darton
M.I.N.D.

Mr John Dunning
Papworth Hospital, Cambridge

Mr Jonathan Earnshaw
Gloucester Royal Hospital

Mr Leonard Fenwick
Freeman Group of Hospitals, Newcastle-upon-Tyne

Professor David Field
Leicester Royal Infirmary

Ms Grace Gibbs
West Middlesex University Hospital NHS Trust

Dr Neville Goodman
Southmead Hospital Services Trust, Bristol

Professor Mark Haggard
MRC Institute of Hearing Research, University of Nottingham

Professor Robert Hawkins
University of Manchester

Dr Duncan Keeley
General Practitioner, Thame

Dr Rajan Madhok
East Riding Health Authority

Dr John Pounsford
Frenchay Hospital, Bristol

Dr Mark Sculpher
University of York

Dr Iqbal Sram
NHS Executive, North West Region

Mrs Joan Webster
Consumer member

Past members

Professor John Farndon*
University of Bristol

Professor Senga Bond
University of Newcastle-upon-Tyne

Professor Ian Cameron
Southeast Thames Regional Health Authority

Ms Lynne Clemence
Mid-Kent Health Care Trust

Professor Cam Donaldson
University of Aberdeen

Professor Richard Ellis
St James's University Hospital, Leeds

Mr Ian Hammond
Bedford & Shires Health & Care NHS Trust

Professor Adrian Harris
Churchill Hospital, Oxford

Dr Gwyneth Lewis
Department of Health

Mrs Wilma MacPherson
St Thomas's & Guy's Hospitals, London

Dr Chris McCall
General Practitioner, Dorset

Professor Alan McGregor
St Thomas's Hospital, London

Professor Jon Nicholl
University of Sheffield

Professor John Norman
University of Southampton

Professor Michael Sheppard
Queen Elizabeth Hospital, Birmingham

Professor Gordon Stirrat
St Michael's Hospital, Bristol

Dr William Tarnow-Mordi
University of Dundee

Professor Kenneth Taylor
Hammersmith Hospital, London

* Previous Chair

continued

continued

Diagnostics and Imaging Panel

Current members

Chair:
Professor Mike Smith
University of Leeds

Dr Philip J Ayres
Leeds Teaching Hospitals NHS Trust

Dr Paul Collinson
St George's Hospital, London

Dr Barry Cookson
Public Health Laboratory Service, Colindale

Professor David C Cumberland
University of Sheffield

Professor Adrian Dixon
University of Cambridge

Mr Steve Ebdon-Jackson
Department of Health

Mrs Maggie Fitchett
Association of Cytogeneticists, Oxford

Dr Peter Howlett
Portsmouth Hospitals NHS Trust

Professor Alistair McGuire
City University, London

Dr Andrew Moore
Editor, *Bandolier*

Dr Peter Moore
Science Writer, Ashtead

Professor Chris Price
London Hospital Medical School

Dr William Rosenberg
University of Southampton

Mr Tony Tester
South Bedfordshire Community Health Council

Dr Gillian Vivian
Royal Cornwall Hospitals Trust

Dr Greg Warner
General Practitioner, Hampshire

Past members

Professor Michael Maisey*
Guy's & St Thomas's Hospitals, London

Professor Andrew Adam
Guy's, King's & St Thomas's School of Medicine & Dentistry, London

Dr Pat Cooke
RDRD, Trent Regional Health Authority

Ms Julia Davison
St Bartholomew's Hospital, London

Professor MA Ferguson-Smith
University of Cambridge

Dr Mansel Haeney
University of Manchester

Professor Sean Hilton
St George's Hospital Medical School, London

Mr John Hutton
MEDTAP International Inc., London

Professor Donald Jeffries
St Bartholomew's Hospital, London

Dr Ian Reynolds
Nottingham Health Authority

Professor Colin Roberts
University of Wales College of Medicine

Miss Annette Sergeant
Chase Farm Hospital, Enfield

Professor John Stuart
University of Birmingham

Dr Ala Szczepura
University of Warwick

Mr Stephen Thornton
Cambridge & Huntingdon Health Commission

Dr Jo Walsworth-Bell
South Staffordshire Health Authority

Methodology Group

Current members

Chair:
Professor Martin Buxton
Health Economics Research Group, Brunel University

Professor Doug Altman
ICRF/NHS Centre for Statistics in Medicine, University of Oxford

