



# Effectiveness Reviews in Health Promotion

- C What effectiveness reviews have been done?
- C What is the impact of the review methods on the scope and recommendations of a review?
- C What are the trade-offs in conducting effectiveness reviews?

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## **Executive Summary**

This study investigated the methods used to conduct reviews of the effectiveness of health promotion interventions. It was carried out over a six-month period and funded by the Department of Health, and aimed:

1. to compile and describe a register of completed and ongoing effectiveness reviews in different areas of health promotion;
2. to describe and compare the review methods used;
3. to determine how different review methods may affect the conclusions drawn about effectiveness;
4. to make recommendations for how effectiveness reviews in health promotion should be carried out.

Though the work necessarily had to focus on particular areas of health promotion (i.e. accident prevention in older people, sexual health promotion, workplace health promotion), common methodological concerns apply throughout the field. Hence, this study is relevant to the broad range of health promotion specialists irrespective of their area of expertise.

### **Part I      The need for effectiveness reviews in health promotion**

Three phases of work were undertaken in relation to the need for effectiveness reviews. Recommendations for the production and presentation of effectiveness reviews were based on the findings of each phase.

Firstly, the research team convened two meetings with commissioners, purchasers and providers of health promotion services to inform this study. At the first meeting reviews of effectiveness were discussed in terms of their value; what they should include; how they should be presented; and their implications for health promotion purchasing and practice. Participants had clear ideas about what should be included in effectiveness reviews. Explicit and transparent details of the review methodology

used was considered to be an essential element. Sufficient detail was also emphasised, both in terms of providing descriptions of effective/ineffective interventions and a full discussion and critical appraisal of findings. In addition, a summary of the review which incorporates clear implications for planning services and identifying gaps in knowledge was considered essential. Process data were highlighted as useful and important to complement the information about effectiveness. One of the fundamental difficulties with the production of reviews of effectiveness was perceived to be avoiding disappointment with the end product. Involving end-users of reviews in the process of framing review questions and providing reviews in different formats for different audiences could be used as strategies for avoiding disappointment. In the second meeting, reviews of effectiveness were discussed in relation to the gap between research and practice. Ways of encouraging practitioner support for an evidence-based approach were suggested. They included providing systematic reviews of 'approaches' to health promotion and improving dissemination of review results.

Secondly, the methods and conclusions from six reviews of the effectiveness of interventions to prevent accidents and injury in older people were compared. The reviews were found to differ in terms of whether they addressed a narrow or broad scope; the number of studies they included; and the quality criteria used to assess the included studies such that the same studies were treated differently in different reviews. Although the implications for research and practice from the reviews were found to conflict, the authors of the reviews exercised caution when drawing final conclusions which served to minimise these conflicts.

Finally, searching was undertaken to compile a register of effectiveness reviews in different areas of health promotion. A total of 398 completed effectiveness reviews were identified and these were summarised according to their health focus and the reported methodology used within the review. Overall the reporting of the methodology used in the reviews was poor, which makes it very difficult to assess validity and comprehensiveness of the review's findings.

Based on these findings, the following recommendations were made:

## **Recommendations for the *preparation* of systematic reviews**

- , Commissioners and potential users of reviews should be involved in framing the review question, the shaping of the review as it progresses and the presentation of its findings. Methods for facilitating discussions to guide the research should draw on information science, education research and public understanding of science.
  
- , Systematic reviews should be commissioned as a two stage process: stage one involving identifying and mapping relevant studies; in stage two, a detailed review of studies should follow discussion between the researchers, commissioners and potential users to determine the criteria for choosing which studies to include, and the degree of information required about each reviewed study.
  
- , Methods for reviewing effectiveness which have been developed for evaluating care in clinical settings are largely applicable to reviewing health promotion interventions. In particular, clarity of scope, exhaustive search strategies, and the application of pre-set quality criteria to assess primary studies are essential, as well as regular updating. However, review methods may be adapted to suit health promotion better by: employing the quality criteria of 'sound' primary studies (comparable groups studied; pre- and post-test data reported for all groups on all outcomes targeted) rather than the quality criteria of random allocation or blinded random allocation (which are rarely reported in the field of health promotion).
  
- , Advances in search strategies addressing narrow clinical questions need to be matched by advances in search strategies to address broad policy questions.
  
- , Systematic reviews should draw on past reviews as a short-cut to critical discussions of the relevant issues and to identifying primary studies. Therefore the search strategy should include seeking both reviews and primary studies.

- , Reviews with a narrow scope should be described within the context of current practice, related research questions and related research (i.e. primary studies and completed and on-going systematic reviews).

### **Recommendations for the *reporting* of systematic reviews**

- , Effectiveness reviews need to lead to several products targeted at different audiences. Partnerships are required for the presentations, for instance, working with practitioners to write for practitioners. The emphasis on dissemination in current government policy should support such initiatives.
- , Reports of systematic reviews published in academic journals and professional ‘magazine’ type journals should raise awareness and signpost full reports.
- , Summaries of reviews, however short, should include the “bottom line” and its implications for planning of services and gaps in knowledge.
- , Full reports (paper or electronic versions) should be available to purchasers and providers. These reports should include:
  - C a clear description of the review methods, why these methods have been chosen and the implications they have for the evidence used to draw conclusions about effectiveness;
  - C not only whether interventions worked, or not, but how and why they worked (or failed);
  - C the quality of the resource or the training of the provider involved in the intervention tested, and the process data for informing the subsequent replication of the intervention in the field;
  - C hypotheses generated from the review which could be tested by subsequent research.

- , There is a need for regular updating of a central register of completed and ongoing effectiveness reviews to avoid overlap of effort and to ensure that new reviews build on previous reviews.
  
- , Clear reporting of review methods should be encouraged. For example, a checklist could be provided to authors and journal editors covering the key stages in conducting a systematic review (methods for searching, inclusion criteria, validity criteria).
  
- , Those commissioning and conducting effectiveness reviews should agree a common framework for how reviews in health promotion should be carried out, including the weighting of primary research.

## **Part II      The impact of review methodology on the scope and recommendations for effective health promotion interventions**

Four phases of work were undertaken in relation to the impact of review methodology on the scope and recommendations for effective health promotion interventions. Recommendations for searching for studies to include in effectiveness reviews and for the use of inclusion criteria are based on this work.

Firstly, searching for health promotion studies on five electronic bibliographic databases was examined. A range of databases were used, these included two medical databases (Medline and EMBASE), two social science databases (PsycLIT and the Social Science Citation Index) and one educational database (ERIC). Using the location of outcome evaluations of sexual health promotion interventions as a case study, search strategies were developed for each database separately and tested for their *sensitivity* (i.e. ability to locate as much as possible of *all* the available effectiveness evidence) and *specificity* (their accuracy in locating *relevant* evidence only). In addition, the sensitivity of search strategies when different combinations of the five databases were used was tested in order to identify the 'best' combination of databases to use, for example, when time constraints or accessibility restrict the extent of electronic searching.

Overall, the findings suggested that identifying health promotion studies to be included in effectiveness reviews is a highly complex, skilled and time-consuming exercise. In order to be highly sensitive, search strategies had to include a wide range of terms, hence had a very low specificity. The Social Science Citation Index was the most productive in locating effectiveness evidence in the area of sexual health promotion. Even so, this database only found just over half of the available effectiveness evidence which means that searching more than one database is essential. Under conditions in which resources are restricted, at least one medical database in combination with at least one social science database should be used to avoid missing too many relevant studies. An important finding to emerge was that some health promotion studies published in journals covered by databases may never be entered into those databases, while other studies may only appear after considerable delay. Using alternative methods of searching, such as handsearching of journals, is also essential.

Secondly, two strategies to decrease the amount of effort in searching for effectiveness studies were examined: using search strategies with higher specificity and using a specialised register of effectiveness studies, the Cochrane Controlled Trials Register (CCTR). The need for a health promotion-specific coding system was examined by testing the utility of MeSH terms within Medline to locate studies to answer specific questions about the effectiveness of sexual health interventions.

The findings suggested that the amount of effort needed for implementing search strategies and sorting the search results can be reduced by using search strategies with higher specificity. Consequent loss of sensitivity can be minimised by combining a comprehensive search based on subject- and prevention-related terminology with specific study design. This was found to be an acceptable strategy on Medline, but loss of sensitivity may be more severe on other databases especially those with a less comprehensive or no indexing system for study design.

The use of the CCTR as a 'short-cut' for locating effectiveness evidence was found to be challenging. Complex and time consuming searches had to be developed to locate relevant studies. However in response to discussions about the difficulties of identifying health promotion trials, amendments are in progress which will facilitate the location of these studies.

The results of testing the utility of Medical Subject Headings (MeSH) on Medline suggested that these terms are less efficient than using a health promotion-specific coding strategy (i.e. MeSH terms locate a smaller number of the available studies). The implication is that specialised registers with standardised health promotion-specific coding are a cost-effective option as they will increase the efficiency of locating evidence to answer pragmatic questions about effectiveness in health promotion.

Thirdly, the impact of different search strategies on the scope and recommendations for effective interventions was determined. This was done by using healthy eating interventions which were implemented in the workplace to change participants' cholesterol levels. Fifty-two reports of relevant outcome evaluations were identified and reviewed according to a standardised quality assessment procedure (the 'EPI-Centre quality criteria'). Twelve studies met the quality criteria of employing a

control/comparison group equivalent to the intervention group in socio-demographic characteristics and baseline outcome measures; and reporting of pre- and post-intervention data for all groups on all outcomes targeted. These studies were deemed 'sound' and constituted the set of studies from which potentially reliable conclusions can be drawn. The number of 'sound' studies found by different search strategies was then examined and the impact on the scope and recommendations of for effective/ineffective interventions assessed.

Different search strategies found different numbers of outcome evaluations. For example, a 'simple' search found only twenty-two of the fifty-two studies whilst a 'detailed' search found forty-eight. Further, of the twelve 'sound' studies, the 'simple' search found four, whilst the 'detailed' search found ten. The less studies there were to draw on, the more difficult it was to identify a pattern in terms of what constituted an effective/ineffective intervention. For example, using the 'detailed' search, the pattern of effective interventions suggested that personalised advice is an essential component in improving cholesterol levels. However, using the 'Cochrane optimal search' the pattern of effective and ineffective studies was less clear; and in case of the 'simple' search there were not enough studies to draw on. Thus, the use of search strategies not only has an effect on the overall number of studies that may be included in an effectiveness review but also on the relative numbers of different types of studies. Search strategies with higher sensitivity produce a bigger pool of studies from which conclusions may be drawn, but require more effort and hence resources to conduct.

Fourthly, we determined how different inclusion criteria related to study design of individual studies may alter the scope and recommendations of an effectiveness review. A range of inclusion criteria employed in identified effectiveness reviews were used: all studies irrespective of their evaluation design; all randomised controlled trials; randomised controlled trials with adequately concealed randomisation only; all trials irrespective of the method of allocation of participants to the different groups involved; and studies with the 'EPI-Centre quality criteria'. These inclusion criteria were applied to the set of fifty-two studies reporting on the impact of workplace healthy eating interventions on cholesterol levels.

The findings showed that the type of inclusion criteria employed resulted in different sets of studies from which conclusions and recommendations could be drawn. For example, including all studies irrespective of their evaluation design meant that a wide range of effective interventions could be recommended, whilst inclusion of randomised controlled trials with concealed allocation meant that only three studies could be used to inform recommendations.

## **Recommendations for *increasing the reliability* of effectiveness reviews**

### **(i) Recommendations for *searching* for effectiveness evidence**

, Commissioners of effectiveness reviews and researchers undertaking a systematic review of effectiveness should be aware of the complexity of electronic database searching for locating outcome evaluations of health promotion interventions and the consequences of this for the budget and time scale of the review.

, Effectiveness reviews should report the search strategies used and provide details of their sensitivity and specificity.

, There is a need to build on previously completed systematic reviews with the aim to make them fully comprehensive i.e. cover *all* available relevant research.

, Developing highly sensitive search strategies requires substantial effort. Use of search strategies with higher specificity can reduce the amount of effort but researchers and commissioners must be willing to acknowledge a loss of sensitivity. Efforts in developing these strategies and compiling a specialised register with standardised coding should be built upon and widely disseminated to avoid duplication of effort.

, Searching for studies to update a systematic reviews should overlap in time with the searching period covered in the original review, rather than starting from where previous searching left off.

, Use of more than one database is necessary for locating outcome evaluations of health promotion interventions as using any one database alone is likely to miss a substantial amount of the available evidence within a field.

, Not every article from all the journals indexed are systematically entered onto electronic databases. While manufacturers need to assess the extent of this problem and make attempts to redress it, this indicates the need for additional alternative ways of searching, such as handsearching of journals, when undertaking a systematic review of effectiveness.

**(ii) Recommendations for *appropriate inclusion criteria***

, The use of different inclusion criteria can result in reviews that are similar in focus (i.e. health area, study population, types of interventions), being different in their recommendations for what constitutes an effective/ineffective intervention. There is a need to agree a set of empirically tested quality criteria to assess the methodological quality of evaluation research. Without such agreement, the value of effectiveness reviews in furthering evidence-based health is questionable.

, The use of random allocation or concealed random allocation is insufficient to assess the quality of studies as it does not deal with the quality of the execution and analysis of the trial. Only inclusion criteria which critically assess key aspects of the research design, execution and analysis are the basis of a reliable strategy.

## **Part I**

### **The need for effectiveness reviews in health promotion**

#### **Chapter 1 Background and purpose of the study**

##### *1.1 What are effectiveness reviews?*

The epidemic in chronic diseases, most of them preventable to a certain extent at least, and rising health care costs, have put disease prevention and health promotion firmly on the political agenda. These factors and ethical concerns have led to the search for evidence of effective interventions. Good practice in health promotion is, however, not self-evident, and findings from evaluation studies have varied: some programmes have failed to achieve their goals and others may have made problems worse. On the one hand, there is an ever-increasing amount of new research evidence, while, on the other hand, available research data are not always easily accessible. Consequently, reviews synthesising the results of primary research have become an essential tool for those interested in advancing evidence-based health promotion.

Health promotion practitioners, users of health promotion services, policy-makers and researchers need to have ready access to reliable reviews of available research to enable them to make informed decisions about practice, policy and research needs in health promotion. Literature reviews aim to summarise the results and implications of research addressing a question or issue relevant to a particular field. Examples of such reviews are: Why do more girls than boys smoke cigarettes? (Swan et al. 1989); Evaluation in health education: A review of progress, possibilities, and problems (Nutbeam et al. 1990); A systematic review of parent-oriented programs to prevent children's use of alcohol and other drugs (Elmqvist 1995). As such, literature reviews aim to provide us with a short-cut to otherwise unmanageable quantities of primary research.

There is a need for information from a range of reviews addressing different questions, to be integrated when making decisions about effective health promotion. One of the important questions is 'Does it

work?'. Finding an answer to the question about the effect of health promotion interventions on a range of outcomes, such as knowledge, attitudes, health-related behaviours, as well as health status, is an essential step in setting priorities for action and in allocating resources. The research presented in this report is confined to 'effectiveness reviews', i.e. reviews aiming to summarise the impact of health promotion on health-related outcomes. Examples of such reviews are: The impact of incentives and competitions on participation and quit rates in worksite smoking cessation programs (Matson et al. 1993); The effectiveness of sexual health interventions for young people (Peersman et al. 1996); Dental caries in developing countries in relation to the appropriate use of fluoride (Manji and Fejerskov 1990). The focus on effectiveness reviews does not imply that other types of literature reviews are redundant; they are extremely important. However, this study is concerned with the methods that have been used in conducting effectiveness reviews, and hence with their validity as tools in evidence-based health promotion.

There is an ongoing debate about what constitutes 'health promotion'. While there is no unanimity, the dominant vision among health promoters today is that health promotion should go beyond individual lifestyle strategies. Health promotion purists argue that 'true' health promotion interventions tend to be complex, use multiple strategies, operate at different levels and aim to empower people to take control over their own health (Ziglio 1996). We take the view that there is a wide choice of interventions involving the target population and/or a range of professionals -from health care workers targeting individual behaviour to politicians making policies on employment, housing conditions, transport and so on, that potentially contribute to improving health, preventing disease and reducing social inequalities (Peersman 1999). Though we necessarily had to focus our study on some areas of health promotion (i.e. accident prevention in older people; sexual health promotion for young people; workplace health promotion), common methodological concerns apply throughout the field. Hence, this study is relevant to the broad range of health promotion specialists irrespective of their area of expertise.

## **1.2 Purpose of this study**

Over the past few years, there has been increasing enthusiasm for undertaking reviews of effectiveness in different areas of health promotion. These reviews vary in the focus of the review's question, the

search strategies used for identifying relevant studies, the criteria for including studies, and the methods for combining results from different studies. Reviews may focus on the health risks of particular populations for cardiovascular disease (Ebrahim and Davey Smith 1996) or risk of injury amongst young people (Towner et al. 1996), a medium for intervention such as video (Eiser and Eiser 1996), a type of desired behaviour such as healthy eating (Roe et al. 1997), or a body system such as oral health (Kay and Locker 1998). Search strategies may focus primarily on the population, intervention or health problem, or on the study methodology, and may draw on a range of electronic databases and handsearching of journals. Conclusions about effectiveness may be drawn from a wide variety of study designs for example, post-test, pre- and post-test, as well as controlled trials (Eiser and Eiser 1996) or from a narrow range for example, adequately controlled trials (Peersman et al. 1996), or randomised controlled trials (Effective Health Care Bulletin 1996). A significant feature of all this review activity has been the lack of a central register listing the reviews being conducted. This has led to a situation in which concurrent reviews have often overlapped in the questions they address, and the primary studies they examine. In addition, systematic research into the extent to which using different review methods may alter the conclusions about effectiveness and the knowledge to guide implementation about effective interventions, has not been carried out. In the area of young people and smoking, for example, a review of reviews spanning ten years revealed that differences in the search strategies and quality criteria were matched by differences in the studies identified and the conclusions drawn about effectiveness (Oakley and Fullerton 1995). Consequently, what is 'known' about what works in health promotion is heavily dependent on 'what questions' have been asked and 'how' they have been addressed. The desirability to avoid unnecessary duplication of effort, and to employ the most appropriate methods for effectiveness in health promotion was the rationale behind the research described in this report.

Our research, which was funded by the Department of Health over a six-month period from September 1997 to February 1998, had four aims :

1. To compile and describe a register of completed and ongoing reviews of effectiveness in different health promotion areas
2. To describe and compare the review methods used

3. To determine how different review methods may affect conclusions drawn about effectiveness
4. To make recommendations for how effectiveness reviews in health promotion should be carried out.

Wider recognition of the key role of reviews in synthesising and disseminating the results of effectiveness research has prompted people to consider their validity. 'Systematic' reviews differ from other types of reviews in that they use explicit, systematic methods with the aim to limit bias (systematic errors) and to reduce random errors, thus providing more reliable results upon which to draw conclusions and make decisions (Mulrow and Oxman 1997). Rather than reflecting the views of the authors, or a restricted selection of the available literature, systematic reviews provide a more comprehensive summary of what we know and do not know about different forms of health care interventions (Deeks et al. 1996). Systematic reviews establish where the effects of health care are consistent, allowing research results to be applied across populations, settings, and differences in treatment; and where effects may vary significantly. In addition, by identifying areas of knowledge and gaps in knowledge, they are also an invaluable first step before carrying out new primary research. We need systematic reviews to integrate efficiently valid information, providing a basis for rational decision-making.

Though the science of systematic reviews is relatively young, there is now a growing literature on review methods and guidelines, most of it related to synthesising the effects of medical care interventions. Important steps in the preparation of a review are considered to be:

- C Formulating the review question
- C Identifying relevant primary research
- C Assessing identified studies for inclusion
- C Assessing the validity of studies
- C Extracting relevant data
- C Analysing and presenting results
- C Interpreting results

Our research is the first to investigate, systematically, the extent to which using different review methods alters the conclusions of effectiveness reviews in health promotion, hence the knowledge to guide

implementation. This work contributes to the methodological paradigm debate in health promotion and social interventions.

### **1.3** *Outline of the report*

Continuing **Part I, Chapter 2** presents information needs with respect to evidence-based health promotion of commissioners, purchasers and providers of services and makes suggestions for how effectiveness reviews can be improved to address those needs better. **Chapter 3** illustrates how different reviews with a similar focus but based on different review methods, can be interpreted by users as presenting conflicting messages. As such, this chapter clearly indicates the need for research into the impact of different review methods on the conclusions of effectiveness reviews, and hence the need for an agreed framework on how those reviews should be conducted. **Chapter 4** explores existing effectiveness reviews in terms of their health focus and the review methods used. **Part II (Chapters 5, 6, 7 and 8)** then deals with the two main stages in conducting a systematic review, i.e. the identification of primary research, and the assessment of the validity of included studies. Throughout the report recommendations have been made, but **Part III** briefly summarises the main recommendations in terms of the commissioning, conducting and dissemination of effectiveness reviews in health promotion.

## Chapter 2 Consultation with users

This chapter reports on the findings from two consultation meetings with commissioners, purchasers and providers of health promotion services as users of effectiveness reviews. Their Information needs with respect to evidence-based health promotion were explored and suggestions for how effectiveness reviews can be improved to address their needs better discussed.

### *2.1 Information needs of purchasers and providers*

The first consultation meeting aimed to determine how different methods of producing effectiveness reviews meet the information needs of purchasers and providers of health promotion services. The meeting was convened early on in the work so that the expressed needs of -at least some- of the target audiences for effectiveness reviews could be used to shape our data gathering and interpretation, as well as direct the recommendations. We invited people who had previously used the EPI-Centre enquiry service with questions about effectiveness reviews; who had participated in the EPI-Centre series of PHASE workshops on critical appraisal skills (Oliver et al. 1996); and/or had participated in the workshop on effectiveness reviews organised by the Health Education Authority (HEA) (Meyrick 1997). Seven people attended the meeting; they were members of the Inner London HIV Commissioning Group, providers of information and other prevention services in the statutory and voluntary sectors, commissioners of research and effectiveness reviews; researchers who had conducted an effectiveness review.

The purpose of the meeting was to discuss how we can best prepare and present effectiveness reviews knowing that we do not all agree on for example, the definition of 'effectiveness' or the types of study designs that should be included in effectiveness reviews.

A two and a half hour session was planned to include: the nature of effectiveness reviews; a comparison of methods for reviewing effectiveness; a discussion of the content and presentation of reviews of effectiveness; a display of different review reports; consideration of the essential, important and optional elements of effectiveness reviews; and the construction of a checklist for effectiveness reviews. To

initiate discussion a definition of effectiveness reviews was offered:

“Reviews of published and unpublished literature which bring together the findings of well-conducted research about effectiveness”

Discussion was invited in response to questions structured to elicit the relevance of effectiveness information and its presentation:

“What sort of questions do you ask/ want to ask about effectiveness?”

“What sort of information do you want included in the answers?”

“How do you want the information presented?”

The following represents the views expressed during the discussion:

Difficulties to be overcome with the production and use of reviews of effectiveness were perceived to be:

- C Commissioners of research have not always been clear about their information needs ie. do they need an effectiveness review or a descriptive mapping? Clarity about the required product will minimise potential disappointment with the final product.
- C Commissioners of services are seen to be acting responsibly if their response to providers' specific ideas is to ask questions about effectiveness. They want to know that providers are thinking about effectiveness.
- C Reviews are often not used because of other constraints, such as political pressures which determine decisions.
- C There may not be consensus about the definition of effectiveness: “Do you mean, does it work?” Nor is there consensus about how much of an intervention needs to be demonstrated as effective: some elements or the whole package?
- C Reviews of effectiveness have not always been explicitly linked with current practice.
- C Practitioners often have very specific questions about “what works”; they have ideas about the interventions they wish to provide, and would like the evidence presented about these specific interventions. They find reviews of effectiveness disappointing if these do not present that specific evidence.

- C The end-users of reviews have rarely been involved in the process of framing review questions.
- C Research commissioners ask policy-related questions e.g. about targets within the Health of the Nation framework; about integrated targets with different dimensions; about cost-effectiveness; about research gaps. These need very broad reviews which are time-consuming to produce.

Information considered to be *useful* in reports of reviews included:

- C Quality of the resource/training of the provider involved in the intervention tested.
- C Transparency about the review methods; why those methods were chosen; the implications these have on the evidence used to draw conclusions.
- C Not only whether an intervention worked, or not; but how it worked, or failed to work.
- C Process data for informing the implementation of a particular intervention in the field.
- C Hypotheses generated from the review which could be tested by subsequent research.
- C A clear “bottom line” related to implications for planning of services and gaps in knowledge.

Suggestions for *presentation of information* about effectiveness included:

- C Reviews of effectiveness need to lead to several products aimed at different audiences.
- C Working partnerships are required for different presentations e.g. practitioners to write for practitioners.
- C Government policy emphasises dissemination and should favour efforts at this stage.
- C Research gaps need to be explicitly stated.
- C A balance is needed between tables and text, which may mean presenting tables as an appendix.
- C Detail should not be sacrificed to increase accessibility.

Elements *essential* to a review were considered to be:

- C Bibliography.
- C Transparent methodology.
- C Full discussion and critical appraisal of findings, including discrepancies but not value judgements.
- C Clear summary.

Elements *important* for a review were considered to be:

- C Details about effective interventions.
- C Information about the context of interventions.
- C Current practice not demonstrated to be effective.
- C A little speculation in discussing the implications.

No elements of reviews were identified as *optional*.

In response to the question “Are the essential/important/optional elements of effectiveness reviews different for different tasks e.g. purchasing/ providing”, it was noted that mapping of current practice was considered essential for the Department of Health. However, this was recognised as complementary to the work of effectiveness reviews.

## **2.2 Value and use of effectiveness reviews**

A second meeting was convened five months later to consider the emerging findings of this study and to discuss the value of effectiveness reviews and their implications for purchaser and providers.

There was support for the production of effectiveness reviews and for open discussion and analysis about the contribution that such reviews should be making to policy-making and service planning. A number of issues were raised which highlight the need to close the gap between research and practice, making research more relevant and accessible to practitioners, and more readily implemented:

- C Practitioners would find it most useful to have systematic reviews of ‘approaches’ to health promotion (e.g. community development or peer-delivered interventions), rather than topic- focused reviews (e.g. healthy eating or accident prevention).
- C Reviews need to give attention to the context in which health promotion interventions are conducted. Such information could strongly influence service planning.
- C Systematic reviews giving recommendations supporting ‘common sense’ or ‘current practice’ might encourage practitioner support for the principle of systematic reviews.
- C One well-designed trial indicating an effective intervention is sufficient evidence for replication. If

more than one trial supports the intervention implemented through slightly different methods, then there may be a choice of approaches.

- C Practitioners do not commission reviews for their own decision-making. Instead they must make do with reviews commissioned for other purposes. They may either look at all relevant evidence and then hone it down to what is practicable (an approach encouraged in professional training workshops), or they may decide in advance which intervention they want to implement and then seek out evidence to support their decision.
- C Because practitioners often need to seek out evidence of effectiveness for themselves, information about effective search strategies should be disseminated to them and the information officers working with them.
- C Practitioners' common misunderstanding that an evidence-based approach means they must undertake their own evaluations of effectiveness needs to be corrected.
- C If research is to meet the needs of practitioners better, methods for involving them in discussion to shape the research need to be based on evidence. Directly relevant evidence about practitioners and research currently focuses on teaching critical appraisal skills and the implementation of research findings, not on research planning. Education research and information science may guide advances in this area, as may the literature on public understanding of science.
- C Research findings need to be translated into policy with broad statements. For instance, if we wish to draw conclusions from RCTs or trials about the effectiveness of cholesterol-reducing interventions, we can safely recommend that workplace health promotion includes cholesterol-reducing interventions because 70-80% of them appear effective (evidence from RCTs and trials). Alternatively, if we wish to draw conclusions from 'sound' trials<sup>1</sup> only, we can safely recommend that cholesterol-reducing interventions should include one-to-one personalised advice (evidence from 'sound' trials) (see **Chapter 8**).

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<sup>1</sup>outcome evaluation studies with at least the following quality criteria : (a) employing a control/comparison group equivalent to the intervention group in socio-demographic characteristics and baseline outcome measures; (b) providing both pre- and post-intervention data for each group; (c) reporting the impact on all outcome measures targeted (as stated in the aims of the study)

- C There is a need to improve the dissemination of the results of systematic reviews to practitioners, for example, by publishing summaries of reviews in ‘magazine’ type journals for nurses.
- C When commissioning reviews, a two-stage process could shape the review involving commissioners more directly in the research. It was suggested that the first stage would involve finding out how many evaluations have been carried out in the particular area of interest, and with this information the second stage would involve negotiating satisfactory funding and timescale. For example, if there are a huge number of studies, a longer timescale or higher funding can be set or, alternatively, the focus of the review could be restructured to concentrate on one particular aspect of the area in question (e.g. population type, use of participatory methods etc) to fit in with restricted time and funding parameters.

### **2.3 Conclusions**

The participants in the first meeting had clear ideas about what should be included in an effectiveness review. Explicit and transparent details of the methodology used in the review were considered to be essential. Sufficient detail was also emphasised, both in terms of providing descriptions of effective/ineffective interventions and a full discussion and critical appraisal of the study findings. In addition, a summary of the review which incorporates clear “bottom line” implications for planning services and identifying gaps in knowledge, was considered essential. Process data were highlighted as important in complementing the information about effectiveness.

One of the perceived fundamental difficulties with the production of effectiveness reviews concerned avoiding disappointment with the end product. While research commissioners felt the need for broad reviews to answer policy-related questions, practitioners felt they needed more intervention-specific information. It was noted that only rarely is the research evidence sufficient to give clear answers or recommendations. Involving end-users of reviews in various stages of the review process was considered a good strategy for avoiding disappointment.

In the second meeting, reviews of effectiveness were discussed in relation to the gap between research and practice. Ways of encouraging practitioner-support for an evidence-based approach

were suggested. They included: the provision of systematic reviews of 'approaches' to health promotion and improving dissemination of review results. While highlighting the need for practitioners to be involved in the framing of review questions, it was also acknowledged that the most effective methods for involving them in this process need to be sought. Again, the different needs of health promotion practitioners and commissioners of research were emphasised: practitioners need information regarding the 'best' way to search for effectiveness evidence supporting their services; commissioners, in discussion with researchers, need to be able to tailor the scope of a systematic review to accommodate resource constraints.

## Chapter 3      Effectiveness reviews in health promotion for older people: a case study

This chapter introduces some of the key methodological issues in conducting and using effectiveness reviews, taking reviews of accident and injury prevention as an example. The topic was chosen because an e-mail request to the Health Promotion Research Internet Network<sup>1</sup> questioned three reviews in this area with apparently conflicting conclusions. One of these (Oakley et al. 1996a) was based on a systematic review carried out by a team of researchers from our own research unit (Oakley et al. 1995). The methodological concerns discussed in this chapter are not unique to the area of accident prevention, but apply throughout health promotion. Some of them will be investigated in more detail in other areas of health promotion, later on in the report.

### *3.1 Answering pragmatic questions: a query about effectiveness reviews in older people*

Discrepancies between conclusions of effectiveness reviews have been recognised by health promotion specialists. Discrepancies in the area of accident and injury prevention came to light when an e-mail request (see **Appendix 1**) to the Health Promotion Research Internet Network<sup>1</sup> produced references to three reviews (Province et al. 1995; Oakley et al. 1996a; Gillespie et al. 1997a) with apparently conflicting conclusions.

According to the e-mail message, these reviews appeared to offer different conclusions about the effects of exercise:

1. a pre-planned meta-analysis of the 'Frailty and Injuries: Cooperative Studies of Intervention Techniques' (FICSIT) trials concluded that exercise programmes alone appeared to reduce

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<sup>1</sup>Network for "international co-operation and support on systematic literature reviews and meta-analyses to synthesise the existing evidence from evaluation studies of injury prevention and control".

the risk of falling by 10%; and combined with balance training by 17% (Province et al. 1995).

2. a review by Oakley et al. (1996a) concluded from the FICSIT trials that balance training only reduced the risk of falling by 25%; and that studies reporting intermediate outcomes (postural stability, sway, balance) contributed little direct evidence for the prevention of falls.
3. a review by Gillespie et al. (1997a) concluded that there was no evidence to support a single intervention for the prevention of falls: neither exercise only (pooled Odds Ratio (OR): 1.05; 95% Confidence Interval (CI): 0.74-1.48) nor health education only (OR: 1.25; 95% CI: 0.51-3.03).

The author of the e-mail also cited a fourth review (Rivara et al.1997) and raised the following questions about these specific reviews and about review methodology more generally in health promotion:

- C “Are the conclusions on the value of exercise contradictory in the three meta-analyses?”
- C “Is the RCT the appropriate method for assessing community intervention trials?  
If not, what kind of criteria should be used for prevention/ health promotion meta-analyses?”

### **3.2 Comparison of the reviews**

In order to explore these questions, we identified four reports (Oakley et al. 1995b; Oakley et al. 1996a; Effective Health Care Bulletin 1996; and Gillespie et al. 1997a) of the two systematic reviews discussed above, the pre-planned meta-analysis (Province et al. 1995) and the review by Rivara et al. (1997) (see **Table 3.1**). We will refer to the Gillespie et al. review (1997a) as the Cochrane review since it was carried out within the Musculoskeletal Review Group of the Cochrane Collaboration.

Some of these reports were related in the sense that later reviews built on earlier ones. The earliest review was Oakley et al. (1995) and the full report was available from the Social Science Research Unit (SSRU), London University Institute of Education. Subsequently, additional searches and

changes in the review methods by the Centre for Reviews and Dissemination (CRD) resulted in the Effective Health Care Bulletin in 1996. An abridged version of this was published in Quality in Health Care (Oakley et al. 1996a). The Cochrane review (Gillespie et al. 1997a) referenced the Effective Health Care Bulletin (1996) and the Quality in Health Care report (Oakley et al. 1996a), but not the original full review report from SSRU (Oakley et al. 1995b). The most recent review (Rivara et al. 1997) had a much broader scope and did not refer to any of the earlier systematic reviews. FICSIT trials were referenced in all of the systematic reviews although the pre-planned meta-analysis was not published until after the original SSRU report. Overall, 137 studies were included in the reviews of which only 33 were common to more than 2 reviews. Twenty-one of these 33 studies were treated differently in the different reviews. Only 2 studies were mentioned in *all* reviews, and only one of these was treated consistently in all the reviews.

**Table 3.1      Reviews/meta-analyses about fall prevention**

<p><b>1995: SSRU review (included two FICSIT trials)</b> Oakley A, France-Dawson M, Fullerton D, Holland J, Arnold S, Cryer C, Doyle Y, Rice J, Russell Hodgson C. Review of health promotion interventions to prevent accidents in older people: Report for the NHS Centre for Reviews and Dissemination/ Health Education Authority. SSRU, Institute of Education, University of London.</p> <p><i>Acknowledgment : C Cryer, Y Doyle, J Rice, and C Russell Hodgson are from the South East Institute for Public Health, UMDS, University of London.</i></p> <p><b>1995: FICSIT trials pre-planned meta-analysis</b> Province MA, Hadley EC, Hornbrook MC, Lipsitz LA, Miller JP, Mulrow CD, Ory MG, Satin RW, Tinetti ME, Wolf SL. The effects of exercise on falls in elderly patients. A preplanned meta-analysis of the FICSIT Trials. JAMA 1995;273:1341-7.</p> <p><b>1996: Effective Health Care Bulletin (drew on SSRU review and FICSIT meta-analysis)</b> NHS Centre for Reviews and Dissemination and Nuffield Institute for Health. Preventing falls and subsequent injury in older people. Effective Health Care 1996;2:1-16.</p> <p><b>1996: Quality in Health Care report (abridged version of Effective Health Care Bulletin)</b> Oakley AE, France Dawson M, Holland J, Arnold S, Cryer C, Doyle Y, et al.. Preventing falls and subsequent injury in older people. Quality in Health Care 1996;5:243-9.</p> <p><b>1997: Cochrane Review (drew on FICSIT pre-planned meta-analysis; Effective Health Care Bulletin; Quality in Health Care report)</b> Gillespie LD, Gillespie WJ, Cumming R, Lamb SE, Rowe BH. Interventions to reduce the incidence of falling in the elderly. In: Gillespie WJ, Madhok R, Murray GD, Robinson CM, Swiontkowski MF (eds.) Musculoskeletal Injuries Module of The Cochrane Database of</p>
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Systematic Reviews , [updated 01 December 1997]. Available in The Cochrane Library [database on disk and CDROM]. The Cochrane Collaboration; Issue 1. Oxford: Update Software; 1998. Updated quarterly.

**1997: Expert opinion review (drew on FICSIT pre-planned meta-analysis, but no systematic reviews)** Rivara FP, Grossman DC, Cummings P. Injury prevention: second of two parts. *New England Journal of Medicine*; 337 (9): 613 - 618.

The reviews were compared for their methodology and their conclusions (for details, see **Appendix 1**). Reviews were characterised by their scope, search strategies, quality criteria for including primary studies and methods for data extraction and synthesising findings. [Note: for our purposes, the breadth of scope of a review was coded as 'broad' or 'narrow' to indicate the broad or narrow range of interventions and/or outcomes respectively. This does not imply a judgement on the validity of the review, but only describes the area of interest the authors decided to focus on]. A list of all primary studies identified in the reviews was compiled and which studies were ultimately included in each review was recorded. In addition, the overlap in primary studies between the reviews was assessed. Reviews' conclusions about the implications for services and future research were compared and any discrepancies investigated for possible causes in the methodology of the reviews. In addition, each review was compared with the criteria identified by purchasers and providers of health promotion services as essential, important or useful for the presentation of findings of effectiveness reviews (see **Section 2.1**).

A review with a much broader scope than accident prevention only, "Health of the Elderly: a review of health education and health promotion" (Isaksson and Pohjolainen 1994) was identified during the preparation of this report. The full report was available from the International Union for Health Promotion and Health Education, but it arrived too late to be integrated in the analysis here. Therefore, this review was not compared directly with the others, but critiqued separately (see **Appendix 1**).

### 3.3 *Differences between the reviews' methods*

#### **Scope**

The major difference between the six reviews being compared was their scope. The review with the narrowest scope was the pre-planned meta-analysis (Province et al. 1995) where variants of interventions in institutional settings were evaluated in terms of time to each fall or fall-related injury. The exclusion of people who fell three times in two months narrowed the scope of the trials to people at lower risk of falling.

*Conclusion: In addition to the inclusion/exclusion criteria for a review, the inclusion/exclusion criteria within individual trials may further limit the applicability of a review's findings.*

The other review which focused on falls and fall-related injuries only was the Cochrane review (Gillespie et al. 1997a). The narrow scope of both these reviews had consequences not only for the evidence of effects of care they were able to assemble, but also for their recommendations for further research. Both called for trials employing different fall-related outcome measures. Gillespie et al. (1997a) recommended developing new outcome measures and Province et al. (1995) recommended a trial large enough to measure the effect on injurious falls.

*Conclusion: Reviews addressing narrow clinical questions can only identify narrow research gaps.*

The narrow scope of the Gillespie et al. review (1997a) was complemented by other Cochrane reviews (completed and ongoing) which also had narrow scopes: vitamin D treatment (Gillespie et al. 1997b; Papadimitropoulos et al. 1997); exercise therapy to prevent bone loss (Bonaiuti et al. 1997); hormone replacement therapy (Tugwell et al. 1997); calcium treatment (Shea et al. 1997; Papadimitropoulos et al. 1997); and prevention of steroid-induced osteoporosis (Homik et al. 1997). Between them, these reviews cover a broader scope. However, there is no consistent cross-referencing or mapping to guide people seeking effectiveness information spanning the broad scope.

*Conclusion: There is a need for reviews with a narrow scope to be described within the context of a map of related research questions, unappraised primary studies and on-going and*

*completed systematic reviews.*

The Effective Health Care Bulletin (1996) focused on falls and injury as well as intermediate outcome measures such as strength, balance, gait and sway. The broader scope encompassing intermediate outcomes meant that this review drew on data from 21 trials that were excluded from the Cochrane review (Gillespie et al. 1997a). The subsequent abridged version of the Effective Health Care Bulletin (1996) in Quality in Health Care (Oakley et al. 1996a) however, excluded studies of exercise programmes employing intermediate outcomes alone as they were considered not to offer such firm evidence about effects of care.

*Conclusion: The choice of outcome measures may influence the relevance and the quantity of the literature to be reviewed.*

In the Cochrane review (Gillespie et al. 1997a), evidence of the feasibility and protective effect of hip pads (Lauritzen et al. 1993; Wallace et al. 1993) was excluded because there were no falls outcomes, although this intervention had been included in the Effective Health Care Bulletin (1996) where it constituted the subject of recommendations for health care and research. The scope of the original SSRU review (Oakley et al. 1995b) was broader still in reviewing strategies to prevent accidents rather than just prevent falls and injuries from falls. Because of its broad scope, the SSRU review was the only one to reveal gaps in our knowledge about preventing accidents (rather than just injuries or falls), and to include broader recommendations for research.

*Conclusion: Broader scope reviews address broader policy questions.*

The latest review (Rivara et al. 1997) had an even broader scope, with no restriction on the type of accident or the type of population of interest. However, there was a tendency for the material reviewed to reflect the expressed aim of encouraging the participation of the *medical* community in injury control [emphasis added]. This was particularly evident in the calls for research, all of which were evaluations of medical interventions (e.g. combined hormone therapy, diuretics and other drugs to increase bone density).

*Conclusion: Lack of an explicit definition of a review's scope may hide the bias of the review's author.*

## Search strategies

The search strategies had an immediate impact on the number of studies to be reviewed. Systematic searching in this area was initiated with the SSRU review (Oakley et al. 1995b) which identified 24 reports of outcome evaluations, including 18 RCTs. This review included the first systematic attempt to identifying outcome evaluations in the area of interest. Methods for searching were necessarily limited due to budget and time constraints, specifically related to the lack of on-line access to electronic databases such as Medline. Extensions to the original search through the use of additional databases and investment in a Cochrane Review Group were incrementally productive: 37 RCTs were identified for 1996 and 51 RCTs for 1997 (Gillespie et al. 1997a). These advances were not drawn on by Rivara et al. (1997) who did not report a search strategy and recorded only 15 studies relevant to falls and injury which addressed dietary and drug prevention of osteoporosis, exercise, and hip protectors, but not home assessment and surveillance.

*Conclusion: Lack of any systematic search strategy may exclude studies that address services offered by professions other than those within the authors' area of expertise.*

*Drawing on past systematic reviews provides a short-cut to both critical discussions of the relevant issues and to identifying relevant primary research.*

Additional searching also led to three reports of intervention trials employing falls outcomes published prior to, but not identified by the authors of, the earlier reviews: identification bracelets in a rehabilitation hospital (Mayo et al. 1994; reviewed in the Effective Health Care Bulletin 1996 and by Gillespie et al. 1997a, but not by Oakley et al. 1995b); low intensity aerobic exercise for sedentary elderly people (Mills et al. 1994; reviewed in the Effective Health Care Bulletin 1996 and by Gillespie et al. 1997a, but not by Oakley et al. 1996a); high intensity strength training (Nelson et al. 1994; reviewed in Effective Health Care Bulletin 1996, but not by Oakley et al. 1995b). However, this extended searching has been developed only for reviews with narrower scopes. It is not possible to know whether similar efforts to develop and extend search methods, which would need a substantial increase in resources for the review (see **Chapter 5** and **6**), would identify accident prevention trials (e.g. prevention of traffic accidents and poisoning) which were noted for their absence in the review by Oakley et al. (1995b).

*Conclusion: There is a need for advances in search strategies addressing narrow clinical questions to be matched by similar advances in search strategies to address broad policy questions.*

Extended systematic searching at a later date identified five trials with falls-related outcomes published too late to be included in earlier reviews, but included in Gillespie et al. (1997a): hormone replacement therapy to promote muscle performance and balance in post-menopausal women (Armstrong et al. 1996); home modification and medication review (Carter et al. 1997); “Head over Heels” health promotion programme (Gallagher et al. 1996); a 12-month community exercise programme (Lord et al. 1995, 1996); and home exercise for elderly people with poor mobility (McMurdo et al. 1993). The last two were also included in the Effective Health Care Bulletin (1996). There were two further trials of resistance training (Skelton et al. 1995) and functional ability training (Skelton et al. 1996), which were also reviewed in the Effective Health Care Bulletin (1996).

*Conclusion: There is a need for regular updating of systematic reviews.*

Investment in searching and updating of reviews identified many more trials and RCTs using direct falls-related outcomes. This allowed for narrower inclusion criteria in terms of outcomes to be set in later reviews, with the result that 38 trials relying on intermediate outcome measures such as balance, sway or gait, were disregarded (Oakley et al. 1996a; Gillespie et al. 1997a). One argument for the focus on direct rather than intermediate falls-related outcomes is that the former are more ‘reliable’ measures of effectiveness. However, the extent to which conclusions based on intermediate outcomes are misleading is not clear because the only study to present numerical data and a meta-analysis was by Gillespie et al. (1997a) who did not include those outcomes. In addition, intermediate outcomes may be more closely related to ‘quality of life’, hence, are important to include as they may provide a different perspective on the reviews’ conclusions.

*Conclusion: Investment in searching and updating of reviews strengthens the evidence in effectiveness reviews. However, there is still a need to review studies with intermediate outcome measures as they may add a different perspective of intervention effects.*

## Quality criteria

Because the quality criteria between reviews differed, some trials were included by Gillespie et al. (1997a) and excluded by Oakley et al. (1995b). For instance, two RCTs where random allocation was not well-concealed, and the overall quality score was low (Carpenter et al. 1990; Tideiksaar et al. 1990), were included in the Gillespie et al. review (1997a) but did not contribute to the conclusions of the review by Oakley et al. (1995b) because information reported about the outcome measures was unclear. Gillespie et al. (1997a) gave the following reasons for giving little weight to these trials: data reported in the Carpenter et al. (1990) trial did not permit pooling and the trialists reported significantly fewer falls in the experimental group during that period but insufficient data were given to calculate the effect size; Tideiksaar et al. (1993) reported a small trial examining strategies to prevent falls in hospital patients which showed no evidence of benefit of the intervention used.

However, a trial of an in-home preventive assessment programme (Fabacher et al. 1994) with concealed random allocation and a higher quality score (Gillespie et al. 1997a) was excluded by Oakley et al. (1995b) as 'flawed' because reporting of outcomes targeted was unclear and outcome data were not reported for the intervention and control groups separately. Thus, when included by Gillespie et al. (1997a) but not by Oakley et al. (1995b), this trial contributed to the evidence of the beneficial effects of assessing and remedying medical and environmental risks in the home.

Gillespie et al. (1997a) included all relevant RCTs even if they were poorly executed. However, the calculation and reporting of a quality score for all the included studies allows additional information for interpreting the strength of evidence of the effects of care. Presentation of the trial results within each meta-analysis can be sorted according to quality or size of the trial. Findings from studies considered to be methodologically 'flawed' by Oakley et al. (1995b) did not contribute to the overall conclusions. However, these studies were not discarded from the review, but were discussed separately from the 'sound' studies including a clear indication of their methodological limitations.

*Conclusion: Some interventions subjected to poor quality evaluations are included in systematic reviews, but care needs to be taken with drawing conclusions from these studies.*

*Reviews of effectiveness can incorporate studies of different qualities without misleading readers if the poorer quality studies are highlighted within the text and allowed to contribute less to the conclusions about effectiveness. Similarly meta-analyses can weight studies according to their size and quality.*

### **Data extraction and synthesis of findings**

None of the studies reported the inter-reviewer variability in data extraction. Only the Cochrane review (Gillespie et al. 1997a) combined the results in a quantitative meta-analysis. This allowed an additional step in the review process for exercising caution in the interpretation: where data were not complete, studies could not be included in a quantitative meta-analysis even if they could be included in a narrative review and table of results. For instance, findings reported by Carpenter et al. (1990) and Tideiksaar et al. (1993) were reproduced in tables of results in the Effective Health Care Bulletin (1996), but excluded from the meta-analysis by Gillespie et al. (1997a). Both were discussed, but their findings did not contribute to the conclusions of the review by Oakley et al. (1995b).

### **Conclusions of reviews**

The authors of the systematic reviews/meta-analyses repeatedly recommended caution in interpreting the findings:

“None of the studies [multi-faceted FICSIT interventions which included exercise] individually or collectively in any meta-analysis had an effect on injurious falls” (Province et al. 1995)

“The evidence is such that no intervention can be identified as effective beyond reasonable doubt” (Oakley et al. 1995b)

“Given the limited evidence, new programmes should, where possible, be developed as part of controlled evaluations” (Effective Health Care Bulletin 1996)

Thus, it appears that while applying different quality criteria to primary studies may affect how the findings of individual studies are treated, it is unlikely to divide opinion radically about effectiveness amongst cautious reviewers. However, such caution may be expressed in a variety of ways. Neither randomisation nor concealed random allocation are the only ways to exercise this caution. Indeed, in

the area of health promotion, the choice of 'sound' trials (comparable groups studied; pre- and post-test data reported for all groups on all outcomes targeted) (Oakley et al. 1995b) may be at least as good for generating evidence of effectiveness.

### **3.4 Conclusions**

After this careful analysis, the questions originally raised in the e-mail were addressed again:

**C     *Are the conclusions on the value of exercise contradictory in the three meta-analyses?***

Not so much the conclusions from different reviews/meta-analyses, as the results, were different. The conclusions are not necessarily conflicting because authors who reviewed trials employing intermediate outcome measures such as sway and balance, reserved judgement about the effects of interventions on falls and injuries. However, the implications for practice and research drawn (not necessarily by the authors) from different reviews may well conflict. Implications for practice when evidence is limited to the promising trials which employed intermediate outcome measures may be more encouraging than when stronger, but less positive, evidence is available from trials employing falls and injuries as outcomes. Thus, the changing implications reflect the growing body of evidence which was revealed with later trials and more effort in searching to ensure a more comprehensive identification of relevant studies.

**C     *Is the RCT the appropriate method for assessing community intervention trials? If not, what kind of criteria should be used for prevention/health promotion meta-analyses?***

RCTs can offer reliable evidence for the effects of community intervention trials, but not all RCTs do because not all are well-designed and well-conducted. Searching for well-designed, well-conducted trials (not necessarily randomised) may be more productive than searching for RCTs when reviewing evaluations of health promotion interventions in non-clinical settings. Few health promotion studies employ random allocation, and reliable evidence may also be generated from sound non-randomised trials.

Having compared the technical aspects of the reviews of older people and injury/accident prevention, they were then matched against criteria discussed by purchasers and providers of health promotion

services (see **Section 2.1**):

**C**     *Do the reviews meet the information needs of purchasers and providers of health promotion services?*

*Bibliography:* All reports included a bibliography, although the number of relevant references ranged from 15 to over 200. Fewest relevant references were found in the expert opinion review (Rivara et al. 1997).

*Transparent methodology:* Methods were most transparent in the original SSRU review (Oakley et al. 1995b) and in an electronic publication (Gillespie et al. 1997a) where authors were not restricted by a word limit. Methods were least transparent in the expert opinion review (Rivara et al. 1997).

*Full discussion and critical appraisal of findings, including discrepancies, but no value judgements:* Least discussion was found in the expert opinion review (Rivara et al. 1997). All the systematic reviews appraised the findings and discussed discrepancies.

*Clear summary:* Neither of the review reports published in journals provided a summary because the journal format precluded this (Oakley et al. 1996a; Rivara et al. 1997). Gillespie et al. (1997a) provided the clearest summary in the structured format for Cochrane reviews.

*Details about effective interventions and their context:* Most space was given to describing effective interventions in the SSRU report (Oakley et al. 1995b). Settings for interventions were recorded (home, hospital or nursing home) but descriptions were scant. However, the information provided in the reports of the primary studies was often not more detailed.