Dr David Armstrong
Guy's, King's & St Thomas's School of Medicine & Dentistry, London

Professor Nicholas Black
London School of Hygiene & Tropical Medicine

Professor Ann Bowling
University College London Medical School

Dr Mike Clarke
UK Cochrane Centre, Oxford

Professor Paul Dieppe
MRC Health Services Research Collaboration, University of Bristol

Professor Mike Drummond
Centre for Health Economics, University of York

Dr Vikki Entwistle
University of Aberdeen

Professor Ewan Ferlie
Imperial College, London

Professor Ray Fitzpatrick
University of Oxford

Mrs Jenny Griffin
Department of Health

Professor Jeremy Grimshaw
University of Aberdeen

Dr Stephen Harrison
University of Leeds

Mr John Henderson
Department of Health

Professor Richard Lilford
R&D, West Midlands

Professor Theresa Marteau
Guy's, King's & St Thomas's School of Medicine & Dentistry, London

Dr Henry McQuay
University of Oxford

Dr Nick Payne
University of Sheffield

Professor Maggie Pearson
NHS Executive North West

Dr David Spiegelhalter
Institute of Public Health, Cambridge

Professor Joy Townsend
University of Hertfordshire

Ms Caroline Woodroffe
Standing Group on Consumers in NHS Research

Past members

Professor Anthony Culyer*
University of York

Professor Michael Baum
Royal Marsden Hospital

Dr Rory Collins
University of Oxford

Professor George Davey Smith
University of Bristol

Professor Stephen Frankel
University of Bristol

Mr Philip Hewitson
Leeds FHSA

Mr Nick Mays
King's Fund, London

Professor Ian Russell
University of York

Professor David Sackett
Centre for Evidence Based Medicine, Oxford

Dr Peter Sandercock
University of Edinburgh

Dr Maurice Slevin
St Bartholomew's Hospital, London

Professor Charles Warlow
Western General Hospital, Edinburgh

* Previous Chair

Pharmaceutical Panel

Current members

Chair:
Professor Tom Walley
University of Liverpool

Dr Felicity Gabbay
Transcrip Ltd

Dr Peter Golightly
Drug Information Services,
NHS Executive Trent

Dr Alastair Gray
Health Economics
Research Centre,
University of Oxford

Professor Rod Griffiths
NHS Executive
West Midlands

Mrs Jeanette Howe
Department of Health

Professor Trevor Jones
ABPI, London

Ms Sally Knight
Lister Hospital, Stevenage

Dr Andrew Mortimore
Southampton & SW Hants
Health Authority

Mr Nigel Offen
NHS Executive Eastern

Dr John Reynolds
The Oxford Radcliffe Hospital

Mrs Marianne Rigge
The College of Health,
London

Mr Simon Robbins
Camden & Islington
Health Authority, London

Dr Frances Rotblat
Medicines Control Agency

Dr Eamonn Sheridan
St James's University Hospital,
Leeds

Mrs Katrina Simister
National Prescribing Centre,
Liverpool

Dr Ross Taylor
University of Aberdeen

Past members

Professor Michael Rawlins*
University of Newcastle-
upon-Tyne

Dr Colin Bradley
University of Birmingham

Professor Alasdair
Breckenridge
RDRD, Northwest Regional
Health Authority

Ms Christine Clark
Hope Hospital, Salford

Mrs Julie Dent
Ealing, Hammersmith &
Hounslow Health Authority,
London

Mr Barrie Dowdeswell
Royal Victoria Infirmary,
Newcastle-upon-Tyne

Dr Tim Elliott
Department of Health

Dr Desmond Fitzgerald
Mere, Bucklow Hill, Cheshire

Professor Keith Gull
University of Manchester

Dr Keith Jones
Medicines Control Agency

Dr John Posnett
University of York

Dr Tim van Zwanenberg
Northern Regional
Health Authority

Dr Kent Woods
RDRD, Trent RO,
Sheffield

Population Screening Panel

Current members

Chair:
Professor Sir John
Grimley Evans
Radcliffe Infirmary, Oxford

Mrs Stella Burnside
Altnagelvin Hospitals Trust,
Londonderry

Mr John Cairns
University of Aberdeen

Professor Howard Cuckle
University of Leeds

Dr Carol Dezateux
Institute of Child Health,
London

Mrs Anne Dixon-Brown
NHS Executive Eastern

Professor Dian Donnai
St Mary's Hospital,
Manchester

Dr Tom Fahey
University of Bristol

Mrs Gillian Fletcher