*Current practice not demonstrated to be effective:* There is a distinction to be made here between current practice where evidence is insufficient to draw conclusions about effectiveness; current practice demonstrated to be ineffective; and current practice not evaluated. All the systematic reviews reported interventions that had been evaluated, whether they were demonstrated to be effective or not. Only the earliest review included a description of interventions whether or not they had been evaluated (Oakley et al. 1995b).

### 3.5 *Recommendations*

#### **Recommendations for the *preparation of systematic reviews***

- C Methods for reviewing effectiveness which have been developed for evaluating care in clinical settings are largely applicable to reviewing health promotion interventions. In particular, clarity of scope, exhaustive search strategies, and the application of pre-set quality criteria to assess primary studies are essential, as well as regular updating. However, review methods may be adapted to suit health promotion better by: employing the quality criteria of 'sound' trials<sup>1</sup> rather than the quality criteria of random allocation or blinded random allocation (which are rarely reported in the field of health promotion).
  
- C Searching for 'sound' studies<sup>1</sup> in health promotion is more difficult than searching for studies which employed random allocation. Some electronic databases, such as Medline, include a tag specifically to identify RCTs; none specifically tag 'sound' studies.
  
- C Advances in search strategies addressing narrow clinical questions need to be matched by advances in search strategies to address broad policy questions.
  
- C Systematic reviews should draw on past reviews as a short-cut to critical discussions of the relevant issues and to identifying primary studies. Therefore, the search strategy should include seeking both reviews and primary studies.
  
- C Reviews with a narrow scope should be described within the context of current practice, related research questions and related research (i.e. primary studies and completed and on-going systematic reviews).
  
- C Commissioners and potential users of reviews should be involved in framing the review question,

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<sup>1</sup>outcome evaluation studies with at least the following quality criteria : (a) employing a control/comparison group equivalent to the intervention group in socio-demographic characteristics and baseline outcome measures; (b) providing both pre- and post-intervention data for each group; (c) reporting the impact on all outcome measures targeted (as stated in the aims of the study)

the shaping of the review as it progresses, and the presentation of its findings.

Methods for facilitating discussions to guide the research should draw on information science, education research and public understanding of science.

- C Systematic reviews should be commissioned as a two stage process: stage one involving identifying and mapping relevant studies; stage two, a detailed review of studies should follow discussion between the researchers, commissioners and potential users to determine the criteria for choosing which studies to include, and the degree of information required about each reviewed study.

### **Recommendations for the *reporting* of systematic reviews**

- C Effectiveness reviews need to lead to several products targeted at different audiences. Working partnerships are required for the presentations, for instance, working with practitioners to write for practitioners. The emphasis on dissemination in current government policy should support such initiatives.
- C Reports of systematic reviews published in academic journals and professional 'magazine' type journals should raise awareness and signpost full reports.
- C Summaries of reviews, however short, should include "the bottom line" and its implications for planning of services and gaps in knowledge.
- C Full reports (paper or electronic versions) should be available to purchasers and providers. These reports should include:
  - C a clear description of the review methods, why these methods have been chosen, and the implications this has for the evidence used to draw conclusions about effectiveness;
  - C not only whether interventions worked (or not), but how and why they worked (or failed);
  - C the quality of the resource or the training of the provider involved in the intervention

tested, and the process data for informing the subsequent replication of the intervention in the field;

- hypotheses generated from the review which could be tested by subsequent research.

## Chapter 4 Existing effectiveness reviews

This chapter explores the extent to which and how effectiveness reviews have been compiled in different areas of health promotion. It looks in detail at systematic reviews carried out within the Cochrane Collaboration, those that form part of the recent HEA-series of effectiveness reviews, and those commissioned as a series of health promotion reviews by the European Commission.

### *4.1 What effectiveness reviews have been done?*

The aim was to compile and describe a register of completed and ongoing effectiveness reviews in different health promotion areas. Reviews were sought by means of electronic database searching on the Cochrane Library, EMBASE, ERIC, Medline, PsycLIT, the Social Science Citation Index, and the National Research Register (NHS R&D). **Appendix 2** gives details of the search strategies used. In addition, reference lists of identified effectiveness reviews were scanned and national and international health promotion agencies involved in commissioning effectiveness reviews, were contacted (including: the Centre for Reviews and Dissemination, the Health Education Authority, Health Promotion Wales, the Health Education Board Scotland, the International Union for Health Promotion and Education, the Centres for Disease Control and Prevention). The bibliographic database of the EPI-Centre was searched to locate previously identified effectiveness reviews.

The results from the electronic searches were downloaded into a reference managing system and the titles and abstracts (when available) were scanned with the aim of identifying relevant citations; full reports were obtained for all those judged to be, potentially, effectiveness reviews. Bibliographic details of the reviews obtained by other means were also entered. The EPI-Centre systematic coding strategy (Peersman and Oliver 1997) was then applied to indicate the health focus and the population covered by the reviews.

**Table 4.1** shows the results of the electronic searching on EMBASE, ERIC, Medline, PsycLIT and the Social Science Citation Index. It gives the total number of citations retrieved and the number of potentially relevant citations i.e. those judged to be health promotion effectiveness reviews on the basis

of the title and/or abstract. EMBASE and Medline were the most productive databases; they identified 52% of all potentially relevant citations. ERIC was the least productive in identifying only 3% of relevant citations. Of the 560 potentially relevant citations, full reports were obtained for 471 (84%) within the time period given for this work. Of these, 255 proved to be effectiveness reviews. Overall, together with the effectiveness reviews identified from other electronic databases and by other means, we identified 398 completed and 39 ongoing effectiveness reviews.

**Table 4.1 Search results from Medline, EMBASE, PsycLIT, ERIC and the Social Science Citation Index**

<i>Electronic database</i>	<i>Number (%) of citations retrieved</i>		<i>Number (%) of potentially relevant citations*</i>	
<b>Total**</b>	<b>6700</b>	<b>100%</b>	<b>560</b>	<b>100%</b>
EMBASE	2630	39	290	52
ERIC	253	4	15	3
Medline	3261	49	290	52
PsycLIT	764	11	148	26
Social Science Citation Index	584	9	104	19

\*Those citations potentially referring to an effectiveness review

\*\*Total not adding up to 6700 or 560 respectively/100% as some reviews were identified by more than one database

**Table 4.2** shows the number of completed effectiveness reviews we identified for different areas of health promotion. The health foci we indicated aimed to reflect the context in which the authors discussed the primary research reviewed, rather than the full range of health outcomes on which the interventions *may have* an impact (i.e. but was not measured). Coding in this way indicates the intended purpose of the review, and reflects the focus of the primary research included. For example, a review of interventions aiming to increase physical activity not discussed by the authors within the context of cardiovascular outcomes, was coded as a review on ‘physical activity’ and not as a review with a ‘cardiovascular’ focus. Similarly, there is overlap between healthy eating and cancer or cardiovascular disease; physical activity and cardiovascular disease or mental health; and obesity and cardiovascular

disease. We coded the overlap only when authors related the findings of studies to more than one health area. The focus of reviews summarising the impact of smoking prevention/cessation interventions, though clearly of relevance to cancer, were coded as ‘tobacco use’. **Table 4.2** shows that the area of substance abuse (drug, alcohol, tobacco) is relatively well-covered (39% of the identified reviews); and that a substantial proportion (18%) of reviews have been carried out within the sexual health field.

**Table 4.2 Health focus of completed effectiveness reviews in health promotion**

<i>Health focus</i>	<i>Number</i>	<i>%</i>
<b>Total*</b>	<b>401</b>	<b>100</b>
Substance abuse (Alcohol/Drugs/Tobacco)	156	39
Sexual health/Pregnancy prevention/ STD (including HIV/AIDS)	72	18
Accidents/Injury	31	8
Healthy eating	31	8
Obesity	27	7
Cardiovascular disease	26	7
Mental health	24	6
Physical activity	19	5
Cancer (including skin cancer prevention)	14	3
Other**	65	16

\* Not adding up to 401 or 100% due to overlap

\*\*including: child neglect, delinquency, diseases, health inequalities, medical care, oral health, physical abuse, sexual abuse

#### **4.2 How have effectiveness reviews been done?**

In order to describe the methods reported in the identified reviews, we developed a systematic coding strategy (see **Appendix 3** for details) based on the quality criteria set out by Mulrow (1987) for a state-of-the-art review article. The choice of keywords aimed to reflect the different stages involved in conducting an effectiveness review: purpose of the reviews, searching for primary studies, inclusion and

validity criteria for primary research, and presentation of findings. All reviews were coded according to this strategy. Some of the identified reviews were part of a 'series' of effectiveness reviews : reviews carried out by Collaborative Review Groups within the Cochrane Collaboration (referred to as Cochrane reviews); reviews commissioned by the Centre for Reviews and Dissemination (CRD)/the Health Education Authority (HEA) within the recent series of 'Health promotion effectiveness reviews' (referred to as HEA reviews); and the reviews of effectiveness of health education and health promotion commissioned by the Commission of the European Communities and managed through the Dutch Centre for Health Promotion and Health Education and the International Union for Health Promotion and Education (IUHPE) (referred to as IUHPE reviews). These reviews were further coded to compare their scope (type of studies, participants, and interventions) with the actual content of the included primary studies.

**Table 4.3 Reporting of review methods and presentation of findings in health promotion effectiveness reviews (n=398)**

<i>Review methods</i>	<i>Number*</i>	<i>%</i>
Aims stated	316	79
Search stated	130	33
Inclusion criteria stated	183	46
Validity criteria stated	108	27
Data analysis and presentation		
Included studies weighted	261	66
Included studies summarised	166	42
Narrative synthesis	361	91
Meta-analysis	63	16
Future directives stated	321	80

\*Based on 398 reviews

**Table 4.3** gives an overview of how many of the effectiveness reviews reported on the review methods used and the way in which the primary research was synthesised and presented. A quarter of the reviews failed to state the purpose for the review, i.e. did not provide a frame of reference helping the reader decide whether to read on, or setting a scope for determining strategies in the selection of primary studies. Only a third of the reviews (33%) reported their search strategy, and even fewer provided it in sufficient detail for it to be replicated (data not shown). This makes it very difficult for the reader to assess whether the range of included studies does represent the existing knowledge base in a particular area, or whether it is likely that relevant materials have been missed. Less than a third of reviews (27%) indicated the criteria by which the methodological quality of the included studies was assessed, though 66% of reviews included some weighting of the included studies (i.e. discussed at least to a certain extent the strengths and weaknesses of the design and execution of at least *some* of the studies). Very few reviews (16%) included both a narrative synthesis and a formal meta-analysis, i.e. a statistical pooling of the findings from different studies; most review provided a narrative synthesis only. Less than half (42%) of the reviews presented a summary table of all included primary research. Only 75 reviews (19%) reported *all* of the following: aims, search strategy, inclusion criteria *and* validity criteria (data not shown). Overall, the lack of clarity in review methodology implies that it is fairly difficult, if not impossible, to assess the potential bias and hence the reliability of most of the available effectiveness reviews. However, the vast majority (81%) of these reviews made recommendations for services and/or directions for future research. Though the word limit imposed by journals necessarily limits the amount of detail provided by authors, it is clear that some authors managed to provide clear descriptions of the methodology used whereas others did not.

The following sections analyse the findings for a specific subset of effectiveness reviews, i.e. those that were part of a series of reviews: Cochrane reviews and HEA reviews will be directly compared; IUHPE reviews will be discussed separately as they used a completely different approach in selecting the primary research to be included. Though the lay-out of the reviews was imposed, there was no strict word limit. The reviews were published either electronically (the Cochrane reviews) or as a full report (the HEA and IUHPE reviews), rather than as a journal article.

**Table 4.4** provides an analysis of how the methods were reported and the findings presented in the Cochrane reviews and the series of effectiveness reviews commissioned by the HEA/CRD.

**Table 4.4 Reporting of review methods and presentation of findings in Cochrane reviews and HEA reviews**

<i>Review methods</i>	<i>Cochrane reviews N (%)</i>	<i>HEA reviews N (%)</i>
<i>Total</i>	26 (100)	6 (100)
Aims stated	26 (100)	6 (100)
Search stated	26 (100)	6 (100)
Databases stated	26 (100)	5 (83)
Keywords stated	25 (96)	6 (100)
Journals stated	22 (85)	1 (17)
Language unrestricted	23 (89)	1 (17)
Unpublished material	23 (89)	3 (50)
Inclusion criteria stated	26 (100)	6 (100)
Validity criteria stated	22 (85)	3 (50)
Standard data extraction	13 (50)	4 (67)
Data analysis and presentation		
Included studies weighted	25 (96)	6 (100)
Included studies summarised	25 (96)	6 (100)
Narrative synthesis	25 (96)	6 (100)
Meta-analysis	25 (96)	1(17)
Future directives stated	26 (100)	6 (100)

**Table 4.5** compares Cochrane reviews with HEA reviews with respect to their intended scope in terms of: types of studies; types of participants; intervention types; types of outcomes.

**Table 4.5 Inclusion criteria of Cochrane reviews compared to HEA reviews**

<i>Scope</i>	<i>Cochrane reviews N (%)</i>	<i>HEA reviews N (%)</i>
<i>Total</i>	26 (100)	6 (100)
Types of studies		
Experimental design	26 (100)	6 (100)
RCTs	26 (100)	3 (50)
Trials	14 (54)	3 (50)
Types of participants		
defined	26 (100)	4 (67)
not defined/unrestricted	0 (0)	2 (33)
Intervention types		
defined	23 (88)	1 (17)
not defined/unrestricted	3 (12)	5 (83)
Types of outcomes		
defined	26 (100)	2 (33)
not defined/unrestricted	0 (0)	4 (67)

*Cochrane reviews*

An analysis of the Cochrane reviews (Gibson et al. 1997; Gillespie et al. 1997a; Gourlay et al. 1996; Gross 1997; Hajek and Stead 1997; Hodnett and Roberts 1997; Hughes et al. 1997; Kramer 1996a,b,c,d;1997; Lancaster et al. 1996; Lancaster and Stead 1997; Mahomed 1996,1997; Mahomed and Gulmezoglu 1996; Quinn et al. 1997; Ray and Hodnett 1997; Renfrew and Lang 1994; Silagy and Ketteridge 1997; Silagy et al.1997; Stead and Hughes 1997; Thompson and Rivara 1997; White and Rampes 1996; Zoritch and Roberts 1997) in the area of health promotion (n=26) revealed that all clearly reported their aims; the search strategy used; the inclusion criteria for types of studies, types of participants, and types of outcomes. Only 4 reviews (Hajek and Stead 1997; Hodnett and Roberts 1997; Hughes et al. 1997; Ray and Hodnett 1997) failed to clearly set out the quality criteria

on which the validity of studies was assessed, however all of them provided a weighted analysis of the included studies. All reviews, except one, presented both a narrative synthesis and a meta-analysis of the included primary research, in addition to a summary table of the basic characteristics of all included studies in terms of participants, setting and interventions. The one exception was a review that excluded all identified primary research on the basis of methodological weaknesses and thus identified the need for rigorous research in this area (Stead and Hughes 1997).

From these analyses we can conclude that the transparency of the methods used in Cochrane reviews provide users with the necessary information to assess any potential biases in the review. In fact, all Cochrane reviews follow the same format, but differences in inclusion criteria for types of studies and in the quality assessment of included studies exist. In other words, review methods and results are rigorously documented, but there is some flexibility for different Review Groups to set unique criteria for the inclusion of certain types of studies and the quality assessment of the included studies. However, most reviews focused on randomised controlled trials (RCTs), as only just over half (54%) set out to also include non-randomised studies. In addition, most used concealed random allocation as a measure for quality of the RCT with the result that only the findings from adequately concealed RCTs are included or are given more weight in the review's conclusions. Most Cochrane reviews reported on secondary prevention rather than on primary prevention strategies: 13 reviews (50%) specified a particular 'treatment' as intervention type (e.g. different types of food supplementation in pregnancy; treatment for smoking cessation such as anxiolytics and antidepressants, acupuncture). Clearly defining participants, intervention types, and outcome measures, resulted in reviews which were narrow in their focus. Thus, they provided clear and reliable recommendations for service implementation and future research in very specific areas of health. For example: the use of clonidine for smoking cessation (Gourlay et al. 1997); the effects of limited (information only) patient education programs on the health outcomes of adults with asthma (Gibson et al. 1998); and isocaloric balanced protein supplementation in pregnancy (Kramer 1996d). The Cochrane format does not preclude reviews with a broader scope, as is evident from some of the reviews identified: for example, home-based social support for socially disadvantaged mothers (Hodnett and Roberts 1997); and interventions to reduce the incidence of falling in the elderly (Gillespie et al. 1997a). However, reviews with a broader scope are not very common to

date. As shown in **Chapter 3**, the scope of reviews such as the one by Gillespie et al. (1997a) may still be considered quite narrow when compared to the review by Oakley et al. (1995b) (see **Chapter 3**).

#### *HEA series of effectiveness reviews*

These reviews (Ebrahim and Davey Smith 1996; Eiser and Eiser 1996; Towner et al. 1996; Roe et al. 1997; Tilford et al. 1997; White and Pitts 1997) scored very high in terms of reporting the review methodology used. But in comparison with the Cochrane reviews, they are less comprehensive in terms of identifying *all* available evidence in a particular health area: only one (17%) (compared with 23 (89%) of the Cochrane reviews) stated that searching for primary research was not restricted to the English language; and 3 (50%) (compared to 23 (89%) of the Cochrane reviews) reported searching for unpublished materials. Authors of HEA reviews, compared with those of Cochrane reviews, reported a standardised data extraction method more often (67% and 50% respectively). In terms of specified scope for the reviews, the HEA reviews tended to be fairly broad: they restricted inclusion criteria either with respect to the types of participants (e.g. childhood and young adolescence); *or* the intervention types (e.g. video as a medium); *or* the type of outcome (e.g. behavioural or health outcome), but never all of the above combined. Conclusions and recommendations from these reviews were therefore specified in more general terms than for Cochrane reviews. HEA reviews were less exclusive in their intention to include a particular type of study design than Cochrane reviews: all aimed to include experimental studies, but only half specified the design in terms of randomised and/or non-randomised studies; none were exclusively focused on RCTs, though the conclusions of the review by Ebrahim and Davey Smith (1996) were based on RCTs only. The latter was the only review to also include a meta-analysis. Though all six reviews had different review methods, they reported their methods in a fairly transparent manner so that any potential biases could be assessed. All HEA reviews weighted the included studies and commented on the lack of rigorously evaluated interventions in the areas covered. Because of the latter, the authors' recommendations were cautious and tentative. However, it was noted that experts providing a commentary on the review, included in the preface of each review, did not always replicate the authors' caution. For example, though the authors reviewing the effectiveness of video for health education (Eiser and Eiser 1996) indicated that :

“Considering the studies across all eleven different areas, we are forced to conclude that many provide little or no positive evidence for the effectiveness of video or any health education intervention of which video forms a part. Even where positive findings are claimed, a number of studies suffer from flaws in the design which render any apparent effect untrustworthy” (Eiser and Eiser 1996; p.37)

However, one of the commentaries states that:

“The review confirms that video is a powerful tool for health educators....” (Eiser and Eiser 1996; p.ix)

though also acknowledges that:

“The review raises many issues and questions which will help to inform the debate concerning the effectiveness of video and other educational media to support health promotion interventions.” (Eiser and Eiser 1996; p.ix)

#### *IUPHE reviews*

These reviews were conducted within the European project “Improvement of the effectiveness of health education and health promotion” and commissioned by the Regional Office for Europe of the International Union for Health Promotion and Health Education. Though not pretending to be *systematic* reviews, they aimed to provide a “series of reviews on the state-of-the-art of effectiveness research”. Each review focused on a health problem, approach, population or setting, discussed the critical issues relevant to the particular focus, presenting a structured abstract of ten or more studies. Rather than relying on systematic search methods, authors were invited to choose studies with particular criteria in mind, some of which could strengthen the evidence of effectiveness and some of which could weaken it:

Selection criteria which could strengthen the evidence about the effects of health promotion included:

- C The interim or final results of the interventions should be accessible and obtainable to everyone who has an interest
- C Studies giving a clear description of the content of the intervention and its objectives are preferred to studies failing to give the reader insight into the intervention studied

- C The methods of the evaluation should preferably include the presence of triangulation. This refers to the practice of drawing conclusions on a number of different sources of information (which might include different data resources, different respondents or even different researchers).
- C Studies containing extended formative or process evaluation are preferred to studies with little or no reflection on the process involved in programme implementation
- C Good studies which are found to have no effect should also be subject to documentation

Selection criteria which could weaken the evidence about the effects of health promotion or introduce bias included:

- C The design of the effect evaluation should **preferably** meet the following conditions:
  - at least one pre- and one post-test measurement
  - at least one intervention and one comparison group
  - each group should consist of at least 15 people (preferably randomly assigned)
- C Interventions are **preferably** but not necessarily implemented within the continent of Europe
- C A maximum of a quarter of the effect studies may originate from [the reviewers'] own country.
- C Effect studies evaluating innovative intervention methods are preferred.
- C A maximum of two publications for each intervention area which deals with another area.

Although these reviews included the innovative approach of combining process and outcome data - important for the dissemination of information about the effects of health promotion, neither the search strategies nor the inclusion criteria were sufficiently systematic for the reviews to be relied upon for their conclusions about effectiveness. What was included as 'state-of-the-art of effectiveness research' was largely dependent on the authors' personal views, hence these reviews have to be used with extreme caution.

### **4.3 Conclusions**

There has been considerable activity in producing effectiveness reviews in different areas of health promotion. Some areas are well-covered (e.g. substance abuse) whereas reviews in other areas are

scant (e.g. reviews of interventions addressing inequalities in health<sup>1</sup>). Overall, reporting of the review methods is poor, which makes it very difficult for the reader to assess any potential bias, and hence the validity and comprehensiveness of the review's findings. Cochrane reviews are a clear exception, however most of these have a narrow scope and deal with secondary prevention issues, which limits their application to general health promotion practice. The HEA series of effectiveness reviews which includes reviews with a very broad scope, provides a serious attempt to compiling the evidence in health promotion in a systematic way. However, as each of these reviews has used different review methods, which in turn are different from the methods used in Cochrane reviews, questions about the impact of review methods on the scope and conclusions of the reviews remain. It is these questions we will deal with in the following section of this report.

#### **4.4 Recommendations**

There is a need :

- C for a regularly updated central register of all completed and ongoing effectiveness reviews in health promotion to avoid overlap of effort and to ensure that new reviews build on previous reviews. This register would complement the Database of Abstracts of Reviews of Effectiveness (DARE), produced by the CRD and included in the Cochrane Library, which provides structured abstracts of quality-assessed effectiveness reviews of health care interventions.
- C to encourage clear reporting of review methods for example, through the provision of a checklist to authors and journal editors covering the key stages in conducting a systematic review (methods for searching, inclusion criteria, validity criteria).
- C for those commissioning and conducting effectiveness reviews to agree a common framework of how reviews in health promotion should be carried out, including weighting of primary research.

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<sup>1</sup>The review by the NHS Centre for Reviews & Dissemination 'Review of the research on the effectiveness of health service interventions to reduce variations in health' (Arblaster et al. 1995), was the first systematic attempt to compile the evidence in this area.

## **Part II**

# **The impact of review methodology on recommendations for effective health promotion interventions**

Part II addresses two of the key stages in conducting an effectiveness review: searching for relevant primary research to include in the review; and assessing the methodological quality of identified studies. The aim of the following chapters is to investigate the extent to which different ways of carrying out these two key stages impact on the scope and recommendations of effectiveness reviews.

## **Chapter 5 Searching for studies to include in effectiveness reviews**

This chapter focuses exclusively on the use of a range of commonly used electronic databases for identifying outcome evaluation studies in the area of sexual health promotion. It discusses in detail the strengths and pitfalls of this method for accessing the available research. Though the findings and recommendations are restricted to the focus on sexual health, the issues dealt with are relevant to searching for studies in any area of health promotion.

### ***5.1 Why is systematic searching important ?***

To find *all* relevant studies for the purpose of compiling a *comprehensive* effectiveness review, searching needs to be extensive and include a range of methods: electronic database searching; handsearching of key journals; scanning bibliographies; contacting individuals/agencies/ academic institutions etc. Particular attention needs to be paid to finding unpublished materials and studies reported in non-English languages. What can be synthesised depends on what is found, and it is well-established at least in the medical field, that neglecting certain sources of research studies may result in reviews being biased in the recommendations and conclusions they can draw (Dickersin et al. 1987; Begg and Berlin 1988; Cooper and Ribble 1989; Hedges 1992). The increasing accessibility of electronic bibliographic databases through libraries and on-line services, has made them increasingly being used as the first and often only, port of call for collecting evidence of effectiveness. Though such

databases between them provide an extensive coverage of the available research, it should be remembered that their coverage is not fully comprehensive and indeed, that some of the most commonly used databases such as Medline and EMBASE, are limited to published research in certain journals only.

Though the effort put into locating studies depends mainly on the resource restrictions for conducting the review, the skills of those carrying out the searches also play an important role. Some researchers for example, may not be aware of the full range of sources of evidence available and so may miss important sources (Reed and Baxter 1994; Joswick 1994). It is often impossible to assess whether important sources may have been missed as many reviews do not explicitly state the searching methods employed (see **Chapter 4**). A study by Oakley and Fullerton (1995) of 13 systematic reviews of the effectiveness of smoking prevention/cessation interventions carried out over the last ten years, found that only 3 included a description of the search strategies. Moreover, different reviews covering the same time period were based on different subsets of the total number of available studies. This suggests that many reviews seriously under-report the total evidence available. Within other fields of health care, considerable effort has gone into examining the best methods to collect available effectiveness evidence (e.g. Marson and Chadwick 1996; Dickersin et al. 1995; Kirpalani et al. 1989). Such attention to the methodological issues surrounding search strategies has not been paralleled within the health promotion field.

This chapter explores some of the methodological issues in the development and implementation of search strategies for electronic searching. It focuses on locating outcome evaluation studies in the area of sexual health promotion.

The work had three aims :

- (i) To develop highly sensitive search strategies on a range of electronic databases for identifying outcome evaluations of sexual health intervention targeted at any population;
- (ii) To examine and compare the sensitivity and specificity of these search strategies on different databases;

- (iii) To recommend the best combination of databases to use when searching for outcome evaluations of sexual health interventions.

The term 'outcome evaluation' is used here to describe those studies reporting on the impact of a sexual health promotion intervention on one or more health-related outcomes (e.g. behaviour, knowledge, attitudes). The aim was to find outcome evaluations of any design including: RCTs; non-randomised trials; and pre-and-post-test and post-test designs with no control/comparison group.

## **5.2 *Searching electronic databases***

Many electronic databases make use of a 'controlled vocabulary' (i.e. standardised terminology) to describe the content of the cited report. For example, a citation can be indexed with relevant subject terms (e.g. cardiovascular disease, health promotion); type of study terms (e.g. review, clinical trial); and/or setting terms (e.g. workplace, community). This 'controlled vocabulary' can be used as a basis for the development of a search strategy to retrieve citations within a specified area of interest. Access to the controlled vocabulary of a particular database is provided via the 'thesaurus' from which a list of relevant terms can be chosen. These terms can be supplemented with 'free-text' searching for words which appear in the abstract, the title and/or any other data field. Thus, adding a 'free text' searching component can help to identify additional studies of interest by means of adding important concepts or terms which do not appear in the controlled vocabulary or alternative formulations of the concepts which do appear.

Developing a 'good' search strategy -i.e. one which locates as much as possible of the available evidence- is complex and requires specialist knowledge as well as a lot of time and effort. Firstly, all relevant concepts which describe the area of interest have to be identified; the range of terms used to refer to each of these identified concepts must then be matched with terms from the thesaurus. Any concepts that can not be matched, may have to be described by 'free text' terms. Choice of thesaurus and/or free text terms is critical: they should reflect fully the scope of the review as well as its boundaries, should include all important concepts, identify relationships between concepts, and identify exclusion terms (Reed and Baxter 1994). Once the relevant terms have been selected, they need to be

linked by 'Boolean' operators to form a search strategy. For example, two terms may be linked by using the 'OR' operator which means that a citation must have either one of the terms to be retrieved; the 'AND' operator determines the retrieval of a citation only if indexed by both terms; and the 'NOT' operator specifies that the citation must be indexed by one term but not the other. In other words, the selected terms need to be linked up into a logical search strategy reflecting the scope and boundaries of the research one wants to identify.

Different bibliographic databases use different types of controlled vocabulary such that the same citations are indexed differently on different databases (Reed and Baxter 1994). Databases such as Medline and EMBASE, for example, use a different indexing system for study type; others, such as PsycLIT and ERIC, do not have specific terms to identify study types (Dickersin et al. 1995; Peersman et al. in press). As a consequence, an appropriate search strategy needs to be developed for each of the databases used.

A well-developed search strategy does not necessarily retrieve *all* relevant citations on the database queried, nor does it retrieve relevant research *only*. This is due to inconsistencies in the application of the controlled vocabulary terms by different indexers and/or in the terminology used by authors of research studies; and/or the controlled vocabulary may not reflect the latest terminology or concepts in a particular discipline or field. Hence, it is important to test a search strategy in terms of how much of what is available is retrieved, and how much of what is retrieved actually fits within the boundaries of what one wants to retrieve. These concepts are described by two measures, the sensitivity and the specificity, which reflect the performance of a search strategy.

The *sensitivity* of a search strategy expresses its ability to locate *all* the available *relevant* research, here *all* outcome evaluations of sexual health interventions. Sensitivity is calculated as the number of outcome evaluations within a particular field identified by the search strategy on the database of choice as a proportion of the total number of outcome evaluations which exist overall within that field. The latter is impossible to determine, thus unknown, but a *proxy* number is used, i.e. the number representing the 'best' effort to find as many as possible of the available outcome evaluations (Dickersin et al. 1995).

Even if search strategies are designed specifically to locate certain types of studies within a particular field, they will also locate other types of studies and studies outside the field of interest as some of these will share some of the terminology used in the search strategy. The *specificity* of a search strategy expresses the accuracy of the search strategy in identifying the studies of interest, here outcome evaluations of sexual health interventions. Specificity is calculated as the proportion of the total number of studies located by the search which are 'truly' outcome evaluations of sexual health interventions. In other words, the specificity provides a measure for how many *relevant* reports are located by the search as part of the overall number of citations identified. As such, it is a useful indicator of the amount of effort needed to sort the search results into 'relevant' and 'irrelevant' citations<sup>1</sup>. For example, a search strategy with low specificity means that only a small proportion of the citations located are 'relevant' ones; consequently, depending on the overall number of citations retrieved, a low specificity may imply that a lot of time is needed to sort through the search results (i.e. scanning titles and/or abstracts).

Sensitivity and specificity tend to be inversely related. If high sensitivity is required, the search strategy needs to be fairly 'broad' and hence it is likely that a larger number of 'irrelevant' citations will be located. Conversely, a highly specific i.e. 'narrow' search strategy increases the likelihood of missing relevant reports. Thus sensitivity and specificity are important interrelated indicators of the utility of a particular search strategy.

### **Choice and description of databases**

There is a vast range of different bibliographic databases to choose from and each have their own particular focus (eg, bio-medical research, social science publications, grey literature, dissertations). Thus the choice of databases should match the area of interest to be searched for. Since outcome evaluations within sexual health promotion are likely to be carried out within a range of disciplines, we

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<sup>1</sup>The term 'irrelevant' is used here for conceptual purposes to refer to any citations which are not outcome evaluations. In fact many of these citations are likely to be relevant to describing the effectiveness of health promotion interventions in a broader sense. For example, research related to the acceptability of certain interventions, needs assessments, findings from previous effectiveness reviews, studies reporting on barriers or facilitators to health behaviour etc.

selected two medical databases (Medline and EMBASE), two social science databases (PsycLIT and the Social Science Citation Index) and one educational database (ERIC). Not only are these databases the ones most commonly used for identifying health promotion research, previous investigations have found them to be very productive in their yield of outcome evaluation studies in different areas of health promotion (e.g. Peersman et al. 1997; Oakley et al. 1994b).

A brief description of these databases follows:

### **1. Medline**

Medline is the National Library of Medicine's bibliographic database. Although primarily a medical database, it also contains references from psychology and the social sciences. Each record on Medline is coded according to a controlled vocabulary of 'Medical Subject Headings' ('MeSH terms'). Each record has several MeSH terms reflecting the content of the report. Each MeSH term has a number of sub-headings which can be applied to describe the focus of a particular record more specifically. For example, all references relevant to HIV should be coded with the MeSH term 'HIV-Infection', but those specifically concerned with HIV-prevention should be coded with 'HIV-Infection-prevention-and-control', i.e. a MeSH term combined with a specific sub-heading.

### **2. EMBASE**

EMBASE is primarily a database of medical journal articles and is produced and maintained by Elsevier Science. Although several systems of controlled vocabulary are used within EMBASE, the 'Medical Descriptors' from the 'EMTREE Thesaurus' provide the most detailed way of retrieving citations. Each reference in EMBASE has several Medical Descriptors. A range of optional sub-headings can be used in association with these descriptors. EMBASE has better coverage of European journals than Medline (Greenhalgh 1997).

### **3. PsycLIT**

Although Medline and EMBASE index some journals from the social sciences, they are not comprehensive sources for this field. PsycLIT is a bibliographic register of the literature in psychology

and related disciplines and is produced by the American Psychological Association. It indexes journal articles, as well as books and book chapters. PsycLIT is the CD-ROM version of PsycINFO. The controlled vocabulary system is in the form of 'Descriptors' and each record has several descriptors. Unlike Medline and EMBASE, the descriptors do not have sub-headings.

#### **4. ERIC (Educational Resources Information Center)**

ERIC is produced by the US Department of Education and contains citations on all aspects of the human learning process. ERIC has a controlled vocabulary of 'ERIC-descriptors' which are used to group together references on similar topics. Like PsycLIT the descriptors do not have sub-headings.

#### **5. The Social Science Citation Index**

The Social Science Citation Index, provided by the Bath Information and Data services (BIDS), consists of bibliographic details of reports within the social sciences and includes any references cited within these reports. Unlike the above mentioned databases, the Social Science Citation Index is a citation index, hence, does not have a controlled vocabulary system to index references. Searching must take the form of 'free text' searching whereby words or phrases are matched exactly with words and phrases which appear either in the title, abstract or key-phrases of a particular reference.

It should be stressed again, that the five databases we selected index published research only and that for the purposes of finding *all* relevant research, one would have to supplement these searches with searches on databases cataloguing unpublished research, and with other means of identifying primary studies (see **section 5.1**).

### **5.3 Methods**

#### **5.3.1 Developing a search strategy for identifying sexual health outcome evaluations on each selected database**

The procedure recommended by Reed et al. (1994) was used to develop the search strategies. A detailed description including examples, as well as the full search strategies are provided in **Appendix 4**. We will explain here in brief how we selected the terms for inclusion in the search strategies. We

randomly selected 46 of the 144 outcome evaluations listed in two systematic reviews of the effectiveness of sexual health promotion interventions previously carried out by our research centre (Oakley et al. 1996; Peersman et al. 1996). Each of these 46 studies (we will refer to these as the 'known set') was then traced back on each of the five databases by means of an author and/or title search. If found, the controlled vocabulary with which these records were coded was noted and a list of the most frequently used keywords was compiled for each database. Terms fell broadly within two categories: those describing the study as having a *sexual health* focus (e.g. condoms, HIV-prevention-and-control) and those describing it as a *prevention* study (e.g. health promotion, health behaviour). The lists of keywords were further expanded with related keywords from the thesaurus of each database, except for the Social Science Citation Index which does not include a thesaurus. The selected 'sexual health' terms were then combined with the operator 'OR' as were the selected 'prevention' terms; and each set of terms was then combined with the operator 'AND'. In other words, to be retrieved, a study has to be coded with any one of the 'sexual health' terms in combination with any one of the 'prevention' terms. It was decided not to include terminology related to study type or design. Although including study design-related terms is highly recommended for locating trials within medicine (Dickersin et al. 1994) and has been used for locating outcome evaluations for reviews of effectiveness within health promotion (e.g. Roe et al. 1997), previous research has found that limiting searches in this way is likely to lead to a substantial loss of relevant outcome evaluations in the area of health promotion (Peersman et al. in press). See also **Chapter 7**.

The search strategies contained a wide range of sexual health terms and prevention terms, but obviously not every possible term, as this would result in unmanageable search yields. We carried out a quick check to determine how many of the 46 outcome evaluations known to be on each database (as we had previously located them by an author/title search) were actually picked up by each of the database-appropriate search strategies. In case a high proportion of the known studies were not retrieved, we would have to expand the terms in the search strategy before going on to implement and test them for sensitivity and specificity.

### 5.3.2 Testing the search strategies for their sensitivity and specificity

The search strategies were implemented on the five databases but limited to finding studies published in 1996 - an arbitrary choice to make the analyses manageable. The results were downloaded into ProCite, a bibliographic reference managing system and each record was coded with: the name of the database(s) from which it had been identified; the type of study (outcome evaluation, needs assessment, case-control study; review etc.); and for outcome evaluations, also the evaluation design (i.e. RCT, non-randomised trial, pre-and-post-test, post-test or not stated).<sup>2</sup>

The overall number of outcome evaluations located by the searches for 1996 on all databases was calculated. This set of outcome evaluations was labelled 'gold standard' and served as the *proxy* for the total number of *all* available outcome evaluations within the sexual health field.

The *sensitivity* of each search strategy for each of the five databases was then calculated in two ways. Firstly, the number of outcome evaluations as a proportion of the *total* number of outcome evaluations in the 'gold standard' to provide a measure of the relative yield and thus the *usefulness* of each database for identifying outcome evaluations in the sexual health field. Secondly, the number of outcome evaluations as a proportion of the number of outcome evaluations in the 'gold standard' that *should be available* on each database (i.e. all of those published in journals covered by the database). This provides a measure of the extent to which each database succeeds in cataloguing *all* research papers from each issue of the indexed journals, hence is a measure of *accuracy* of the database. The *specificity* of each search strategy for each of the five databases was calculated as the number of *relevant* outcome evaluations as a proportion of the total number of reports located by the search. Sensitivity and specificity measures were compared across the five databases.

In addition, we also explored why any outcome evaluations within the 'gold standard' which were known to be present on the database, but were not retrieved by the search strategy. Reasons for failing to locate studies were classified into 'other sexual health terms' (i.e. the keywords used to identify the

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<sup>2</sup>The design of the outcome evaluations was determined at this stage by the information given in the title and/or abstract.

report as sexual health had not been included in the search strategy), 'other prevention terms' (i.e. the keywords used to identify the report as prevention had not been included in the search strategy) and 'not available on the database at the time the search strategy was implemented'. In the latter case, further attempts were made to find the particular study 5 months later to allow for delayed entry on the database; if this failed, the report was considered to be 'not present on the database'.

### 5.3.3 *Determining the best combination of databases for identifying sexual health outcome evaluations*

The *overlap* between the five different databases was determined in terms of the number of outcome evaluations within the 'gold standard' which were found by more than one database<sup>3</sup>. This provides a measure for which databases, if any, are redundant or which one is the most productive in identifying relevant outcome evaluations. The proportion of the 'gold standard' which was found when different *combinations* of databases were used was also examined. This determines the best combination of databases to use, for example, under conditions in which time constraints or accessibility restrict the number of databases that can be searched.

## 5.4 **Results**

### 5.4.1 *Identifying known outcome evaluations*

**Table 5.1** shows the number/proportion of the outcome evaluations within the 'known set' (the 46 studies used to develop the search strategies) which were present on each database. Medline contained most of them (65%), followed by the Social Science Citation Index (59%); ERIC contained the lowest number (9%).

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<sup>3</sup>Citations which were found on more than one database were keyworded with the names of all databases they had been located on. This allowed for the overlap between databases to be calculated.

**Table 5.1** Number/percentage of the ‘known set’ of outcome evaluations present on each database

<i>Electronic database</i>	<i>Outcome evaluations within the ‘known set’ (n=46) present on each database</i>	
	Number	%
EMBASE	21	46
ERIC	4	9
Medline	30	65
PsycLIT	21	46
Social Science Citation Index	27	59

**Table 5.2** presents the findings from the quick check to determine how many of the outcome evaluations known to be on each database (e.g. the 30 studies present on Medline; see **Table 5.1**) were actually picked up by the database-appropriate search strategy. Our search strategies performed very well as 82% (for the Social Science Citation Index) to 100% (for Medline and EMBASE) of the outcome evaluations were indeed picked up. Hence there was no need to amend the strategies before implementing them and testing their sensitivity and specificity.

**Table 5.2** Number/proportion of outcome evaluations located by the search strategies

<i>Electronic database</i>	<i>Known outcome evaluations identified</i>	
	Number	%
EMBASE	21	100
ERIC	4	100
Medline	28	93
PsycLIT	20	95
Social Science Citation Index	22	82

#### 5.4.2 Sensitivity and specificity of the search strategies

The search results for the selected one year period (1996) are shown in **Table 5.3**. The table shows firstly, the total number of citations found overall as well as for each database separately; secondly, the proportion of citations which were deemed to be within the scope of sexual health promotion; and finally, the proportion of those deemed to be outcome evaluations of sexual health interventions.

The total number of outcome evaluations (74) found on all five databases will be used as the proxy for the total number of outcome evaluations available overall within the sexual health field, and will be termed the 'gold standard' against which the sensitivity calculations will be done.

**Table 5.3** Number/proportion of citations found by search strategies

<i>Electronic database</i>	<i>Total nr of citations</i>	<i>N (%) of sexual health citations</i>	<i>N (%) of outcome evaluations</i>
<b>All databases*</b>	<b>1766</b>	<b>1066 (60)</b>	<b>74(4)</b>
EMBASE	768	467 (61)	40 (5)
ERIC	68	47 (69)	7 (10)
Medline	752	549 (73)	41 (5)
PsycLIT	222	191 (86)	29 (13)
Social Science Citation Index	677	467 (69)	47 (7)

\*The number of records identified by each database does not add up to the total for all databases because some citations are found on more than one database.

**Table 5.4** shows the sensitivity and specificity of the search strategies'. The two types of sensitivity calculations are indicated as 'overall sensitivity' and 'accuracy'. As described in the methods section, the 'overall sensitivity' is the sensitivity for identifying *all* outcome evaluations within sexual health promotion (this is calculated against the 'gold standard'); the 'accuracy' is the sensitivity for locating all outcome evaluations which *should be available* on a specific database (as the source journals are indexed on that database).

**Table 5.4 Sensitivity and specificity of the search strategies**

<i>Electronic database</i>	<i>Overall sensitivity</i> %	<i>Accuracy</i> %	<i>Specificity</i> %
<b>All databases</b>	<b>100</b>	<b>100</b>	<b>4</b>
EMBASE	53	85	5
ERIC	9	58	10
Medline	55	89	5
PsycLIT	39	59	13
Social Science Citation Index	63	84	7

In terms of sensitivity, the data suggest that the search on the Social Science Citation Index was the most sensitive for locating sexual health outcome evaluations; closely followed by the Medline and EMBASE searches. The search on ERIC only picked up about a tenth (9%) of the available relevant research. However, it should be noted that even the more sensitive searches only located just over half (53% to 63%) of the 'gold standard'. Hence, these findings strongly suggest that it is essential to search more than one database when the purpose is to retrieve *all* available relevant research. For the Social Science Citation Index, Medline and EMBASE, the sensitivity for identifying outcome evaluations published in journals indexed on those databases is substantially higher (over 80%) than for PsycLIT and ERIC (just under 60%). In other words, the Social Science Citation Index, Medline and EMBASE are more accurate than PsycLIT and ERIC in cataloguing *all* research papers published in the journals they cover.

In terms of specificity, PsycLIT had the highest specificity (13%), while EMBASE had the lowest with only 5% of all the records retrieved being relevant outcome evaluations. The data suggest that the social science databases (PsycLIT and the Social Science Citation Index) and the educational database (ERIC) had a higher specificity than the medical databases (Medline and EMBASE) for the research in our area of interest. This implies that the controlled vocabulary of these medical databases -even though health promotion/disease prevention terms were selected, is less well applied by indexers than on the social science and educational databases investigated here.

**Table 5.5** shows the number and proportion of outcome evaluations which *should* have been available on the databases and the reasons why they were not.

**Table 5.5** Reasons why outcome evaluations from journals indexed on the databases were not retrieved by the search strategies

Database	Nr (%) Outcome evaluations NOT picked up due to		N (%) Outcome evaluations NOT present	
	'Other' sexual health terms	'Other' prevention terms	At time of first search	5 months later
EMBASE	0 (0)	4 (57)	0 (0)	3 (43)
ERIC	0 (0)	0 (0)	0 (0)	5 (100)
Medline	3 (60)	2 (40)	0 (0)	0 (0)
PsycLIT	1 (5)	0 (0)	11(55)	8 (40)
Social Science Citation Index	1 (14)	4 (57)	0 (0)	2 (29)

The main reason for not picking up all available outcome evaluations on the Social Science Citation Index, Medline and EMBASE was due to the reports being coded with other terms (either subject- or prevention-related) than those used in the search strategies. For all the databases except Medline, some of the outcome evaluations within the 'gold standard' which *should* have been available on the databases were not. This means that not all articles from each journal issue are systematically entered onto the database. One factor may be the delay with which a citation is entered onto the database. For example, some citations were present when the search was repeated five months later. These articles, all published in 1996, were not entered on for example, PsycLIT until November/December 1997. However a further 8 reports, 40% of the outcome evaluations available on PsycLIT, were still *not* present at that time. Thus, some reports of outcome evaluations may never be entered onto a particular database, while others may only appear after a considerable delay.

#### 5.4.3 The best combination of databases

The number of outcome evaluations in the 'gold standard' exclusively found on each of the five databases is shown in **Table 5.6**. The overlap between the five databases was 76%, which means that three quarters of the outcome evaluations in the 'gold standard' were found on more than one database. This substantial overlap implies that each database on its own contributes very little to the identification

of outcome evaluations. For example, Medline found only 12% of the studies not already found on other databases. Bearing in mind that even the more sensitive searches only located just over half of the 'gold standard' studies overall (see **Table 5.4**), there is a clear need to determine the best combination of databases to use if one wants to search for *all* available relevant research in the most efficient way. Again, we must stress that our findings, hence our recommendations, are related to finding outcome evaluations of sexual health interventions and are not necessarily transferable to finding other study designs and/or other areas of health promotion.

**Table 5.6** Number of outcome evaluation retrieved uniquely by each database

<i>Electronic database</i>	<i>Number (%) of outcome evaluations exclusively found on the database</i>
ERIC	1 (14)
EMBASE	4 (10)
Medline	5 (12)
PsycLIT	4 (14)
Social Science Citation Index	4 (9)

**Tables 5.7, 5.8** and **5.9** present sensitivity analyses illustrating how many and which type (trials, non-trials) of the studies in the 'gold standard' were found when four, three and two databases were used respectively. These figures give an indication of how many outcome evaluations of sexual health interventions would be *missed* if only a certain selection of the five databases are used. The combinations of databases are ordered in rank such that the combination which yields the highest number of the 'gold standard' studies appears at the top in the table and the combination which yields the least studies, at the bottom of the table.

The results in **Table 5.7** suggest that searching any combination of *four* out of the five databases will result in comparable yields. A combination of Medline, EMBASE, PsycLIT and the Social Science Citation Index is the most productive both in identifying outcome evaluations of sexual health interventions overall and in identifying trials in this field. In other words, it is better to leave out ERIC than any of the other databases in terms of outcome evaluations overall; whereas not using PsycLIT results in the greatest loss in terms of trials.

**Table 5.7 Sensitivity analysis of sexual health search strategies in combinations of four electronic databases**

<i>Database combinations</i>					<i>N (%) of outcome evaluations found*</i>	<i>N (%) of trials found**</i>
Medline	EMBASE	PsycLIT	Social Science Citation Index	ERIC		
<b>T</b>	<b>T</b>	<b>T</b>	<b>T</b>		74 (99)	38 (100)
<b>T</b>		<b>T</b>	<b>T</b>	<b>T</b>	71 (96)	37 (97)
<b>T</b>	<b>T</b>	<b>T</b>		<b>T</b>	71 (95)	37 (97)
	<b>T</b>	<b>T</b>	<b>T</b>	<b>T</b>	71 (93)	37 (97)
<b>T</b>	<b>T</b>		<b>T</b>	<b>T</b>	71 (92)	34 (90)

\*as calculated against the 'gold standard' of 74 outcome evaluations overall

\*\*as calculated against the 38 trials in the 'gold standard'

**Table 5.8** shows the results of the sensitivity analyses for combinations of *three* databases out of the five selected ones. The best yield comes from including at least one medical database (Medline or EMBASE) in combination with at least one social science database (PsycLIT or the Social Science Citation Index). There is no evidence to suggest that using two social science databases in combination with a medical database (i.e. Medline & PsycLIT & Social Science Citation Index OR EMBASE & PsycLIT & Social Science Citation Index) rather than two medical databases in combination with one social science database (i.e. Medline & EMBASE & PsycLIT OR Medline & EMBASE & Social Science Citation Index) is better. However, it is worth noting that using the Social Science Citation Index in combination with Medline and EMBASE yields slightly less of the 'gold standard' than PsycLIT in combination with Medline and EMBASE (89% and 93% respectively). In terms of locating trials, PsycLIT in a combination with either Medline, EMBASE or the Social Science Citation Index results in the least loss of trials.

The first three combinations of *three* databases, highlighted in bold in **Table 5.8**, produce similar yields to those combinations of *four* databases which include ERIC (see **Table 5.7**). This again suggests that

ERIC is not an essential database to search when wanting to identify outcome evaluations in the sexual health field.

**Table 5.8 Sensitivity analysis of sexual health search strategies in combinations of three electronic databases**

<i>Combination of databases</i>					<i>N (%) of outcome evaluations found*</i>	<i>N (%) of trials found**</i>
Medline	EMBASE	PsycLIT	Social Science Citation Index	ERIC		
T		T	T		<b>71 (95)</b>	<b>37 (97)</b>
T	T	T			<b>70 (93)</b>	<b>37 (97)</b>
	T	T	T		<b>69 (93)</b>	<b>37 (97)</b>
T	T		T		67 (89)	34 (90)
	T		T	T	63 (84)	33 (87)
T			T	T	62 (83)	31 (82)
	T	T		T	60 (80)	34 (90)
T		T		T	60 (80)	32 (84)
T	T			T	60 (80)	29 (76)

\*as calculated against the 'gold standard' of 74 outcome evaluations overall

\*\*as calculated against the 38 trials in the 'gold standard'

The results in **Table 5.9** present the sensitivity analyses of using various combinations of only *two* databases out of the five selected ones. The findings suggest that it is important to have at least one of the social science databases with a medical database or both of the social science databases together. However there is not enough variation within the yields to specify further which medical or which social science database it is best to use. It is interesting to note that the best combination of *two* databases (EMBASE & PsycLIT) yields more of the 'gold standard' set of outcome evaluations than the bottom three combinations of *three* databases in **Table 5.8**. However, comparing the best yields of searching *two* versus *three* databases results in a substantial loss of outcome evaluations (10), but not in trials (2). There is clearly an issue of trade-offs here. Searching *three* as opposed to *four* databases (comparing

the most productive combinations) does not make a substantial difference in either outcome evaluations overall, or trials.