National Childbirth Trust

Dr JA Muir Gray
National Screening Committee,
NHS Executive Oxford

Professor Alexander Markham
St James's University Hospital,
Leeds

Dr Ann McPherson
General Practitioner,
Oxford

Dr Susan Moss
Institute of Cancer Research

Mr John Nettleton
Consumer member

Mrs Julietta Patnick
NHS Cervical
Screening Programme,
Sheffield

Dr Sarah Stewart-Brown
Health Service Research Unit,
University of Oxford

Past members

Dr Sheila Adam*
Department of Health

Professor George Freeman
Charing Cross & Westminster
Medical School, London

Dr Mike Gill
Brent & Harrow
Health Authority

Dr Anne Ludbrook
University of Aberdeen

Professor Theresa Marteau
Guy's, King's &
St Thomas's School of
Medicine & Dentistry,
London

Professor Catherine Peckham
Institute of Child Health,
London

Dr Connie Smith
Parkside NHS Trust,
London

Ms Polly Toynbee
Journalist

Professor Nick Wald
University of London

Professor Ciaran Woodman
Centre for
Cancer Epidemiology,
Manchester

* Previous Chair

continued

continued

Primary and Community Care Panel

Current members

Chair:
Dr John Tripp
Royal Devon & Exeter Healthcare NHS Trust

Mr Kevin Barton
East London & City Health Authority

Professor John Bond
University of Newcastle-upon-Tyne

Dr John Brazier
University of Sheffield

Ms Judith Brodie
Cancer BACUP

Mr Shaun Brogan
Ridgeway Primary Care Group, Aylesbury

Mr Joe Corkill
National Association for Patient Participation

Dr Nicky Cullum
University of York

Professor Pam Enderby
University of Sheffield

Dr Andrew Farmer
Institute of Health Sciences, Oxford

Dr Jim Ford
Department of Health

Professor Richard Hobbs
University of Birmingham

Professor Allen Hutchinson
University of Sheffield

Dr Aidan MacFarlane
Independent Consultant

Professor David Mant
Institute of Health Sciences, Oxford

Dr Chris McCall
General Practitioner, Dorset

Dr Robert Peveler
University of Southampton

Professor Jennie Popay
University of Salford

Dr Ken Stein
North & East Devon Health Authority

Past members

Professor Angela Coulter*
King's Fund, London

Professor Martin Roland*
University of Manchester

Dr Simon Allison
University of Nottingham

Professor Shah Ebrahim
Royal Free Hospital, London

Ms Cathy Gritzner
King's Fund, London

Professor Andrew Haines
RDRD, North Thames Regional Health Authority

Dr Nicholas Hicks
Oxfordshire Health Authority

Mr Edward Jones
Rochdale FHSA

Professor Roger Jones
Guy's, King's & St Thomas's School of Medicine & Dentistry, London

Mr Lionel Joyce
Chief Executive, Newcastle City Health NHS Trust

Professor Martin Knapp
London School of Economics & Political Science

Dr Phillip Leech
Department of Health

Professor Karen Luker
University of Liverpool

Dr Fiona Moss
Thames Postgraduate Medical & Dental Education

Professor Dianne Newham
King's College London

Professor Gillian Parker
University of Leicester

Dr Mary Renfrew
University of Oxford

Ms Hilary Scott
Tower Hamlets Healthcare NHS Trust, London

* Previous Chair

National Coordinating Centre for Health Technology Assessment, Advisory Group

Current members

Chair:
Professor John Gabbay
Wessex Institute for Health Research & Development

Dr Sheila Adam
Department of Health

Professor Nicholas Black
London School of Hygiene and Tropical Medicine

Professor Martin Buxton
Health Economics Research Group, Brunel University

Mr Harry Cayton
Alzheimer's Disease Society

Professor Angela Coulter
The King's Fund, London

Professor Paul Dieppe
MRC Health Services Research Collaboration, University of Bristol

Professor Mike Drummond
Centre for Health Economics, University of York

Professor Shah Ebrahim
MRC Health Services Research Collaboration, University of Bristol

Ms Lynn Kerridge
Wessex Institute for Health Research & Development

Professor Jos Kleijnen
NHS Centre for Reviews and Dissemination, University of York

Dr Ruairidh Milne
Wessex Institute for Health Research & Development

Ms Kay Pattison
Research & Development Directorate, NHS Executive

Professor James Raftery
Health Economics Unit, University of Birmingham

Professor Ian Russell
Department of Health Sciences & Clinical Evaluation, University of York

Dr Ken Stein
North & East Devon Health Authority

Professor Andrew Stevens
Department of Public Health & Epidemiology, University of Birmingham

Professor Kent Woods
Department of Medicine & Therapeutics, University of Leicester

Past member

Dr Paul Roderick
Wessex Institute for Health Research & Development

HTA Commissioning Board

Current members

Chair:
Professor Shah Ebrahim
Professor of Epidemiology of Ageing, University of Bristol

Professor Doug Altman
Director, ICRF Medical Statistics Group, Centre for Statistics in Medicine, University of Oxford

Professor John Bond
Director, Centre for Health Services Research, University of Newcastle-upon-Tyne

Mr Peter Bower
General Manager and Independent Health Advisor, Thames Valley Primary Care Agency

Ms Christine Clark
Honorary Research Pharmacist, Hope Hospital, Salford

Professor Martin Eccles
Professor of Clinical Effectiveness, University of Newcastle-upon-Tyne

Dr Mike Gill
Regional Director of Public Health, NHS Executive South East

Dr Alastair Gray
Director, Health Economics Research Centre, University of Oxford

Professor Mark Haggard
Director, MRC Institute of Hearing Research, University of Nottingham

Dr Jenny Hewison
Senior Lecturer, Department of Psychology, University of Leeds

Professor Alison Kitson
Director, Royal College of Nursing Institute

Dr Donna Lamping
Senior Lecturer, Department of Public Health, London School of Hygiene & Tropical Medicine

Professor Alan Maynard
Joint Director, York Health Policy Group, University of York

Professor David Neal
Joint Director, York Health Policy Group, University of York

Professor Jon Nicholl
Director, Medical Care Research Unit, University of Sheffield

Professor Gillian Parker
Nuffield Professor of Community Care, University of Leicester

Dr Tim Peters
Reader in Medical Statistics, Department of Social Medicine, University of Bristol

Professor Martin Severs
Professor in Elderly Health Care, University of Portsmouth

Dr Sarah Stewart-Brown
Health Service Research Unit, University of Oxford

Professor Ala Szczepura
Director, Centre for Health Services Studies, University of Warwick

Dr Gillian Vivian
Consultant, Royal Cornwall Hospitals Trust

Professor Graham Watt
Department of General Practice, University of Glasgow

Professor Kent Woods
Professor of Therapeutics, University of Leicester

Dr Jeremy Wyatt
Senior Fellow, Health Knowledge Management Centre, University College London

Past members

Professor Ian Russell*
Department of Health Sciences & Clinical Evaluation, University of York

Professor Charles Florey*
Department of Epidemiology & Public Health, Ninewells Hospital & Medical School, University of Dundee

Professor David Cohen
Professor of Health Economics, University of Glamorgan

Mr Barrie Dowdeswell
Chief Executive, Royal Victoria Infirmary, Newcastle-upon-Tyne

Dr Michael Horlington
Head of Corporate Licensing, Smith & Nephew Group Research Centre

Professor Sir Miles Irving
Professor of Surgery, University of Manchester, Hope Hospital, Salford

Professor Martin Knapp
Director, Personal Social Services Research Unit, London School of Economics & Political Science

Professor Theresa Marteau
Director, Psychology & Genetics Research Group, Guy's, King's & St Thomas's School of Medicine & Dentistry, London

Professor Sally McIntyre
MRC Medical Sociology Unit, Glasgow

Professor David Sackett
Centre for Evidence Based Medicine, Oxford

Dr David Spiegelhalter
MRC Biostatistics Unit, Institute of Public Health, Cambridge

Professor David Williams
Department of Clinical Engineering, University of Liverpool

Dr Mark Williams
Public Health Physician, Bristol

* Previous Chair

Health Technology Assessment 1999; Vol. 3: No. 22

Health promoting schools and health promotion in schools

Copies of this report can be obtained from:

The National Coordinating Centre for Health Technology Assessment,
Mailpoint 728, Boldrewood,
University of Southampton,
Southampton, SO16 7PX, UK.
Fax: +44 (0) 23 8059 5639 Email: hta@soton.ac.uk
http://www.hta.nhsweb.nhs.uk

ISSN 1366-5278