**Table 5.9 Sensitivity analysis of sexual health search strategies in combinations of two electronic databases**

<i>Combination of databases</i>					<i>N (%) of outcome evaluations found*</i>	<i>N (%) of trials found**</i>
Medline	EMBASE	PsycLIT	Social Science Citation Index	ERIC		
	T		T		61 (81)	33 (87)
		T	T		60 (80)	35 (92)
T			T		60 (80)	31 (82)
T		T			59 (81)	32 (84)
	T	T			58 (77)	34 (90)
T	T				58 (77)	29 (76)
			T	T	50 (67)	28 (74)
	T			T	43 (57)	22 (58)
T				T	42 (56)	21 (55)
		T		T	35 (47)	21 (55)

\*as calculated against the 'gold standard' of 74 outcome evaluations overall

\*\*as calculated against the 38 trials in the 'gold standard'

## 5.5 Conclusions

It is necessary to develop search strategies that use of a wide range of terms to identify outcome evaluations of sexual health promotion interventions on electronic databases. To undertake a systematic review of effectiveness within health promotion, commissioners and researchers should be aware of the complexity of searching and the resources (budget and time scale) this implies. Attempts to reduce the complexity of searching could be made by database manufacturers; the same keywords could be

applied more consistently within and across different databases. For instance, the Medline MeSH term 'HIV-Infections-prevention-and-control' could be used uniquely to identify sexual health interventions which aimed to prevent HIV, rather than using 'Acquired-immunodeficiency-syndrome-prevention-and-control' for some citations and 'HIV-infections-prevention-and-control' for others. Similarly, 'Health-Promotion' and 'Health-Education' could be applied more consistently rather than using a whole range of prevention-related MeSH terms to locate a report within a health education/ health promotion context. However, using more consistent controlled vocabulary across different databases may not be easily achieved for commercial as well as practical reasons.

The probability of identifying *all* published outcome evaluations within the sexual health field using the complex search strategies on Medline, EMBASE, PsycLIT, ERIC and the Social Science Citation Index is between 9% and 63%. In general, the search strategies with higher sensitivity have lower specificity. Thus, with the benefits of high sensitivity in locating outcome evaluations comes the cost of having to look through a great many more reports to eliminate the studies outside the scope of interest. The fact that the search strategy for Social Science Citation Index had the highest sensitivity is of note since this database is the only one which does not use controlled vocabulary, hence any search strategy performed on this database has to be a free-text search. Free-text searching in combination with controlled vocabulary is usually associated with an increase in sensitivity and a decrease in specificity (Dickersin et al. 1994). Thus, sensitivity of the search strategies we developed for the other four databases may be further increased by combining controlled vocabulary with free-text terms. However, any attempt to incorporate such free-text search terms will need to be examined against the increased complexity of the search and the decreased specificity with its associated cost in time. Free-text searching can be enhanced and made more specific by using 'word proximity operators' (e.g. outcome NEAR evaluation) and a judicious use of text words in combination with strongly indicative thesaurus terms. In other words, there are alternative approaches to searching to the ones we have presented here and it is certainly worthwhile to further investigate this area.

Despite the Social Science Index identifying the largest proportion of the available outcome evaluations, if used alone, this database would only find just over 60% of all published outcome evaluations in the sexual health field. This clearly highlights the need to use more than one database for searching.

In documenting the reasons why not all available outcome evaluations were located, we found that using an even wider range of sexual health and prevention keywords may improve the sensitivity of the search strategies for Medline, EMBASE and the Social Science Citation Index. However, for ERIC and PsycLIT, the problem is mainly the delay and inaccuracy with which studies are entered on these databases. Thus, it must be taken into consideration that some reports of outcome evaluations which *should* be available on a particular database may never be available, while others may only appear after a considerable delay. It is therefore important to repeat searching. Since database searching for systematic reviews is usually carried out at one point in time (restricted by resources), it is obvious that all available studies will not get included in the review. This finding also highlights the importance of using other means of searching in addition to electronic searching, for example, handsearching of journals. The fact that all of the outcome evaluations were found by using multiple databases, strengthens the case for using more than one database when searching for outcome evaluations of health promotion interventions.

There is substantial overlap in the outcome evaluations of sexual health interventions located by Medline, EMBASE, PsycLIT, ERIC and the Social Science Citation Index. An examination of the proportion of the total number of outcome evaluations located when only four, three or two databases were used in combination, suggested that when access/time/resources are restricted and for reasons of efficiency, at least one medical database in combination with at least one social science database should be used. In addition, EMBASE and PsycLIT combined are more productive than any combination of *three* databases which included ERIC. Thus, in some instances, combining three databases, may be less productive than combining only two databases.

In summary, identifying relevant studies to be included in effectiveness reviews is a highly complex, skilled and time-consuming exercise.

## **5.6 Recommendations**

C Commissioners of effectiveness reviews and researchers undertaking a systematic review should be aware of the required complexity of electronic database search strategies for locating outcome evaluations of health promotion interventions and the consequences of this for the

budget and time scale, as well as the potential bias of the review.

- C Not all the articles from all the journals indexed are systematically entered onto the electronic databases. While manufacturers need to assess the extent of this problem and make attempts to redress it, this finding indicates the need for additional searching methods (e.g. handsearching) when undertaking a systematic review of effectiveness.
- C Use of more than one database is necessary for locating outcome evaluations of health promotion interventions as using any one database alone is likely to miss a substantial amount of all the available evidence within a field.
- C Searching for studies to update a systematic reviews should overlap in time with the searching period covered in the original review, rather than starting from where previous searching left off.
- C When access to databases is restricted, at least one medical database and at least one Social Science database should be used for locating outcome evaluations of sexual health interventions.
- C ERIC is not a useful database for locating outcome evaluations of sexual health interventions. Search strategies designed to locate trials in this area, should use PsycLIT in combination with any of the following databases: Medline, EMBASE, or the Social Science Citation Index.
- C Search strategies developed by experts in the field should be widely disseminated to avoid overlap of effort and inaccuracy in searching.
- C The establishment and maintenance of specialised registers within health promotion on which citations are coded in a consistent way and with health promotion-specific terms, is a cost-effective option. These registers should be made widely accessible.

## Chapter 6      **Medline, the Cochrane Collaboration and health promotion trials**

This chapter looks at the advantages and disadvantages of potential short-cuts in identifying health promotion trials. It focuses on the sexual health field and Medline and the Cochrane Controlled Trials Register as case studies to illustrate the issues involved.

### *6.1 Ways to decrease the effort in searching for effectiveness studies*

We documented the time it took an experienced health promotion researcher in developing and implementing the Medline search strategy described in **Chapter 5**, and in analysing the search results. Developing and testing a sensitive sexual health search strategy for Medline took **40** hours; implementing the search for the most recent Medline period available (January 1996 to September 1997) and downloading the citations identified, took **8** hours. Scanning through the 1048 retrieved records to identify potential outcome evaluations took approximately **7** hours, and resulted in 72 citations including 37 trials. If such a strategy were to be implemented over the 30 years covered by Medline, the number of records retrieved would be around 10,000. Consequently, about **70** hours would be needed to identify the relevant citations for the review. Overall, developing, implementing and analysing the results of this Medline search strategy would take approximately **120** hours. Given that the Medline search strategy only identified 55% of all available outcome evaluations (see **Chapter 5**), one also needs to search other electronic databases, and use alternative ways to identify studies (e.g. handsearching of journals). Though depending on experience, searching time may vary and may even be substantially less than in our example, the bottom line is that trying to identify *all* available relevant research is a time-consuming task. It is therefore important to try and identify means by which it can be done more efficiently. Specialised bibliographic registers such as the Cochrane Controlled Trials Register (CCTR) available as part of the Cochrane Library (The Cochrane Collaboration 1998), may provide one short-cut to effectiveness evidence.

This chapter reports on an analysis of the feasibility and utility of two possible 'short-cuts' for locating effectiveness evidence within health promotion: using search strategies with higher specificity on Medline,

and the Cochrane Controlled Trials Register (CCTR) as a specialised register. In addition, it compares the utility of the EPI-Centre standardised coding for health promotion studies with the Medline MeSH headings in searching for particular types of studies, hence, examines the need for a health promotion-specific coding system.

The work described in this chapter aimed:

- (i) to develop and test highly specific search strategies on Medline;
- (ii) to determine how useful the Cochrane Controlled Trials Register is for identifying trials in health promotion;
- (iii) to examine how useful Medline MeSH headings are in searching for outcome evaluations to answer more specific questions about effectiveness within sexual health promotion (e.g. the effectiveness of interventions using peer delivery).

## **6.2 Increasing the specificity of a Medline search strategy**

We tested two ways of increasing the specificity of the Medline sexual health strategy (called here the 'original Medline strategy') used in **Chapter 5**: firstly, by reducing the number of MeSH headings used; and secondly, by adding 'study design' terms by means of the operator 'AND', thereby restricting the retrieval of citations to those that had at least one of the prevention-related terms *and* one of the sexual health focus terms *and* one of the study design terms.

*Search 1*: used those MeSH terms of the original Medline strategy, both subject- and prevention-related terms, that *contributed most* to the yield of relevant citations in **Chapter 5**;

*Search 2*: further reduced the prevention-related terminology in *Strategy 1*;

*Search 3*: combined the 'original Medline strategy' with 'study design' MeSH terms.

More details and the full search strategies are given in **Appendix 5**.

Sensitivity for each strategy was calculated using the 72 outcome evaluations found by the 'original Medline strategy' for the period January 1996 to September 1997. We will call this set of studies 'gold

standard'<sup>1</sup>. Specificity was calculated as the proportion of the total number of citations retrieved which were outcome evaluations of sexual health interventions. The three strategies were then compared in terms of the extent to which relevant studies were missed (i.e. decreased sensitivity) and the effort required to sort through the search results to select the relevant studies.

**Table 6.1** presents the sensitivity and specificity analyses of *Search 1*, *Search 2*, and *Search 3*. Both *Search 1* and *Search 2* retrieved less citations than the 'original Medline strategy' with only 669 and 385 records respectively, as opposed to the 1048 records identified by the 'original Medline strategy'. Thus, the time needed to look through the results of *Search 1* and *Search 2* would be approximately **3 hours** and **2 hours** respectively, as opposed to **7 hours** for the 'original Medline strategy'. However, with *Search 2*, sensitivity is severely compromised (i.e. only 65% of the 'gold standard' studies were identified). *Search 3* produced the best balance between sensitivity and specificity: there were only 171 records to look through and sensitivity is maintained at a fairly high level (i.e. 85% of the outcome evaluations in the 'gold standard').

**Table 6.1 Sensitivity and specificity analyses of the alternative sexual health search strategies for Medline**

<i>Search strategy</i>	<i>Total number of citations</i>	<i>Sensitivity%</i>	<i>Number of outcome evaluations</i>	<i>Specificity %</i>
Original strategy	1048	100	72	7
Search 1	669	89	64	10
Search 2	385	65	47	12
Search 3	171	85	61	36

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<sup>1</sup>These 72 outcome evaluations are not to be confused with the set of 74 outcome evaluations in the 'gold standard' used in Chapter 5. The latter set of outcome evaluations were those located by the five databases overall for the year 1996.

### 6.3 *Searching a specialised register of trials*

#### 6.3.1 *The Cochrane Controlled Trials Register*

The Cochrane Library includes two bibliographic registers of studies: CENTRAL and the Cochrane Controlled Trials Register (CCTR). The Cochrane Collaboration aims to help people make well-informed decisions about health care by preparing, maintaining and promoting the accessibility of systematic reviews of the effects of health care interventions. To support this effort, the registers of studies in *The Cochrane Library* aims to capture and make widely available RCTs and non-randomised trials. The following section briefly describes both CENTRAL and CCTR as described in *The Cochrane Library*, (1998, issue 1):

**CENTRAL** is a new register.... distributed on the CD-ROM edition of The Cochrane Library since issue 4 of 1997. The main aim of CENTRAL is to establish a system for the efficient flow of information on studies within the Collaboration and to ensure that each Collaborative Review Group is aware of all studies that might be relevant to its scope. It is recognised that CENTRAL will be over-inclusive. It will contain reports of studies that are found not to be relevant for inclusion in Cochrane reviews. It is also likely to contain duplicates and errors...

**The Cochrane Controlled Trials Register (CCTR)** is the 'clean' version of CENTRAL. It is a list of references to controlled trials in health care and contains those records in CENTRAL which have been judged to meet the necessary quality criteria. These are assigned the keyword CCTR. At the moment, this means those records that are very likely to be reports of randomised or quasi-randomised trials. This assessment is an ongoing process and the lack of the CCTR keyword does not imply that a record is not a controlled trial....

The records for CENTRAL and, therefore, CCTR have primarily been identified through handsearching of journals within the Cochrane Collaboration. They include records from the specialised registers of trials that are maintained by the Collaborative Review Groups (CRGs), records supplied from elsewhere, both inside and outside of the Collaboration, and references to clinical trials identified on MEDLINE and EMBASE. All records in MEDLINE which

contain the publication type RANDOMIZED CONTROLLED TRIAL or CONTROLLED CLINICAL TRIAL have been included with permission from the National Library of Medicine in the United States. Records in both CENTRAL and CCTR include their MEDLINE or EMBASE accession numbers where available. MeSH keywords have also been included for many of the records. Each record will also eventually have two additional codes attached: (a) Specialised register codes - to show which CRG specialised registers a record appears in, and (b) Possible home codes - to show which CRG a record might be relevant to. The principal aim of the home code is to identify those records that cannot be assigned easily to a CRG. The home codes should not be relied upon as the sole search term by which CRGs try to identify new studies relevant to their scope.

[The] aim is to create a register within CENTRAL which will be the best source of information on trials available anywhere, both because of the large number of studies it contains and also because it will not contain records that do not relate to such studies. This will take time but each issue of the Cochrane Library should get closer to this goal. The process of assigning the specialised register and home codes has just begun and remains very incomplete. However, CENTRAL and CCTR can be searched using these codes in addition to the other search terms that are needed to identify relevant studies.

CCTR (*The Cochrane Library* 1997, issue 3) contains 131,535 records. The EPI-Centre, as part of their responsibilities for the Cochrane Health Promotion Field, contributed 539 of these records as a by-product of systematic reviews (France-Dawson et al. 1994; Holland et al. 1994; Oakley and Fullerton 1994, 1995; Oakley et al. 1994a, b; 1995a, b, c, d; 1996a, b; Peersman et al. 1996, 1998) and mapping of health promotion research for young people (Peersman 1996).

### 6.3.2 *Assessing the value of CCTR as a source of health promotion trials*

Sexual health promotion trials were searched for on CCTR of *The Cochrane Library* 1997, issue 3. Five issues were explored: (i) searching using MeSH terms; (ii) searching using free-text searching; (iii) comparing the results of these searches to the results of the sexual health search strategies implemented on Medline, EMBASE, PsycLIT, ERIC and the Social Science Citation Index; (iv) updating searches and (v) extension of searches to other topics within health promotion.

(i) *Searching using MeSH headings*

Searching CCTR for sexual health promotion trials began with MeSH terms identified as useful within Medline for locating sexual health studies (See **Appendix 4**). Two problems arose. Firstly, some MeSH terms on Medline did not appear as MeSH terms on *The Cochrane Library* (e.g. Acquired-Immunodeficiency-Syndrome-prevention-and-control, HIV-Infections-prevention-and-control, and HIV-Infections-psychology) even though they were attached to individual records of trials. Secondly, MeSH term searches mainly identified trials submitted by the Cochrane Schizophrenia Review Group, only some of which are relevant to health promotion; they found few of the trials submitted by the Health Promotion Field (tagged with CT-HPF), all of which are relevant to health promotion.

Scanning abstracts revealed that trials were identified only if Medline keywords were attached, and this was rarely the case with trials submitted by the Health Promotion Field because many of these had been located on other databases, through handsearching, personal contact or serendipity.

(ii) *Free-text searches*

In the light of the unproductive use of MeSH term searches, a sensitive search using free-text search terms was developed with the aid of the CT-HPF tag attached to all trials submitted by the Health Promotion Field. Of the 539 trials tagged with CT-HPF, 140 were trials about sexual health. Medline keywords and text words which described the focus of these trials as sexual health or health promotion were listed. These were combined with terms which the EPI-Centre uses when searching for sexual health trials. Refining the search took 35 hours and a few trials could still not be located by the extensive search strategy. Such trials were listed with unrevealing titles (no sexual health term and/or no prevention term) and no abstracts, which is not uncommon in reports of health promotion evaluations (Peersman et al. in press). Overall, this search identified 453 studies, 345 of which had not been contributed by the Health Promotion Field. Scanning titles and abstracts revealed that 197 of the total number of studies were relevant to health promotion, 166 of which had been contributed by entities other than the Health Promotion Field. These trials were added to the EPI-Centre's bibliographic register of studies and keyworded with the EPI-Centre system standardised coding strategy (Peersman and Oliver 1996).

(iii) *Comparison of CCTR with other bibliographic databases*

When compared with searches of other databases, searching CCTR for sexual health trials in 1996 identified 19 studies, 5 of which had not been identified by searches on MEDLINE, EMBASE, PsycLIT, ERIC or the Social Science Citation Index. Thus, CCTR could be used as an additional source for health promotion trials in this area; however there is no reference to outcome evaluations employing other designs which may inform the development of interventions.

(iv) *Updating searches*

Searches developed and saved on one issue of *The Cochrane Library* were stored on the hard disc and automatically transferred to the updated issue when it was installed on the same computer. Running the search again on *The Cochrane Library* 1997, issue 4 led to 229 references in CCTR (22 new this issue). Running the search yet again on *The Cochrane Library* 1998, issue 1 led to 458 references in CENTRAL (30 new this issue), 314 of which were in CCTR (0 new this issue).

(v) *Extending searches to other topics within health promotion*

Preliminary searches for trials of workplace health promotion interventions faced the same challenge of distinguishing between treatment and prevention trials as was found in the area of sexual health promotion. Again, a complex search incorporating a wide range of terms to identify specific types of interventions was needed. However, *The Cochrane Library* 1997, issue 4, no longer had trials tagged with their source code CT-HPF, so developing searches for health promotion trials could no longer take advantage of this short cut.

#### **6.4 *The need for health promotion-specific coding***

Over the past three years, the EPI-Centre has developed and maintained a specialised register of health promotion studies, called BiblioMap, as part of the Cochrane Health Promotion Field. Relevant studies were identified by means of electronic searching, handsearching of journals, and contacting research institutions both nationally and internationally. Citations were compiled into a bibliographic register using ProCite reference managing software. All entries were coded using a specially developed standardised coding strategy (Peersman and Oliver 1997) with keywords indicating the type of study, the country

where the study was carried out, the health focus, the study population (age group, sex), and for intervention studies, also the programme name, the intervention provider, setting and type of intervention. Training was provided on how to use this strategy and the EPI-Centre team members, with the help of a group of graduate students, have coded nearly 8,000 references to date. This specialised register is used to provide people in the field with lists of references within a particular area of interest, to provide a descriptive mapping of research already carried out, to identify research gaps, and to provide relevant studies for those conducting effectiveness reviews. As a lot of effort has gone into re-coding studies originating from databases such as Medline and EMBASE, which have their own database-specific terms, we wanted to assess the added value of using a consistently applied, health promotion-specific terminology, as compared to the controlled vocabulary of more medically-oriented databases, such as Medline. In particular, we tested the MeSH terms for their ability to identify studies with the potential to answer specific questions about the effectiveness of sexual health interventions, questions that are frequently asked by people in the field. For example: 'What are effective sexual health interventions for young people or for men who have sex with men?'; 'Does the evidence favour peer-led interventions?'; 'What are the most effective interventions to be used within a school setting?'; 'Is skill development an essential component of an effective sexual health intervention?'

The set of outcome evaluations located by the original Medline strategy (see **Appendix 4**) implemented for the period from January to December 1996 was used. We managed to obtain full reports for 28 of these studies within the limited time frame for this work and coded them according to the EPI-Centre keywording strategy. MeSH terms that were equivalent to the EPI-Centre terms were identified from the Medline thesaurus, for example, the equivalent term for 'peer' in the EPI-Centre coding was 'Peer-Group' in the MeSH terms. Each of these MeSH terms was tested for its ability to retrieve specific subsets of the 28 outcome evaluations in terms of : studies targeting young people; studies targeting men who have sex with men; studies evaluating peer-led interventions; studies carried out in a school-setting; and studies testing interventions which included a skill development component, respectively. In addition, we recorded the list of MeSH terms with which the reports were coded on Medline.

**Table 6.2** shows the efficiency of Medline MeSH terms in locating outcome evaluations within particular populations or intervention settings; or involving particular intervention providers and

intervention types. Both EPI-Centre terms and the equivalent Medline MeSH terms are shown, and the number of outcome evaluations identified by each type of coding. The results suggest that for locating evidence to answer specific questions about health promotion effectiveness, the MeSH terms are less efficient than using the EPI-Centre standardised coding. The utility of the MeSH terms is greatest for locating outcome evaluations of sexual health interventions targeted at young people (these terms located 78% of the total number of studies targeting young people).

MeSH terms were least efficient in locating outcome evaluations of sexual health interventions which included a skill development component.

**Table 6.2 Efficiency of Medline MeSH terms to locate outcome evaluations within particular populations, intervention settings, intervention providers and types of interventions as compared to the EPI-Centre coding**

<i>Target</i>	<i>Coding system</i>		<i>Nr identified by MeSH terms</i>	<i>Nr identified by EPI-Centre terms</i>
	MeSH terms	EPI-Centre terms		
Outcome evaluations of sexual health interventions*				
targeting young people	Adolescence-	Young people	21	27
targeting men who have sex with men	Homosexuality-; Bisexuality-	Homosexual; Bisexual	4	9
provided by peers	Peer-Group	Peer	4	6
provided in school settings	Schools-; School-Health-Services; Curriculum-; Students-	Primary Education; Secondary Education	4	11
including skill development	No equivalent	Skill Development	0	7

\* Total number=28

## 6.5 Conclusions

Developing and implementing highly sensitive search strategies requires substantial effort. Effort can be reduced by using search strategies with higher specificity. However these result in a loss of relevant studies due to lower sensitivity. Loss of sensitivity can be minimised by combining a comprehensive search based on subject- and prevention-related terminology (e.g. the 'original Medline strategy') with

specific study design terms. However, while such a strategy may be acceptable for Medline, previous research suggests that for other databases such as EMBASE, PsycLIT, ERIC and the Social Science Citation Index, loss of sensitivity may be more severe (Peersman et al. in press). Thus, commissioners of and researchers conducting systematic reviews should be aware of the amount of effort required to identify as much as possible of the available evidence. If, for reasons of limited resources, more specific searches are required, the loss in comprehensiveness of the review should be acknowledged.

Although the Cochrane Library was an additional source of outcome evaluations within sexual health promotion, its use as a 'short-cut' for locating effectiveness evidence was found to be disappointing. Searches needed to distinguish between treatment and prevention, and complex and time-consuming searches including a wide range of terms were needed to locate relevant studies. The utility of the Cochrane Library was further reduced when the later version of the database discontinued using the Health Promotion Field source code to tag trials in this area. However, in response to discussions about the difficulties of identifying health promotion trials, a system for tagging trials in CENTRAL to the Fields which contributed them will be reinstated. In addition, contributors of trials are invited to add their own keywords to references and abstracts to improve retrieval. Since this work, further discussions within the Cochrane Collaboration have led to developments which will ease the identification of health promotion trials and reviews in future:

“The publishers of the Cochrane Library, Update Software, have agreed to include keywords for Cochrane Reviews of interest to health promotion and public health in future issues of the library. This will enable users of the library to immediately identify relevant reviews and further refine searches. As the Cochrane Database of Systematic Reviews (CDSR) continues to grow, this search capacity will become more necessary.”  
(Sheila McNair, Health Promotion Field Administrator, 27 March 1998, Email discussion list)

The development of a standardised coding strategy for health promotion and the re-coding of citations from electronic databases such as Medline, increases the efficiency of locating evidence to answer

specific questions about the effectiveness of sexual health interventions. In view of this, the development and maintenance of a highly specific register of health promotion studies, keyworded according to population, intervention type, setting and provider is a desirable alternative to the lengthy process of searching on other electronic databases.

## **6.6 Recommendations**

- C Developing highly sensitive search strategies requires substantial effort. Use of search strategies with higher specificity can reduce the amount of effort but researchers and commissioners must be willing to acknowledge a loss of sensitivity. Efforts in developing these strategies and compiling a specialised register with standardised coding should be built upon and widely disseminated to avoid duplication of effort.
  
- C The specificity of a comprehensive search strategy for identifying outcome evaluations based on subject- and prevention-terms can be increased with a minimal loss of sensitivity, by adding study design-terms.
  
- C It would be desirable to maintain the EPI-Centre register of outcome evaluations within health promotion to facilitate the gathering of evidence in order to answer pragmatic questions about the effectiveness of health promotion interventions.
  
- C More effort needs to go into keywording health promotion trials on the Cochrane Controlled Trials Register (CCTR), thereby making them more easily available to health promotion specialists. Search strategies for all areas of health promotion should be developed for the Cochrane Library and the searches updated each issue. A cost-effective strategy would be to add EPI-Centre keywords to identified trials. The EPI-Centre strategy could then be incorporated into the Health Promotion Field Module of *The Cochrane Library* with instructions for those people wanting to search for health promotion trials. Similarly, it would make sense to code the constituent trials in Cochrane reviews coded 'health promotion' or 'public health' with EPI-Centre keywords.

## **Chapter 7      What is the impact of different search strategies on the scope and recommendations for effective interventions?**

So far, we have explored ways to improve systematic searching for *all* available evidence. In this chapter, we look in detail at how different ways of searching impact on the number and types of studies that can be included in an effectiveness review, and hence on the conclusions of the review. The focus of both this chapter and **Chapter 8**, is on workplace health promotion as a case study. Again, the issues addressed are relevant to other areas of health promotion.

### **7.1      *Aim***

To determine how using different search strategies for identifying primary studies may alter the recommendations about and the knowledge to guide the implementation of effective interventions.

### **7.2      *Methods***

Highly sensitive search strategies were developed to identify evaluations of workplace healthy eating interventions which include a cholesterol measurement on four electronic databases: Medline, EMBASE, PsycLIT and the Social Science Citation Index. For Medline, MeSH-headings were used; for PsycLIT and EMBASE, descriptor terms, and for the Social Science Citation Index, free-text terms were used. For further details and the full search strategies see **Appendix 6** and **7**.

Three approaches were used:

#### *1/ The simple search*

Health promotion terms (e.g. health promotion OR health education OR primary prevention) and workplace-related terms (e.g. workplace) were combined with the operator 'AND'.

#### *2/ The detailed search*

This approach used disease-specific terms and terms related to a health problem/state (e.g. 'Behavior-Therapy' OR 'hypercholesterolemia') and all the terms of the *simple search* but with an extended range of workplace terms (e.g. 'occupational medicine' OR 'business and industrial personnel').

### 3/ The *Cochrane* search

Study design terms (e.g. program-evaluation, clinical trial, follow-up studies), based on the optimally sensitive search strategy developed by the Cochrane Collaboration for identifying RCTs on Medline (Dickersin et al.1995), and all the terms of the *detailed search* were combined. Design terms were linked to the *detailed search* by the operator 'AND'.

The yields of the different search approaches were compared in terms of their sensitivity and specificity.

All the relevant outcome evaluation studies, identified by these searches, were reviewed using the EPI-Centre standardised Review Guidelines (Peersman et al. 1997). These guidelines consist of a set of multiple choice questions covering the following areas: A. How can the report be identified; B. Support for the study; C. Type of study; D. Description of the intervention; E. Description of the study population; F. Planning and process measures; G. Quality of the outcome evaluation. Two reviewers independently extracted the required data from each study and any disagreements were resolved, if necessary, with a third reviewer. Sound studies from which potentially reliable conclusions can be drawn were judged to be those employing a control/comparison group equivalent to the intervention group in socio-demographic characteristics and baseline outcome measures; and providing both pre- and post-intervention data for each group on all outcome measures targeted. These quality criteria have been used in a range of systematic reviews carried out by the Social Science Research Unit (SSRU) and the EPI-Centre which is part of the SSRU (France-Dawson et al. 1994; Holland et al. 1994; Oakley and Fullerton 1994, 1995; Oakley et al. 1994a, b; 1995a, b, c, d; 1996a, b; Peersman et al. 1996, 1998). The approach used in this reviewing process follows the model for reviewing health care interventions established within the Cochrane Collaboration (Chalmers et al.1997) and the work of other reviewers in the health education and social welfare fields (Biglan et al. 1987; Chalmers and Haynes 1994; Knipschild 1994; Loevinsohn 1990; MacDonald et al. 1992; Mulrow 1994; Schnaps et al. 1981).

The subset of 'sound' studies was used to examine the impact of the different search strategies on the scope and recommendations for effective interventions: we noted the number of sound studies which were found by each of the three different search approaches and compared the conclusions and recommendations for effective/ineffective interventions based on each pool of studies. We looked at the

study findings related to cholesterol levels only as this outcome measure can be considered ‘objective’, thereby avoiding confounding of review conclusions due to *potentially* invalid ‘subjective’ measurements.

All analyses were performed using EPIC, the EPI-Centre fully-relational database, which allowed for the subsets of studies to be analysed in terms of the development, content and delivery of the interventions, the study population and the methodological criteria and findings of the evaluations.

### 7.3 Results

#### 7.3.1 Sensitivity and Specificity of the search strategies

Overall, we identified 52 outcome evaluations of healthy eating interventions including at least one cholesterol measurement; 20 (39%) of these described a RCT; 11 (21%) a non-randomised trial; and 21 (40%) were either pre- and post-test or post-test studies only. The number and types of studies found by each of the three different search strategies is shown in **Table 7.1**.

**Table 7.1 Percentage (number) of (a) the total number of relevant workplace health promotion studies, (b) the total number of RCTs, (c) non-randomised trials and (d) other evaluation designs found by the three different search strategies**

<i>Search strategy</i>	<i>(a) all studies</i>	<i>(b) RCTs</i>	<i>(c) other trials</i>	<i>(d) other design</i>
<i>Total</i>	<i>n=52</i>	<i>n=20</i>	<i>n=11</i>	<i>n=21</i>
Simple Search	22 (42%)	7 (35%)	5 (46%)	10 (48%)
Detailed Search	48 (92%)	18 (90%)	10 (91%)	20 (95%)
Cochrane Search	31 (60%)	15 (75%)	7 (64%)	10 (48%)

The *detailed search* was the most productive: it identified 92% of all studies, and at least 90% or more of the studies in each category of evaluation design. The *Cochrane search* was much better in locating RCTs (75%) and other trials (64%) than in locating non-trial designs, which reflects the inclusion of study design terms in this search strategy. However, the inclusion of these terms which made the search

strategy more specific, resulted in a the loss of 3 RCTs and 3 other trials that were identified by the *detailed search*. The *simple search* was the least productive: it located less than half of the studies overall, as well as in each design category. It was particularly ineffective in locating RCTs; only 35% of all RCTs were identified by this search. These findings clearly show that the number and type of studies which potentially can be included in a particular review depends on the search strategy used.

Sensitivity and specificity calculations for the *simple search* and the *detailed search* are shown in **Table 7.2** with the associated amount of effort required to develop and implement the search and to analyse the search results. As we did not develop the *Cochrane search* ourselves, it is not included in these calculations.

**Table 7.2** The sensitivity, specificity and amount of effort required for different search strategies

<i>Search strategy</i>	<i>Total nr of citations</i>	<i>Sensitivity %</i>	<i>Nr of relevant studies</i>	<i>Specificity %</i>	<i>Time effort (hours)</i>
Simple Search	1919	42	22	1	30
Detailed Search	10573	92	48	0.5	84

The results show that with increasing sensitivity (from 42% to 92%), specificity decreases (from 1% to 0.5%). Comparing the *simple search* with the *detailed search* in terms of the amount of effort required, a small decrease in specificity (from 1% to 0.5%) means a substantial increase in the amount of effort required (from 30 to 84 hours).

### 7.3.2 Impact of different search strategies on conclusions

The EPI-Centre review process found that only 12 (23%) of the 52 studies identified were ‘sound’ studies, i.e. those from which potentially reliable conclusions can be drawn. They described 7 interventions found to be *effective* in changing participants’ cholesterol level and 5 interventions found to have no effect. *Effective* interventions were those *lowering* (with statistical significance) clinically

elevated cholesterol levels; *ineffective* interventions were those which did *not change* elevated cholesterol levels; and *harmful* interventions were those *increasing* (with statistical significance) cholesterol levels which were already too high.

The *effective* interventions were:

- C A 12-week intervention in which all participants received a health check, feedback on their cholesterol levels (i.e. bio-feedback), personalised written information on their health risk, and information stressing the role of exercise and healthy eating. In addition, low-fat foods were made available in the worksite canteen. The evaluation aimed to assess the impact of additional access to exercise facilities for one group as compared to doing physical activity and the provision of *free daily* low-fat foods for another group. The latter group showed greater reduction in cholesterol levels than those who had additional access to resources or those who only received bio-feedback and personalised information (Ostwald 1989).
  
- C A one-day intervention including a health check and personalised advice, with or without bio-feedback and/or providing a personal risk score. The findings showed no added benefit in feeding back participants' cholesterol level and/or their associated health risk score (Hanlon et al. 1995).
  
- C An intervention which took place in the context of a health check-up at occupational health clinics. All participants had a high cholesterol level and received bio-feedback and general written advice about reducing cholesterol levels. Those in the intervention group also received extra personalised advice in the form of counselling which lasted for 10-15 minutes. The intervention group showed a significantly greater reduction in cholesterol levels than the comparison group (Rastam and Frick 1996).
  
- C An intervention which took place over one year. All participants received bio-feedback and personalised advice. One group also had access to a health resource centre and self-care books; another group received social support and behaviour change education in addition; and a final group (those with high cholesterol levels) also received extra case management. A greater

reduction in cholesterol was shown for the case management group compared to the group which received social support and behaviour change classes, which in turn had a greater cholesterol reduction than those who had access to resources or bio-feedback only (Shi 1992).

- C A two-week intervention including bio-feedback, and access to services and personalised advice on how to make appropriate lifestyle changes -including diet and exercise, within the setting of a health fair. The intervention group were also given incentives i.e. cash prizes for 20% reduction in cholesterol level. The intervention group showed greater reduction in cholesterol level than the comparison group (Francisco et al. 1994).
- C An intervention which was spread over one year. The evaluation compared the effect of bio-feedback and giving personalised advice in different ways: either through a structured 60-minute one-off session, or through five face-to-face sessions, or repeated counselling by mail and telephone. The results showed that repeated face-to-face counselling was more effective in reducing cholesterol than mail/telephone counselling, which in turn was more effective than providing advice by means of a one-off session only (Crouch et al. 1986).
- C The WHO European collaborative trial of multi-factorial coronary heart disease prevention took place in four countries and involved a range of worksites. The intervention consisted of bio-feedback with or without personalised advice (face-to-face for men at high risk, written advice for others). Greater reductions in cholesterol were found when personalised advice was given in addition to bio-feedback only (WHO 1986).

The studies reporting *ineffective* interventions were :

- C The "Take Heart" intervention was implemented in a range of industrial worksites and lasted up to two years. It included low-intensity health promotion activities involving environmental modification, practical skill development and incentives. Employees were involved in the planning of the interventions through a 'Steering Committee'. There was no effect of the intervention on cholesterol levels as compared to the control group (Glasgow et al. 1994).

- C An eight-week educational programme with or without spouse support. The educational programme involved practical skill development, education and recipe tasting. There was no difference in cholesterol levels between those who had spouse support and those who had not (Blanke et al. 1990).
  
- C An intervention consisting of information through mass media, provision of health education materials and bio-feedback with personalised written advice. This intervention was part of the North Karelia Project and took place over a one year period. There was no difference in cholesterol levels between the intervention group and the control worksites who received baseline and follow-up screening only (Puska et al. 1988).
  
- C The common component of the intervention for the different groups consisted of bio-feedback with a one-off 3-5minutes counselling session. Those whose cholesterol was borderline-high but who did not have two or more other cardiovascular risk factors or a history of coronary heart disease were randomised to receive either high-frequency follow-up counselling for 6 months or low-frequency follow-up counselling (i.e. one counselling session 6 months after initial bio-feedback). There were no differences in cholesterol levels between the low-frequency and high-frequency groups or those who received the one-off counselling session only (Gemson et al. 1990).
  
- C The 'Take Heart II' intervention which took place continuously over a period of two years and consisted of bio-feedback and advice, education, physical activity, practical skill development and social support. Employees were involved in the planning of the interventions through a 'Steering Committee'. There was no difference in cholesterol levels between participants of intervention sites and those at control worksites (Glasgow et al. 1997).

**Table 7.3** shows the proportion of 'sound' and 'flawed' studies (i.e. those not meeting the minimum quality criteria for 'soundness') in the set of 52 outcome evaluations as found by the different search strategies.

**Table 7.3 Percentage (number) of ‘sound’ and ‘flawed’ studies in the 52 workplace health promotion studies identified by the different search strategies**

<i>Search strategy</i>	<i>Sound studies</i>	<i>Flawed studies</i>
<i>Total</i>	<i>n=12</i>	<i>n=40</i>
Simple Search	4 (33%)	18 (45%)
Detailed Search	10 (83%)	38 (95%)
Cochrane Search	7 (58%)	24 (60%)

The *detailed search* found the highest proportion of ‘sound’ studies (83%) while the *simple search* identified only a third (33%) of the ‘sound’ studies. Obviously, the more sensitive the search strategy (i.e. the *detailed search*), the higher the chance of capturing ‘sound’ studies. While identifying high proportions (75%) of RCTs (see **Table 7.1**), the Cochrane search located only 58% of studies judged to be ‘sound’.

In terms of drawing conclusions from the subset of sound studies, we determined which reliable (i.e. ‘sound’) studies would be included in the review for each of the three different search scenarios:

### **1. Simple Search**

Of the 4 ‘sound’ studies found by the *simple search*, 1 was effective in decreasing cholesterol levels (Shi 1992) and 3 were ineffective (Glasgow et al. 1994, 1997; Puska et al. 1988). On the basis of these studies, one would recommend that a high-intensity intervention is better than a low-intensity intervention in decreasing cholesterol levels. More specifically, adding case management to an intervention consisting of a health risk appraisal, education, behaviour change classes, and social support, has added benefit in that a greater effect on cholesterol levels was obtained. Providing just a health risk appraisal and information results in the smallest change in participants’ cholesterol.

The 3 ineffective interventions would suggest that an intervention which is fairly diffuse, i.e. implemented over a long period of time (1 to 2 years) should be avoided. There also does not seem to be a beneficial

impact of involving the target population in the planning of interventions.

The review based on the *simple search* would recommend:

- C Encouraging healthy eating by providing extra case management in addition to social support, behaviour change classes, access to resources and bio-feedback;
- C Involving the target population in the planning of health promotion activities as part of a diffuse intervention may not increase the likelihood of a beneficial effect.

## **2. Detailed Search**

Of the 10 'sound' studies found, 5 were effective in decreasing cholesterol levels (Francisco et al. 1994; Hanlon et al. 1995; Ostwald 1989; Rastam and Frick 1996; Shi 1992) and 5 were ineffective (Blanke et al. 1990; Gemson et al. 1990; Glasgow et al. 1994, 1997; Puska et al. 1988). This search identified all of the ineffective studies and failed to identify only 2 studies reporting effective interventions. One of these two studies (Crouch et al. 1986) showed that face-to-face individual advice was more effective than advice given over the phone, which in turn was more effective than having an advisory session in group or bio-feedback only. The other 'missing' study (WHO 1986) showed that personalised advice was more effective than bio-feedback only.

The conclusion/recommendations drawn from the studies found by the *detailed search* are:

- C Personalised advice is an essential component of an effective cholesterol intervention;
- C This counselling has to last more than 5 minutes at the time, even if brief sessions were to be repeated over time;
- C It may not be important for participants to know their actual cholesterol level and/or associated health risk score;
- C Providing cash incentives or free low-fat meals may have added benefit;
- C Diffuse interventions not including a personalised advice component, even if there is involvement of the study population in the planning of activities, need to be avoided.

### 3. Cochrane Search

Of the 7 'sound' studies found by the *Cochrane search*, 4 were effective in decreasing cholesterol levels (Francisco et al. 1994; Hanlon et al. 1995; Ostwald 1989; Rastam and Frick 1996) and 3 were ineffective (Gemson et al. 1990; Glasgow et al. 1994; Puska et al. 1988).

The conclusions which can be drawn from a review which uses this search are :

- C Interventions aimed at reducing cholesterol levels should include face-to-face personalised advice on how to change their lifestyle;
- C This counselling has to last more than 5 minutes at the time, even if brief sessions were to be repeated over time;
- C It may not be important for participants to know their actual cholesterol level and/or associated health risk score;
- C Providing cash incentives or free low-fat meals may have added benefit.

#### 7.4 *Conclusions*

Search strategies not only have an effect on the overall numbers of studies that may be included in an effectiveness review, but also on the relative numbers of different types of studies (i.e. RCTs, non-randomised trials, 'sound' studies). The broader the search strategy, the bigger the potential pool of studies (of any design) to be included, but the more effort and hence resources are needed to conduct the review. Any discussions on trade-offs related to searching for primary research have to acknowledge that the less studies to draw on, the more difficult it is to identify patterns in what constitutes an effective/ineffective intervention, and the more likely the bias in the review.

#### 7.5 *Recommendations*

Given the impact of searching on the scope and recommendations of reviews, it is essential to:

- C report the search strategies used and to provide details of their sensitivity and specificity;
- C for new reviews to build on previously completed systematic reviews with the aim to make them fully comprehensive i.e. cover *all* available research evidence;
- C disseminate well-developed search strategies widely for use in updating previously completed reviews.

## **Chapter 8            The impact of different inclusion criteria: the case of workplace health promotion**

This is the final chapter where we investigate how using different inclusion criteria for primary studies affects the scope and recommendations of an effectiveness review. Again, as in **Chapter 7**, the focus is on workplace health promotion. We address the key issue of assessing the validity of evaluation research and the necessity for weighting studies according to their methodological strength. We conclude that if effectiveness reviews are to play a key-role in advancing evidence-based health promotion, there is an urgent need to agree a common framework for conducting these reviews.

### **8.1    *Aim***

To determine how different inclusion criteria related to the study design of individual studies as employed in a range of effectiveness reviews may alter the recommendations about, and the knowledge to guide the implementation of, effective interventions.

### **8.2    *Methods***

The 52 studies reporting outcome evaluations of workplace interventions with a healthy eating component aiming to change cholesterol level were used (see **Chapter 7**). We investigated the relationship between different inclusion criteria with respect to the methodological characteristics of the evaluation studies and the scope and recommendations for effective. As already indicated in **Chapter 7**, cholesterol level was chosen as the outcome measure under study because it was considered to be an 'objective' measure. We selected a range of inclusion criteria which have been employed in different effectiveness reviews (see **Chapter 4**):

- C      all outcome evaluation studies irrespective of their evaluation design;
- C      all RCTs;
- C      RCTs with adequately concealed randomisation only;
- C      all trials irrespective of the method of allocation of participants to the different groups involved;

C outcome evaluations which employ a control/comparison group which is equivalent to the intervention group in socio-demographic characteristics and baseline outcome measures; and which provide both pre- and post-intervention data for each group on all outcomes targeted. These inclusion criteria will be referred to as 'EPI-Centre quality criteria'.

We compared :

(a) the number of studies reporting on *effective* interventions; and

(b) the content of *effective* interventions

when different subsets of studies were included according to the criteria set out above.

As already stated in **Chapter 7**, *effective* interventions were those *lowering* (with statistical significance) clinically elevated cholesterol levels; *ineffective* interventions were those which did *not change* elevated cholesterol levels; and *harmful* interventions were those *increasing* (with statistical significance) cholesterol levels which were already too high.

### 8.3 Results

**Table 8.1** presents the authors' conclusions about the impact of the tested interventions on the cholesterol level of the study participants in relation to the study design (i.e. the type of control/comparison group employed). Most studies found the intervention to be effective, with studies *not* employing a control/comparison group being more likely to report an effective intervention (95%) as compared to those employing a control/comparison group (71% of RCTs; 67% of non-randomised trials). None of the studies reported a harmful effect.

**Table 8.1 Evaluations of workplace health promotion interventions aimed at reducing cholesterol level (N=52)**

<i>Authors' conclusions</i>	<i>Type of control/comparison group</i>		
	<i>random (N=21)</i>	<i>non-random (N=9)</i>	<i>none (N=22)</i>
effective intervention	71%	67%	95%
ineffective intervention	29%	33%	5%

**Table 8.2** presents the comparative results of including different subsets of studies according to the different inclusion criteria. The definition of specific inclusion criteria had a considerable effect on the total number of studies from which to draw conclusions, here ranging from 3 (RCTs with adequately concealed randomisation) to 52 studies (all outcome evaluations irrespective of the study design). The proportion of studies reporting a positive effect was high for all scenarios (ranging from 70% to 100%) except when EPI-Centre criteria were applied (58%). In the latter scenario, studies reporting effective (58%), as opposed to ineffective (42%), interventions are more evenly balanced. As the EPI-Centre quality criteria not only relate to the design, but also the execution and analysis of evaluation research, studies meeting those criteria are more likely to present the ‘true’ effect of the interventions tested. The conclusions in **Table 8.2** are those reported by the authors, except for the studies meeting EPI-Centre criteria for which the reviewers’ judgement on effectiveness is reported which may be different from the authors’ conclusions. Part of the EPI-Centre review process is to compare the authors’ conclusions with the reviewers’ conclusions bearing in mind the methodological quality of the study.

**Table 8.2 Evaluations of workplace health promotion interventions aimed at reducing cholesterol level (N=52)**

<i>Inclusion criteria</i>	<i>Conclusions</i>	
	<i>N</i>	<i>N (%) effective interventions</i>
all outcome evaluations	52	42 (81%)
all trials	30	21 (70%)
all RCTs	21	15 (71%)
trials meeting EPI-Centre criteria	12	7 (58%)
RCTs with adequately concealed randomisation	3	3 (100%)

### **Effect on scope and recommendations for effective interventions**

For a brief description of the interventions tested in all 52 outcome evaluation studies, see **Appendix 10**. In the following section, we will provide descriptions of some of the interventions to serve as examples of the range of effective and ineffective programmes reported on.

### Inclusion of all outcome evaluations irrespective of their evaluation design

The authors of 42 studies (81%) reported effective interventions for reducing cholesterol level. There was a wide range of interventions which seemed to be *effective*, for example:

- C providing seminars on food composition, cancer and coronary heart disease; and providing instructions on how to keep a food diary, how to plan meals, and how to cook (Briley et al. 1992).
  
- C providing information; measuring cholesterol levels and reporting the individual results back to the participants (bio-feedback); providing counselling; providing access to a fitness centre and lifestyle improvement programmes; and organising goal-oriented challenges and contests (Goetzel et al. 1996).
  
- C organising mandatory daily exercises; and providing access to a weight control and nutrition clinic (Barnard and Anthony 1980).

Examples of interventions which seemed to be *ineffective* were:

- C providing three 1-hour education classes on the identification, significance and modification of cardiovascular disease risk factors; health screening; and referring participants to medical evaluation and/or treatment (Masur-Levy et al. 1990).
  
- C health risk appraisal with bio-feedback alone or in combination with: counselling; providing self-help materials and access to classes in smoking cessation, cholesterol reduction, weight control; and walking contests (Connell et al. 1995).

### Inclusion of all trials irrespective of the method of allocation to the different groups involved

The authors of 21 evaluation studies (70%) reported a positive impact on cholesterol levels. As above, there was a range of effective interventions, and no clear pattern in what constituted an effective or ineffective intervention.

Examples of interventions which seemed to be *effective* were:

- C education on appropriate eating pattern messages (e.g. “try eating bagels or English muffins instead of doughnuts and pastries”) presented in a variety of ways (Hartman et al. 1993).
  
- C employer and employee involvement in a programme consisting of a health risk appraisal; counselling; health education classes; implementation of a smoking policy; provision of healthy food in vending machines; organisation of contests; provision of self-help kits (Bertera 1993).

Examples of interventions which seemed to be *ineffective* were:

- C a health screening programme and brief advice for each participant followed by two dietary interventions: either a self-help pack with dietary recommendations or a nutrition course (Barratt et al. 1994).
  
- C an intervention consisting of several components including the establishment of Employee Steering Committees to help tailor the programme to the context and culture of the worksite; a menu of activities addressing both smoking and nutrition; exercise activities; networks for more integration with community health organisations and other intervention worksites to share ideas and compare experiences; incentives such as gym bags and T-shirts to increase the visibility of the programme and to reward employees for engaging in healthy behaviours (Glasgow et al. 1997).

### Inclusion of all RCTs

The authors of 15 RCTs (71%) reported effective interventions for reducing cholesterol level.

Interventions which seemed *effective* included:

- C bio-feedback; small-group education based on behavioural, skills-based principles in choosing and preparing food; medical referral (Byers et al. 1995).

- C exercise training three times a week with weekly individualised dietary counselling (Gambera et al. 1995).

Interventions which seemed *ineffective* included:

- C participants were asked to change their lifestyle and provided with personal advice, lectures, circulars and brochures (Schar 1969).
- C a health and medical screening; physician counselling providing advice on risk reduction taking into consideration the participant's preferences and limitations; educational materials; access to follow-up counselling sessions with a nurse; and repeated weight and blood pressure measurements (Edye et al. 1989).

#### Inclusion of RCTs with adequately concealed randomisation

Only 3 (14%) of the RCTs reported that randomisation had been blinded. All three studies compared the impact of different interventions on cholesterol levels:

- C a 1-hour session introduced by a physician and run by a dietitian advocating appropriate diet followed by bio-feedback *was more effective than* education without bio-feedback (Elton et al. 1994).
- C bio-feedback; referral to a physician, monthly 10-minute counselling sessions including addressing reasons for compliance/non-compliance with treatment; education; incentives; priority enrollment in a relevant health promotion programme *was more effective than* bio-feedback; medical referral; and access to a health promotion programme (Fielding et al. 1995).
- C face-to-face advice *was more effective than* mail/telephone advice which in turn *was more effective than* advice provided in a group session *or* bio-feedback alone (Crouch et al. 1986).

#### Inclusion of outcome evaluations meeting the EPI-Centre quality criteria

Only 12 (23%) studies met at least the quality criteria of employing a control/comparison group equivalent to the intervention group in terms of socio-demographic characteristics and baseline outcome

measures, and reporting on both pre- and post-intervention data for all targeted outcomes. The reviewers judged the impact of the interventions tested in 7 studies (58%) to be effective in lowering cholesterol level (Crouch et al. 1985; Francisco et al. 1994; Hanlon et al. 1995; Ostwald 1989; Rastam and Frick 1996; Shi 1992; WHO 1986); 5 studies reported no effect on cholesterol levels (Blanke et al. 1990; Gemson et al. 1990; Glasgow et al. 1994,1997; Puska et al. 1988). Comparing the effective with the ineffective interventions showed that *all effective* interventions included one-to-one personalised advice; 4 of the ineffective interventions lacked such component (Blanke et al. 1990; Glasgow et al. 1994,1997; Puska et al. 1988) and 1 intervention did include some one-to-one personalised advice but this ‘counselling’ was reported to have lasted only 3-5 minutes (Gemson et al. 1990). In addition, the study did not include a non-intervention control group; it set out to test whether repeated brief counselling was more effective than one-off counselling and found no difference between the groups (Gemson et al. 1990).

#### **8.4 Conclusions**

The criteria used for selecting the types of studies to include in effectiveness reviews clearly affect the scope of and recommendations from those reviews. This may result in reviews that are similar in focus (i.e. health area, study population, types of interventions), being different in their recommendations for what constitutes an effective/ineffective intervention. If not exactly contradicting one another, some of these reviews may recommend different choices of intervention, whereas others may make very specific recommendations. Because evaluations of particular interventions are so rarely replicated, employing random allocation, concealed random allocation or the EPI-Centre quality criteria will access a different set of studies and a different set of interventions from which to draw conclusions about the effects of services. It is therefore difficult, if not impossible, to assess the differential effect of those inclusion criteria by means of meta-analyses. However, it is widely accepted by those compiling *systematic* effectiveness reviews, that a hierarchy of evidence exists and that the results from *well-designed* and *well-executed* RCTs are necessarily more reliable than those from other studies. The important issue is to assess critically key aspects of the research design, execution and analysis that are known to compromise the validity and reliability of the research findings. Applying the criteria of ‘random allocation’ or ‘concealed random allocation’ do not deal with the quality of the execution and analysis of the trial.

Our investigation of the relationship between inclusion criteria for study design and the recommendations for effective interventions was restricted to comparing the impact on cholesterol levels. However, several studies concurrently assessed the impact on other health-related outcomes such as blood pressure, fat intake etc. Hence, any recommendations about the wider implementation of particular interventions further depend on the impact on other health-related outcomes, as well as the precision and clinical relevance of the observed cholesterol reductions; the sustainability of observed changes; specific characteristics of the intervention and/or study population; the resource requirements and feasibility with respect to the implementation; the acceptability of the intervention; competing needs etc.

### **8.5 Recommendations**

- C There is an urgent need to agree on a set of empirically tested quality criteria to assess the methodological quality of evaluation research in health promotion.
  
- C Reviews of effectiveness can incorporate studies of different qualities but the poorer quality studies need to be clearly highlighted within the text and should contribute less to the conclusions about effectiveness.
  
- C If appropriate and possible, meta-analyses should be included to allow for studies to be weighted according to their size and quality.

## **Part III**

### **Summary of recommendations**

Health promotion practitioners, users of health promotion services, policy-makers and researchers need syntheses of primary research to enable them to make informed decisions about practice, policy and research needs in health promotion. Effectiveness reviews aim to summarise the effect of health promotion interventions on a range of outcomes, such as knowledge, attitudes, health-related behaviours, and health status; as such, they are an essential step in setting priorities for action and allocating scarce resources.

The increasing enthusiasm for effectiveness reviews in different areas of health promotion has led to an epidemic of concurrent reviews. These have often overlapped in the questions they address and the primary studies they examine, but they have often differed in the conclusions drawn. These differences are related to the use of different review methods. Hence, what is 'known' about what works in health promotion may not only be dependent on 'what questions' have been asked, but also on 'how' these questions have been addressed.

The use of explicit, systematic methods in conducting effectiveness reviews limits bias and reduces random errors, thus providing more reliable conclusions on which to base decisions. Comprehensive summaries aiming to include *all* available evidence allow us to establish where the effects of health care or health promotion interventions are consistent, and where effects may vary significantly. In this study, we identified 398 completed effectiveness reviews; only 19% (75) of which reported *all* of the following: the purpose of the review, the strategies for identifying primary research, the inclusion criteria *and* the criteria used in the assessment of the validity of the included studies. Overall, the lack of clarity in review methodology implies that it is fairly difficult, if not impossible, to assess the potential bias and hence the reliability of most of the available effectiveness reviews. As such, the usefulness of existing effectiveness reviews in advancing evidence-based health promotion is seriously in question. There is an urgent need to improve the status and use of effectiveness reviews. The findings from our research lead to the following recommendations:

### *Commissioning reviews*

There is a need to maintain and regularly update a central register of completed and ongoing effectiveness reviews to avoid overlap of effort and to ensure that new reviews build on previous reviews.

Commissioners and potential users of reviews should be involved in framing the review question, the shaping of the review as it progresses and the presentation of its findings. Methods for facilitating discussions to guide the research should draw on information science, education research and public understanding of science.

Systematic reviews should be commissioned as a two stage process. This procedure has been used by the Centre for Reviews and Dissemination, York and by several NHS R&D departments, but is certainly not common practice. The first stage in the review process would involve finding out how many relevant studies have been carried out in the particular area of interest, and with this information the second stage would involve negotiating satisfactory funding and timescale. A detailed review of studies should follow discussion between the researchers, commissioners and potential users to determine the criteria for choosing which studies to include, and the degree of information required about each reviewed study. For example, if there a great number of studies are available, a longer timescale or more funding can be agreed, alternatively, the focus of the review could be restructured to concentrate on a more specific aspect of the review question (e.g. population characteristics, use of participatory methods etc) to fit in with more restricted time and funding parameters.

There is a need for a common framework for how reviews in health promotion should be carried out. Methods for reviewing effectiveness which have been developed for evaluating care in clinical settings are largely applicable to reviewing health promotion interventions. In particular, clarity of scope, exhaustive search strategies, and the application of pre-set quality criteria to assess primary studies are essential, as well as regular updating.

## *Conducting reviews*

### **1. Formulating the review question**

Lack of an explicit definition of a review's scope may hide the bias of the review's authors.

Narrow scope reviews address narrow practice questions and identify narrow research gaps. There is a need for reviews with a narrow scope to be described within the context of a map of related research questions, unappraised primary studies and on-going and completed systematic reviews.

Research commissioners ask policy-related questions e.g. about targets within the Health of the Nation framework; about integrated targets with different dimensions; about cost-effectiveness; about research gaps. These require very broad reviews which are time-consuming to produce.

Health promotion practitioners would find it most useful to have systematic reviews of 'approaches' to health promotion (e.g. community development or peer-delivered interventions) rather than topic-focused reviews.

### **2. Identifying relevant primary research**

What can be synthesised depends on what is found, and methods for searching may vary in a number of ways: the amount of effort put into finding unpublished evidence or evidence published in non-English languages; the number and range of journals handsearched; the number of electronic databases used to locate studies; and the quality of the search strategies used for these electronic databases. This variation may result in reviews being biased in the studies they potentially can include and hence in the recommendations and conclusions they can draw. The effort put into locating studies may depend on the resource restrictions for conducting the review and/or the skills of the researcher carrying out the review.

Given the complexity of searching for outcome evaluations of health promotion interventions and the consequences of this for the budget and time scale of a review, as well as for the impact on review conclusions, the establishment and maintenance of specialised registers within health promotion, which

are accessible to others in the field, is a cost-effective option. At the very least, well-developed search strategies should be widely disseminated to avoid duplication of effort.

Systematic reviews should draw on past reviews as a short-cut to identifying primary studies. Therefore the search strategy should include seeking both reviews and primary studies. The use of more than one database is necessary and searching for studies to update a systematic review should overlap in time with the searching period covered in the original review, rather than starting from where previous searching left off.

Given the impact of searching on the scope and recommendations of reviews, it is essential to report the search strategies used and to provide details of their sensitivity and specificity.

### **3. Assessing the validity of studies**

There is an urgent need to agree on a set of empirically tested quality criteria to assess the methodological quality of evaluation research.

A hierarchy of evidence exists and should be reflected in the presentation of the review's conclusions. It is important to critically assess key aspects of the research design, execution and analysis that are known to compromise the validity and reliability of the research findings. Poor quality evaluation does not preclude interventions from systematic reviews, but care needs to be taken with drawing conclusions about effectiveness. Reviews of effectiveness can incorporate studies of different qualities without misleading readers if the poorer quality studies are clearly highlighted within the text and allowed to contribute less to the conclusions about effectiveness. If appropriate, meta-analyses should be included as these allow for studies to be weighted according to their size and quality.

### **4. Extracting relevant data**

Standardised data extraction sheets and double independent data extraction should be used to ensure consistency and to avoid errors.

It is important not only to know whether an intervention worked or not, but also how and why it worked or failed to work. Apart from effectiveness data, systematic reviews should include, where available, process data for informing the implementation of a particular intervention in the field including the quality of the resource/training of the provider involved in the intervention tested.

When assessed in the included primary studies, reviews should present findings related to the differential impact of an intervention on different sub-groups of the study population (by age, gender, ethnicity etc).

## **5.      Analysing and presenting results**

Reviews of effectiveness need to lead to several products aimed at different audiences. Partnerships are required for different presentations e.g. practitioners to write for practitioners.

Detail should not be sacrificed to increase accessibility. Review methods should be clearly reported to enable assessment of any potential bias, and hence the validity and applicability of the review.

Research gaps and hypotheses generated from the review which could be tested by subsequent research, need to be explicitly stated.

### ***Disseminating reviews***

The use of findings from effectiveness reviews is often limited for reasons of constraints, such as political pressures which determine decisions.

There is a need to improve the dissemination of the results of systematic reviews to practitioners, for example, by publishing summaries of reviews in 'magazine' type journals for nurses, and considering what other types of dissemination may better meet the needs of all those committed to improving the 'art' or 'science' of health promotion.

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## *Appendix 1 A query on effectiveness reviews in older people*

### **ORIGINAL MESSAGE DETAILING POSSIBLE DISCREPANCIES**

The apparently conflicting messages from reviews were summarised for the Health Promotion Research Internet Network on 29 October 1997:

“Health promotion interventions to prevent falls and subsequent injury in older people can be delivered through: firstly reducing of falling implemented by increased exercise, home assessments and surveillance, changing older peoples' footwear, and through interventions in institutional settings; secondly, reducing injuries from falls through dietary interventions and hip protectors. Rivara (1997) has recently reviewed these activities. Three meta-analyses are provided by Province, Oakley and Gillespie, whereof the last has been available as one of the first on Health Promotion/ Disease prevention from the Cochrane database.

Province 1995: A meta-analysis of data from seven randomised, controlled trials in the US concluded that exercise programmes alone appear to reduce the risk of falls by 10 percent; combining these programme with balance training reduced the risk by an additional 7 percent (Province MA et al. 1995). These seven studies make up a set of linked RCTs at separate sites examining exercise alone or with other interventions carried out under the "Frailty and Injuries Co-operative Studies of Intervention Techniques" (FICSIT). All these trials measured the effect of the intervention on the rate of falls. Two took place in nursing homes and five were community based. All the interventions included an exercise component for 10-36 weeks, sometimes combined with other interventions, mainly balance training, and follow up lasted 2-4 years.

Oakley et al. 1996a: In a meta-analysis by Oakley et al. (1996a) they ended up with thirty six trials with interventions to prevent falls including the above FICSIT trials. In addition they identified 16 RCTs with exercise interventions. The outcomes differed and were falls, postural stability, sway or balance, strength and quality of life. They also vary according to the populations studied, the risk of falling, the type and duration of exercise intervention, how it was delivered and the length of follow up. They conclude from the FICSIT trials, if the results of the pooled studies only included balance training, the reduction in the risk of falling was 25% (Oakley et al. 1996a). In one trial offering balance training exercise Thai Chi had a 37% lower risk of falling than the non-intervention group (Wolf et al. 1993).

Oakley et al. (1996a) conclude that *these studies which report intermediate outcomes contribute little in the way of direct evidence for the prevention of falls*. They do however provide evidence for the acceptability of various exercise programmes in this age group. Overall, despite the variable quality of these studies, the results from these and the FICSIT trials provide reasonable evidence to suggest that exercise offers potential benefits in reducing the risk of falls and some risk factors for falls. Those interventions which use balancing exercise, and low impact aerobic exercise, appear to be the most promising.

Gillespie 1997a: Recently one of the first traditional Cochrane evaluations in prevention/ health promotion - "Falls in the elderly" has been available from the Cochrane database (updated 28 August 1997) provided by Gillespie et al. (1997a). They have presented a third review of RCT interventions to reduce the incidence of falling in the elderly in community dwellings or institutions. For each included trial, quality assessment and data extraction was carried out by two reviewers. The outcomes from individual trials were analysed and results from similar groups of trials pooled together.

Eighteen trials and one pre-planned meta-analysis (the Province study above) were included. Interventions targeting multiple risk factors after individual assessment (pooled OR 0.77; 95% CI 0.64 to 0.91), and behavioural interventions targeting environmental hazards plus any risk factor (*pooled OR 0.81; 95% CI 0.71 to 0.91*) significantly reduced the incidence of falling. There was no evidence to support a single intervention eg. exercise (*pooled OR 1.05; 95% CI 0.74 to 1.48*) or health education classes (*OR 1.25; 95% CI 0.51 to 3.03*) for the prevention of falls.

Questions:

Are the conclusions on the value of exercise contradictory in the three meta-analyses?

Is the RCT the method proper for assessing community intervention trials?

If not, what kind of criteria should be used for prevention/ health promotion meta-analyses?"

## DETAILS OF REVIEW METHODS AND CONCLUSIONS

### *Scope of reviews*

**Province 1995 (pre-planned meta-analysis):** This study was a prospective meta-analysis of RCTs which between them tested the effects of interventions to reduce falls and frailty in elderly patients: exercise (varying in character, duration, frequency and intensity); training (one or more of the following: endurance, flexibility, balance platform, Tai Chi, resistance training); behavioural interventions; medication changes; education; functional activity; or nutrition supplements. The exclusion of people who fell three times in two months narrows the scope to people at lower risk of falling.

**Oakley et al. 1995b (SSRU):** This study sought to review evidence of the effects of interventions aimed directly or indirectly at lessening the impact of, reducing or preventing accidents among people aged 55 and over. Accidents were not restricted to falls. Interventions aimed at preventing non-accidental injury were not included, nor were hormonal drug programmes aimed at maintaining bone density (an underlying factor of injury risk). Other exclusions were: workplace health promotion programmes for the "young elderly"; interventions which may be of general benefit to all age groups but which have not been evaluated with older people; evaluations of instruments such as fall assessment tools unassociated with the prevention of falls; experimental studies of equipment modification; and interventions aiming to improve the health of older people and/or aspects of their service use which did not measure outcomes relevant to accident prevention; and evaluations of the impact of different forms of institutional provision on older people's health.

**Effective Health Care Bulletin 1996:** This report sought to review evidence of the effects of interventions to prevent falls and subsequent injury in older people (aged 65 and over).

**Oakley et al. 1996a (Quality in Health Care):** This study sought to review evidence of the effects of interventions to prevent falls and subsequent injury in older people (aged 65 and over).

**Gillespie 1997a (Cochrane review):** This study sought to review evidence of the effects of interventions designed to minimise the effect of, or prevent exposure to, any putative risk factor for falling in elderly individuals living in the community, in institutional care or in hospital.

**Rivara 1997:** This article reviewed injury prevention strategies developed over the previous decade with the hope of increasing their dissemination and encouraging the participation of the medical community in injury control. The scope was not limited by types of injury or population.

### *Search strategies*

**Province 1995 (pre-planned meta-analysis):** As this was a prospective meta-analysis of seven RCTs, no searching was required.

**Oakley et al. 1995b (SSRU):** The following journals were handsearched for outcome evaluations for the period 1988-1991: Accident Analysis & Prevention; Age & Ageing; Disability and Rehabilitation: an international journal; Geriatrics; The Gerontologist; Journal of Gerontology; Journal of the American Geriatrics Society; Mount Sinai Journal of Medicine; Scandinavian Journal of Social Medicine; Topics in Geriatric Rehabilitation; Journal of American Medical Association; British Medical Journal; American Journal of Public Health. Bibliographic databases (Social Science Citation (BIDS), PsycLIT, EMBASE, UNCOVER, BIRD) were searched. Citations in published papers were sought and experts were contacted in the field. 24 relevant outcome evaluations were identified.

**Effective Health Care Bulletin 1996:** The above search was extended by searching previous reviews, AMED and the RCN database and welcoming contributions from peer reviewers. 31 RCTs were included in addition to the FICSIT studies.

**Oakley et al. 1996a (Quality in Health Care):** This report was based on the Effective Health Care Bulletin. 23 RCTs were included in addition to the FICSIT studies. Those trials of exercise interventions with outcomes of potential risk factors for falling (rather than falls or related injuries) were excluded.

**Gillespie 1997a (Cochrane Review):** Bibliographic databases searched were Medline, EMBASE, CINAHL, PsycLIT, Soc Sci Citation, Dissertation Abstracts, Index to UK theses, Current Contents and the Cochrane Collaboration Trials Register. Handsearching of relevant journals was undertaken and abstract books were accessed. Bibliographies of identified studies were searched and contact was made with known workers in the field. 126 reports were identified. 24 were reports with no comparison group (other than historical controls). These were excluded as were 39 reports of RCTs, of which 3 were methods papers only, and the remainder reported outcomes unrelated to falls, or intermediate and

surrogate outcomes such as balance, muscle strength, and range of movement. A study reporting artificially induced falls and two reporting accidents (of which some were falls) were also excluded. 17 RCTs were included in the review in addition to the FICSIT studies; 5 of these were published in 1996 or 1997 and therefore unavailable to previous reviewers.

**Rivara 1997:** No search strategy reported. 15 studies relevant to falls were referenced, 8 of which focused on the effects of care.

### *Quality criteria*

**Province 1995 (pre-planned meta-analysis):** 7 of the 8 FICSIT studies were RCTs and only these were included in the meta-analysis.

**Oakley et al. 1995b (SSRU):** Outcome evaluations were considered 'sound' and relied upon for conclusions about the effects of interventions if they (a) employed a control/comparison group which was equivalent to the intervention group in terms of socio-demographic characteristics and baseline outcome measures, (b) reported pre-intervention data for each group, (c) reported post-intervention data for each group, *and* (d) reported on all outcomes targeted (as stated in the aims of the study). Of the 24 relevant outcome evaluations identified, 9 were judged 'sound'.

**Effective Health Care Bulletin 1996:** Studies were included if they were RCTs. Greater weight was given to studies reporting incidence of falls or subsequent injury rather than relying on intermediate outcomes related to risk of falling such as balance, sway or flexibility. Three RCTs of exercise interventions relied on falls or related injury as outcome measures. 13 RCTs of exercise interventions relied on intermediate outcomes where modification of potential risk factors for falling was measured. Eight RCTs of home assessment and surveillance with outcomes of falls and fall related injury were included. One RCT was included of home assessment and surveillance where modification of potential risk factors for falling were measured. Six RCTs of other interventions to reduce the risk of falls, falls and injury from falls were included.

**Oakley et al. 1996a (Quality in Health Care):** As with the Effective Health Care Bulletin, studies were included if they were RCTs. Greater weight was given to studies reporting incidence of falls or subsequent injury rather than relying on intermediate outcomes related to risk of falling such as balance, sway or flexibility.

**Gillespie 1997a (Cochrane review):** RCTs were included, even where the method of allocation to treatment or control group was inadequately concealed. Each trial was graded for quality according to the extent to which:

- a) the assigned treatment was adequately concealed prior to allocation;
- b) the outcomes of patients who withdrew were described and included in the analysis;
- c) the outcome assessors were blinded to treatment status;
- d) the treatment and control group were comparable at entry;
- e) the subjects were blind to assignment status after allocation;
- f) the treatment providers were blind to assignment status;

- g) care programmes other than the trial options were identical;
- h) inclusion and exclusion criteria were clearly defined;
- j) outcome measures used were clearly defined;
- k) ascertainment of fall and other outcomes was reliable;
- l) duration of surveillance was clinically appropriate.

The individual studies were rated of moderate quality according to these criteria.

**Rivara 1997:** No quality criteria were reported, although designs of individual studies underpinning conclusions were sometimes reported.

### *Data extraction and synthesis of findings*

**Province 1995 (pre-planned meta-analysis):** Complex statistical analysis was employed to take into account the heterogeneity between populations and study designs; to allow the outcome to include all observed fall events for subjects; to allow variable lengths of follow-up for each subject; to use correctly the censoring information from lost-to-follow-up time periods; and to incorporate other base-line and time-dependent co-variates (such as allowing the risk to change when a new fall event occurs) in addition to the primary treatment effects of interest.

**Oakley et al. 1995b (SSRU):** Two reviewers with a background in qualitative social science independently assessed each study. Any disagreements were discussed and resolved with a third reviewer. A final element in the reviewing process consisted of judging effectiveness of the programme from the information provided in published papers, and bearing in mind the “quality” criteria for ‘sound’ studies. The findings were presented as a narrative review.

**Effective Health Care Bulletin 1996:** Papers were read and data extracted by two people.

**Oakley et al. 1996a (Quality in Health Care):** Refers to Effective Health Care Bulletin.

**Gillespie 1997a (Cochrane review):** Trials identified via the search strategy were assessed for inclusion by two reviewers using the selection criteria. For each included trial, quality assessment and data extraction was carried out by two reviewers using piloted tools. Reviewers were not blinded to author or source institution. Disagreement was resolved by consensus or third party adjudication. The outcomes from individual trials were analysed. Pooling of results from groups of trials of similar design was undertaken.

**Rivara et al. 1997:** No methods reported for data extraction. Findings presented as a narrative review.

### *Authors' conclusions and recommendation about effective services*

**Province 1995 (pre-planned meta-analysis):** The multi-faceted FICSIT interventions which included exercise for elderly adults reduced the risk of falls. None of the studies individually or collectively in any meta-analysis had an effect on injurious falls.

**Oakley et al. 1995b (SSRU):** A small number of interventions were identified where there is some evidence of effectiveness in preventing falls and their sequelae. However, the evidence is such that no intervention can be identified as effective beyond reasonable doubt. These interventions are: exercise; medical assessment and treatment of underlying conditions; assessment and modification of prescription drug use; and home safety checks with environmental modification. These are most likely to be effective in programmes aimed at older people with one or more risk factors for falls. There is also some evidence as to the effectiveness of vitamin D and calcium supplementation, and of hip protectors in reducing the risk of hip fracture following falls in frail institutionalised older people.

**Effective Health Care Bulletin 1996:** There is limited evidence for any single intervention, but some evidence to suggest that exercise, such as balance training, is effective in reducing the risk of falls in older people. Home visits and surveillance to assess and, where appropriate, modify environmental and personal risk factors can be effective in reducing falls. Soft hip protectors have been shown to dramatically reduce hip fractures in frail older people in residential care. High dose Vitamin D supplementation with or without calcium supplementation appears to be effective in reducing fractures.

The implications for health services are:

1. Balancing, low impact aerobic strengthening exercise for older people may reduce the rate of falls. Therefore, older people should be offered access to exercise classes or home exercise routines which include for example, balance training such as Tai Chi. Little is known about the best way to implement such programmes and encourage attendance in the UK and so these should be carefully monitored and evaluated.
2. Home visiting to identify and remedy environmental and personal risk of falling may reduce risk of falling. The type of safety changes could include removal of throw rugs and objects in pathways, and installation of improved night lights and bath non-skid mats. Visits could be carried out by health visitors, nurses, occupational therapists, or trained volunteers.
3. Introducing the use of hip pad protectors for high risk people in institutional care may significantly reduce injury due to falls. Their acceptability in various settings in the UK needs to be evaluated.

Given the limited research evidence, new programmes should, where possible, be developed as part of controlled evaluations.

**Oakley et al. 1996a (Quality in Health Care):** As reported in the Effective Health Care Bulletin, balancing, low impact aerobics, and muscle strengthening exercise may reduce the rate of falls in older people with reasonable levels of fitness... Home visiting to identify and remedy environmental and personal risks of falling may also reduce risk of falling... High dose vitamin D supplements with or without calcium seem to be effective in reducing risk of fracture... The use of hip protectors for people in institutional care who are at high risk of falling reduce the risk of injury due to falls...

**Gillespie 1997a (Cochrane review):** There is no evidence to show that exercise alone, health education alone or exercise and health education combined prevent falls other than, possibly, minor events such as stumbles.

Behavioural interventions targeting risk factors following environmental safety assessment (in the presence of a screening intervention) reduced the number of fallers, but not the number of falls resulting in injury.

There is conflicting evidence from trials of health screening followed by targeted interventions. In calcium replete post-menopausal women, there was no evidence of a protective effect of hormone replacement therapy against falling on at least one occasion during the study period. Neither of the two small hospital based trials of strategies to prevent falls showed evidence of benefit.

Health care purchasers and providers contemplating fall prevention programmes should consider health screening of at-risk elderly people, followed by interventions which are targeted at both intrinsic and environmental risk factors of individual patients. There is inadequate evidence for the effectiveness of single interventions such as exercise alone or health education classes for the prevention of falls.

**Rivara et al. 1997:** Only the conclusions about injury and falls are included here. Hormone replacement therapy during menopause has been associated with a 25 percent reduction in hip fractures... There are no data on the protective effect of oestrogen plus progesterone on hip fracture... Calcium and vitamin D supplements taken during later life to reverse hyperparathyroidism due to vitamin D and calcium deficiency can reduce the incidence of hip fracture... Use of other drugs, such as calcitonin, fluoride, and etidronate, to increase bone density is still experimental but deserves further exploration... Weight bearing exercise has been associated with a reduced risk of hip fracture... The risk of falling was reduced by 31 percent by a home visit of a nurse and a physical therapist to offer discontinuation of medicine, elimination or modification of hazards in the home, exercise programmes, gait training and behavioural modifications tailored to individual needs... Protective hip pads reduced risk of hip fracture by 66 per cent.

***Authors' conclusions and recommendation about research:***

**Province et al. 1995:** None of the studies individually or collectively in any meta-analysis had an effect on injurious falls... That question will have to await a much larger clinical trial specifically designed for that purpose, but the rationale for conducting such a trial is considerably bolstered by the demonstration of fall risk reduction from exercise treatment within FICSIT interventions.

**Oakley et al. 1995b (SSRU):** There is a major problem of injury among older pedestrians involved in traffic accidents, but no evaluations of interventions in this area were identified. However there are a number of interventions that may benefit the older, as well as the disabled person, including: traffic calming; pedestrian areas; pedestrian crossings designed to meet the needs of people with sticks, frames and wheel chairs; stippled paving stones at crossings to alert the visually impaired; well-designed signs and structures on the pavement/road side. More research is also needed on accidents involving older people as drivers of motor vehicles.

Many aspects of the social position of older people are relevant both to the kinds of interventions introduced to decrease adverse health outcomes and to the impact of these in "real life" situations. In particular, the prevalence of poverty among older people is a factor influencing the extent to which they live in poor physical environments without the resources to improve these, regardless of the "scientific" evidence yielded by well-designed randomised controlled trials of prevention interventions. The association between accidents and social- and housing- conditions needs to be investigated in a prospective community study designed to identify more accurately factors predicting falls.

Future systematic reviews of interventions for older people and accident preventions should be carried out, with the work being undertaken by any relevant review group within the Cochrane Collaboration.

The discussion addressed the need to pay attention to the potential ethical problems of involving older people in intervention research, and the costs of some proposed interventions which makes rigorous evaluation of potential benefits even more necessary.

In particular, there is a need for:

1. a comprehensive review of the literature to estimate the proportion of falls/fall injury attributable to different risk factors
2. identifying ways to use annual screening information for targeting older people at particular risk for accidents
3. evaluating the most promising interventions in the UK
4. evaluating environments modification interventions not part of multi-factorial interventions (such as personal risk assessment and physiotherapy)
5. evaluating systems for attracting help in the event of a fall
6. evaluating policies/protocols for assessment, treatment, care, rehabilitation and discharge following falls
7. evaluating the role of informal carers
8. evaluating the potential of dietary interventions
9. evaluating road-traffic related interventions
10. investigating the association between accidents and social conditions
11. undertaking more systematic reviews.

#### **Effective Health Care Bulletin 1996:**

Recommendations for research include:

1. a programme of work designed to identify risk factors for defined populations of older people which suffer the highest number of injurious falls
2. research to identify the most cost-effective exercise programmes for older people
3. research to assess the most cost-effective ways of reducing home environmental and personal risks of falling.
4. major trials to assess the cost-effectiveness of vitamin D/calcium supplementation in older people to reduce fracture risks
5. trials to examine the potential effect of shoes on falls
6. during the planning, evaluation and implementation of interventions, the perspectives of older people should be taken into account.

**Oakley et al. 1996a (Quality in Health Care):**

Research is needed:

1. to identify the most cost-effective exercise programmes
2. in the UK about home visiting to identify and remedy environmental and personal risk factors of falling
3. for major trials to assess the cost-effectiveness of vitamin D and calcium supplements
4. to assess the acceptability of hip pad protectors in non-institutional settings.

**Gillespie 1997a (Cochrane review):**

The individual trials reviewed differed considerably in detail of intervention, and in the health and social status of the participants. Outcome measures varied. The total number of falls in each group, or the number of falls per hundred or thousand participant years are outcomes of limited value as they take no account of multiple fallers, who may be the most important group. We recommend that outcomes should be monitored throughout the study using diaries or active registration. Outcomes recorded should include the number of individuals sustaining any fall, more than one fall, any fall resulting in injury, any fall resulting in medical care, and any fall resulting in fracture. Mean time to first fall, and the mean number of falls for each participant during the study period (with standard deviation) would also be useful.

More data are required to confirm whether strategies apparently effective in significantly reducing the numbers of individuals falling are also effective in reducing more serious sequelae of falls such as fractures. Apparently effective interventions may require re-evaluation in different health care systems. Before that is done, there is a need for a systematic review of exercise interventions in the elderly to establish their effectiveness for the various intermediate and surrogate outcomes such as balance, gait and muscle strength. The large number of identified but excluded studies reporting surrogate/intermediate outcomes, but not falls, was disappointing. The research community should work to maximise the collection of good data on clinically relevant outcomes.

Randomised controlled trials are required to evaluate the effectiveness of falls prevention programmes in institutions such as nursing homes and hospitals.

Finally, this review should be revised by December 1998.

**Rivara et al. 1997:**

Research gaps are mentioned (but not discussed) alongside brief statements about the effectiveness of some interventions:

1. There are no data on the protective effect of oestrogen plus progesterone on hip fracture, but the combination is probably at least as effective as oestrogen alone
2. Trial results of diuretics are conflicting
3. Use of other drugs such as calcitonin, fluoride and etidronate, to increase bone density deserves further evaluation.

## ***Appendix 2 Search strategies for identifying effectiveness reviews in health promotion on Medline, EMBASE, PsycLIT, ERIC, and the Social Science Citation Index***

Five electronic databases were searched: Medline (1966-1997); PsycLIT (1972-1997); ERIC (1992-1997); EMBASE (1980-1997) and the Social Science Citation Index (1981-1997). Search strategies for identifying effectiveness reviews were developed for each of the electronic databases. For Medline, the search strategy developed by the NHS Centre for Reviews and Dissemination (CRD) was adapted with free text terms with the aim to increase its specificity. This search strategy was then further adapted for use with each of the other electronic databases.

For Medline, EMBASE and PsycLIT search strategies were developed for the SPIRS operating system, WinSpirs for ERIC, and for the Social Science Citation Index the BIDS operating system.

Thesaurus terms are denoted in upper case; free text terms are denoted in lower case.

### **Medline**

#### *Type of Study terms*

- #1 META-ANALYSIS / all subheadings
- #2 META-ANALY\*
- #3 METAANAL\*
- #4 systematic\* near (review\* or overview\*)
- #5 META-ANALYSIS in PT
- #6 explode REVIEW-LITERATURE / all subheadings
- #7 REVIEW in PT
- #8 review\* in TI
- #9 REVIEW-LITERATURE in PT
- #10 overview\* near trial\*
- #11 CONSENSUS-DEVELOPMENT-CONFERENCE in PT
- #12 CASE-REPORT in TG
- #13 HISTORICAL-ARTICLE in PT
- #14 REVIEW-OF-REPORTED-CASES in PT
- #15 REVIEW-MULTICASE in PT
- #16 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11
- #17 #12 or #13 or #14 or #15
- #18 #16 not #17
- #19 ANIMAL in TG
- #20 HUMAN in TG
- #21 #19 not(#20 and #19)
- #22 #18 not #21

#### *Health Promotion Terms*

- #23 explode HEALTH-EDUCATION/ all subheadings
- #24 HEALTH-PROMOTION/ all subheadings
- #25 BEHAVIOR-THERAPY/ all subheadings
- #26 explode HEALTH-BEHAVIOR/ all subheadings
- #27 KNOWLEDGE-ATTITUDES-PRACTICE/ all subheadings
- #29 PRIMARY-PREVENTION/ all subheadings
- #30 PUBLIC-HEALTH/ all subheadings
- #31 PREVENTIVE-HEALTH-SERVICES/ all subheadings
- #32 PREVENTIVE-MEDICINE/ all subheadings
- #33 ATTITUDE-TO-HEALTH/ all subheadings

- #34 RISK-TAKING/ all subheadings
- #35 KNOWLEDGE- / all subheadings
- #36 ATTITUDE- / all subheadings
- #37 CULTURE- / all subheadings
- #38 CHOICE-BEHAVIOR/ all subheadings
- #39 PRIMARY-HEALTH-CARE/ all subheadings
- #40 PATIENT-ACCEPTANCE-OF-HEALTH-CARE/ all subheadings
- #41 HEALTH-SERVICES-ACCESSIBILITY/ all subheadings
- #42 #23 or #24 or #25 or #26 or #27 or #28 or #29 or #30 or #31 or #32 or #33 or #34 or #35 or #36 or #37 or #38 or #39 or #40 or #41 or #42

*Free text "content of study" terms*

- #43 (evidence\* or review\* or effect\* or success\* or impact\* or reduc\* or increas\* or recommend\*)
- #44 (program\* or intervention\* or education\* or prevent\* or services\* or approach\* or practice\* or screening\* or strateg\*)
- #45 (behavi\* near (chang\* or modif\*))
- #46 #44 or #45
- #47 #34 near #46
- #48 (evidence\* or review\*) near (effect\* or success\* or impact\* or reduc\* or increas\*)
- #49 #47 or #48

*Combining*

- #50 #22 and #42
- #51 #50 and #49**

**EMBASE**

*Type of study terms*

- #1 META-ANALYSIS/ all subheadings
- #2 meta-analy\*
- #3 metaanaly\*
- #4 (systematic\* near (review\* or overview\*))
- #5 REVIEW- / all subheadings
- #6 Review in EM
- #7 review in TI
- #8 overview\* near trial\*
- #9 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8
- #10 exp ANIMAL-/ all subheadings
- #11 ANIMAL in EM
- #12 #10 or #11
- #13 #9 not #12

*Health Promotion Terms*

- #14 explode HEALTH-EDUCATION / all subheadings
- #15 HEALTH-BEHAVIOR / all subheadings
- #16 HEALTH-PROGRAM / all subheadings
- #17 PRIMARY-PREVENTION / all subheadings
- #18 BEHAVIOR-THERAPY / all subheadings
- #19 BEHAVIOR-MODIFICATION / all subheadings
- #20 BEHAVIOR / all subheadings
- #21 SEXUAL-BEHAVIOR / all subheadings

- #22 ATTITUDE / all subheadings
- #23 LIFESTYLE / all subheadings
- #24 DECISION-MAKING / all subheadings
- #25 EDUCATION-PROGRAM / all subheadings
- #26 PREVENTIVE-HEALTH-SERVICE / all subheadings
- #27 PREVENTIVE-MEDICINE / all subheadings
- #28 RISK-MANAGEMENT / all subheadings
- #29 SEXUAL-EDUCATION/ all subheadings
- #30 #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21 or #22 or #23 or #24 or #25 or #26 or #27 or #28 or #29

*Free text "content of study" terms*

- #31 (evidence\* or review\* or effect\* or success\* or impact\* or reduc\* or increas\* or recommend\*)
- #32 (program\* or intervention\* or education\* or prevent\* or services\* or approach\* or practice\* or screening\* or strateg\*)
- #33 (behavi\* near (chang\* or modif\*))
- #34 #32 or #33
- #35 #31 near #34
- #36 (evidence\* or review\*) near (effect\* or success\* or impact\* or reduc\* or increas\*)
- #37 #34 or #36

*Combining*

- #38 #13 and #30
- #39 #38 and #37**

**PsycLIT**

*Type of study terms*

- #1 META-ANALYSIS in DE
- #2 LITERATURE-REVIEW in DE
- #3 review in TI
- #4 meta-analy\*
- #5 metaanaly\*
- #6 (systematic\* near (review\* or overview\*))
- #7 overview\* near trial\*
- #8 #1 or #2 or #3 or #4 or #5 or #6 or #7

*Health Promotion terms*

- #9 explode HEALTHEDUCATION in DE
- #10 KNOWLEDGE-LEVEL in DE
- #11 HEALTH-KNOWLEDGE in DE
- #12 HEALTH-PROMOTION in DE
- #13 PREVENTION- in DE
- #14 PREVENTIVE-MEDICINE in DE
- #15 RISK-MANAGEMENT in DE
- #16 RISK-PERCEPTION in DE
- #17 RISK-TAKING in DE
- #18 SEXUAL-RISK-TAKING in DE
- #19 HEALTH-BEHAVIOR in DE
- #20 HEALTH-ATTITUDES in DE
- #21 explode LIFESTYLE in DE

- #22 PHYSICAL-ILLNESS-ATTITUDES-TOWARD in DE
- #23 BEHAVIOR-MODIFICATION in DE
- #24 BEHAVIOR-CHANGE in DE
- #25 BEHAVIOR-THERAPY in DE
- #26 PROBLEM-SOLVING in DE
- #27 DECISION-MAKING in DE
- #28 CHOICE-BEHAVIOR in DE
- #29 EDUCATIONAL-PROGRAMS in DE
- #30 AIDS-PREVENTION in DE
- #31 SEX-EDUCATION in DE
- #32 #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21 or #22 or #23 or #24 or #25 or #26 or #27 or #28 or #29 or #30 or #31

*Free text "content of study" terms*

- #33 (evidence\* or review\* or effect\* or success\* or impact\* or reduc\* or increas\* or recommend\*)
- #34 (program\* or intervention\* or education\* or prevent\* or services\* or approach\* or practice\* or screening\* or strateg\*)
- #35 (behavi\* near (chang\* or modif\*))
- #36 #34 or #35
- #37 #33 near #36
- #38 (evidence\* or review\*) near (effect\* or success\* or impact\* or reduc\* or increas\*)
- #39 #36 or #38
- #40 (evidence\* or review\*) near (effect\* or success\* or impact\* or reduc\* or increas\*)
- #41 #37 or #40

*Combining*

- #42 #8 and #32
- #43 #42 and #40**

**ERIC**

*Type of study terms*

- #1 META-ANALYSIS in DE
- #2 meta-analy\*
- #3 metaanaly\*
- #4 systematic\* near (review\* or overview\*)
- #5 LITERATURE-REVIEWS" in DE
- #6 STATE-OF-THE-ART-REVIEWS" in DE
- #7 review\* in TI
- #8 overview\* near trial\*
- #9 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8
- #10 explode "ANIMALS"
- #11 #9 not #10

*Health Promotion Terms*

- #12 HEALTH-EDUCATION in DE
- #13 HEALTH-PROMOTION in DE
- #14 HEALTH-ACTIVITIES in DE
- #15 HEALTH-PROGRAMS in DE
- #16 HEALTH-MATERIALS in DE
- #17 BEHAVIOR- in DE
- #18 BEHAVIOR-CHANGE in DE
- #19 BEHAVIOR-MODIFICATION in DE

- #20 BEHAVIOR-THEORIES in DE
- #21 explode SOCIAL-BEHAVIOR in DE
- #22 BEHAVIOR-STANDARDS in DE
- #23 explode BEHAVIORAL-SCIENCE-RESEARCH in DE
- #24 BEHAVIOR-PATTERNS in DE
- #25 KNOWLEDGE-LEVEL in DE
- #26 ATTITUDES- In DE
- #27 ATTITUDE-CHANGE in DE
- #28 ATTITUDE-MEASURES in DE
- #29 BELIEFS- in DE
- #30 PREVENTIVE-MEDICINE in DE
- #31 explode PREVENTION
- #32 OUTCOMES-OF-EDUCATION in DE
- #33 RISK- in DE
- #34 AT-RISK-PERSONS in DE
- #35 #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21 or #22 or #23 or #24 or #25 or #26 or #27 or #28 or #29 or #30 or #31 or #32 or #33 or #34
- #36 SEX-EDUCATION in DE
- #37 #35 or #36

*Free text "content of study" terms*

- #38 evidence\* or review\* or effect\* or success\* or impact\* or redcuc\* or increas\* or recommend\*
- #39 program\* or intervention\* or education\* or prevent\* or service\* or appraoch\* or practice\* or screening\* or strateg\*
- #40 behavio\* near (chang\* or modif\*)
- #41 #39 or #40
- #42 #38 near #41
- #43 (evidence\* or review\*) near (effect\* or success\* or impact\* or reduc\* or increas\*)
- #44 #42 or #43
- #45 #44 in TI
- #46 #44 in AB
- #47 #45 or #46

*Combining*

- #48 #11 and #37
- #49 **#48 and #47**

**Social Science Citation Index (SSCI)**

*Type of Study Terms*

- #1 meta-analy\*
- #2 metaanaly\*
- #3 meta analy\*
- #4 overview\*
- #5 review\*
- #6 #1 or #2 or #3 or #4 or #5

*Health Promotion terms*

- #7 health education
- #8 health promotion
- #9 health behavi\*
- #10 behavi\* chang\*
- #11 behavi\* modif\*
- #12 risk taking
- #13 risk behavi\*
- #14 #7 or #8 or #9 or #10 or #11 or #12 or #13

*Free text "content of study" terms*

- #15 evidence\* or review\* or effect\* or success\* or impact\* or redcuc\* or increas\* or recommend\*
- #16 program\* or intervention\* or education\* or prevent\* or service\* or appraoch\* or practice\* or screening\* or strateg\*
- #17 behavio\* near (chang\* or modif\*)
- #18 #16 or #17
- #19 #15 near #18
- #20 (evidence\* or review\*) near (effect\* or success\* or impact\* or reduc\* or increas\*)
- #21 #18 or #20

*Combining*

- #22 #6 and #14
- #23 #22 and #21**

### Appendix 3 Coding strategy for effectiveness reviews in health promotion

	REVIEW_EFFECTS
Funding <i>if specified</i>	FUNDING_NOT_STATED FUNDING_[COUNTRY] OR FUNDING_[COUNTRY]_[FUNDER]
Source	SOURCE_CLIB_COCHRANE SOURCE_CONTACT SOURCE_EMBASE SOURCE_ERIC SOURCE_MEDLINE SOURCE_PSYCLIT SOURCE_SOCSCIENCE
Status of report	STATUS_FULL_REVIEW STATUS_PUBLISHED_ARTICLE_FULL_REPORT
Publication date	<75 76_80 81_85 86_90 91_95 >95
Year range	YEAR_[YEAR]_[YEAR]
Number of references cited	CITATIONS_X(Y) with X= number of citations in effectiveness section with Y= total number of citations as given in bibliography

The following coding aimed to indicate the extent to which the different stages of the review process were adhered to in the different reviews with the aim to assess the applicability of different reviews as a basis for decision-making. The choice of keywords was based on the criteria set out by Mulrow (1987) for a state-of-the-art review article.

#### 1. Was the specific purpose of the review stated?

AIMS\_NOT\_STATED  
AIMS\_STATED  
AIMS\_UNCLEAR

#### Rationale :

- C to give the reader a frame of reference for deciding whether to read further;
- C to help determine strategies to select information
- C to determine appropriate methods of information assessment (eg population, setting).

A well-conceived review always answers a question. This question should be made clear at the beginning of the review. It should be precisely formulated rather than broad of ill-defined. (Mulrow 1987)

2. *Were sources and methods of the citation search identified?*

SEARCH\_NOT\_STATED  
SEARCH\_UNCLEAR  
SEARCH\_STATED  
*If specified* SEARCH\_[YEAR\_YEAR]  
SEARCH\_DATABASES\_STATED  
SEARCH\_KEYWORDS\_STATED  
  
SEARCH\_CITATIONS  
SEARCH\_ELECTRONIC\_RECORDS  
SEARCH\_EXPERT\_CONSENSUS  
SEARCH\_JOURNALS\_STATED  
SEARCH\_PERSONAL\_SELECTION  
  
SEARCH\_PUBLISHED  
SEARCH\_UNPUBLISHED  
  
SEARCH\_LANGUAGE\_RESTRICTED  
SEARCH\_LANGUAGE\_UNRESTRICTED

Rationale:

to determine potential selection biases :

C whether reviewed material represented information available on a given subject;

C whether relevant material had been excluded.

(Mulrow 1987)

3. *Were explicit guidelines provided that determined the material included in and excluded from the review?*

INCLUSION\_CRITERIA\_NOT\_STATED  
INCLUSION\_CRITERIA\_UNCLEAR  
INCLUSION\_CRITERIA\_STATED  
*If specified* SCOPE\_DESIGN\_NOT\_DEFINED  
SCOPE\_DESIGN\_DESCRIPTIVE  
SCOPE\_DESIGN\_EXPERIMENTAL  
AND SCOPE\_DESIGN\_PROCESS\_EVALUATION  
SCOPE\_DESIGN\_OUTCOME\_EVALUATION  
AND SCOPE\_DESIGN\_RCT  
SCOPE\_DESIGN\_TRIAL  
SCOPE\_DESIGN\_EXPERIMENTAL\_OTHER  
SCOPE\_DESIGN\_SECONDARY\_RESEARCH  
AND SCOPE\_DESIGN\_REVIEW  
IDENTIFIED\_DESIGN\_...

Rationale:

to determine potential selection biases :

- C whether reviewed material represented information available on a given subject;
- C whether relevant material had been excluded.

(Mulrow 1987)

3. *Was data extraction performed in a systematic way?*

STANDARD\_DATA\_EXTRACTION

4. *Was a methodological validity assessment of material in the review performed?*

QUALITY\_ASSESSMENT\_STATED  
QUALITY\_ASSESSMENT\_UNCLEAR  
QUALITY\_ASSESSMENT\_NOT\_STATED

Rationale :

- C Systematic assessment of quality or validity determines, on the basis of a critical examination of the methods used to produce findings, what conclusions are justifiable.
- C Appraisal of research designs, implementations, and analyses is required. Failure to examine details of study design leave the quality of data included open to question.
- C To manage large quantities of data objectively and effectively, standardised methods of appraising information should be included (research designs, implementations, analyses). Standardised appraisal forms addressing these issues can be used to optimise uniform assessment of data. To avoid single-reviewer biases, data assessments may be consensus ranked by more than one reviewer. Experts from different areas, such as appropriate specialists, statisticians, and research methodologists can be used to help develop the standardised appraisal forms and to rank data.

(Mulrow 1987)

5. *Was the information systematically integrated with explication of data limitations and inconsistencies?*

Rationale :

- C Final synthesis should involve systematic rather than selective integration. Data regarded as scientifically unsound on the basis of the standardised appraisal should be discarded. Other data can sometimes be assigned a weight or relative value based on its quality as determined by the standardised appraisal.
- C Insights gained from careful explorations of divergent findings in scientifically valid data sets should be sought, and limitations of data sets identified.

(Mulrow 1987)

6. Was the information integrated and weighted or pooled metrically?

Rationale :

- C To provide a common unit of comparison; to identify average effects or average characteristics; to identify interactions; to identify small effects not readily detectable by individual small studies. These methods can be used to evaluate generalisability, consistency, interactions, and small effects that are not readily recognisable from individual studies.

(Mulrow 1987)

7. Was a summary of pertinent findings provided?

Rationale :

- C The conclusions should be succinct and logically ordered summarisations of data. If the appraisal and synthesis of data involves weighting of evidence according to some type of quality assessment, the conclusions too should reflect the relative weighting.

(Mulrow 1987)

INCLUDED\_STUDIES\_SUMMARISED  
INCLUDED\_STUDIES\_WEIGHTED  
INCLUDED\_NARRATIVE\_SYNTHESIS  
INCLUDED\_META-ANALYSIS\_X      with X = number of studies included

8. Were specific directives for new research initiatives proposed?

FUTURE\_DIRECTIVES\_STATED  
FUTURE\_DIRECTIVES\_UNCLEAR  
FUTURE\_DIRECTIVES\_NOT\_STATED

Rationale :

- C to identify the most promising areas for future research and discourage duplicative and wasteful efforts
- C Reviewers should capitalise on their intensive efforts by clearly identifying gaps in present knowledge and suggesting future initiatives. Unsolved issues and problems can be delineated, and appropriate methods for addressing these issues can be suggested. In this way, the reader finishes the review with a view of what is not known about the subject as well as what is known.

(Mulrow 1987)

Country      COUNTRY\_[COUNTRY]

Health focus      SCOPE\_FOCUS\_NOT\_DEFINED  
SCOPE\_FOCUS\_...

IDENTIFIED\_FOCUS\_ACCIDENTS  
IDENTIFIED\_FOCUS\_ALCOHOL

IDENTIFIED\_FOCUS\_ASTHMA  
 IDENTIFIED\_FOCUS\_SKIN\_CANCER (includes exposure to UV radiation/sun)  
 IDENTIFIED\_FOCUS\_CANCER  
 IDENTIFIED\_FOCUS\_CARDIOVASCULAR  
 IDENTIFIED\_FOCUS\_CHILD\_NEGLECT  
 IDENTIFIED\_FOCUS\_DELINQUENCY  
 IDENTIFIED\_FOCUS\_DIABETES  
 IDENTIFIED\_FOCUS\_DISABILITY  
 IDENTIFIED\_FOCUS\_DISEASE  
 IDENTIFIED\_FOCUS\_DRUGS  
 IDENTIFIED\_FOCUS\_EDUCATION\_SYSTEM  
 IDENTIFIED\_FOCUS\_EMOTIONAL\_ABUSE  
 IDENTIFIED\_FOCUS\_EPILEPSY  
 IDENTIFIED\_FOCUS\_EATING\_DISORDER  
 IDENTIFIED\_FOCUS\_HEALTHY\_EATING  
 IDENTIFIED\_FOCUS\_INEQUALITIES (includes health inequalities and social isolation)  
 IDENTIFIED\_FOCUS\_HYGIENE  
 IDENTIFIED\_FOCUS\_INJURY  
 IDENTIFIED\_FOCUS\_LEISURE  
 IDENTIFIED\_FOCUS\_MEDICAL\_CARE  
 IDENTIFIED\_FOCUS\_MENTAL\_HEALTH  
 IDENTIFIED\_FOCUS\_OBESITY  
 IDENTIFIED\_FOCUS\_ORAL\_HEALTH  
 IDENTIFIED\_FOCUS\_PARENTING  
 IDENTIFIED\_FOCUS\_PHYSICAL\_ABUSE  
 IDENTIFIED\_FOCUS\_PHYSICAL\_ACTIVITY  
 IDENTIFIED\_FOCUS\_PROBLEM\_BEHAVIOUR  
 IDENTIFIED\_FOCUS\_SEXUAL\_ABUSE  
 IDENTIFIED\_FOCUS\_STD (includes HIV/AIDS)  
 IDENTIFIED\_FOCUS\_PREGNANCY\_PREVENTION  
 IDENTIFIED\_FOCUS\_SEXUAL\_HEALTH  
 IDENTIFIED\_FOCUS\_SOLVENTS  
 IDENTIFIED\_FOCUS\_TOBACCO  
 IDENTIFIED\_FOCUS\_WORKPLACE  
  
 IDENTIFIED\_FOCUS\_OTHER

Population SCOPE\_POPULATION\_NOT\_DEFINED  
 SCOPE\_POPULATION\_...  
 IDENTIFIED\_POPULATION\_NOT\_STATED  
 IDENTIFIED\_POPULATION\_GENERAL\_POPULATION  
 IDENTIFIED\_POPULATION\_CHILDREN  
 IDENTIFIED\_POPULATION\_YOUNG\_PEOPLE  
 IDENTIFIED\_POPULATION\_ADULTS  
 IDENTIFIED\_POPULATION\_OLDER\_PEOPLE  
 IDENTIFIED\_POPULATION\_FEMALE  
  
 IDENTIFIED\_POPULATION\_MALE  
 IDENTIFIED\_POPULATION\_MIXED\_SEX  
 IDENTIFIED\_POPULATION\_HETEROSEXUAL  
 IDENTIFIED\_POPULATION\_HOMOSEXUAL  
 IDENTIFIED\_POPULATION\_BISEXUAL  
 IDENTIFIED\_POPULATION\_ETHNIC\_MINORITY  
 IDENTIFIED\_POPULATION\_BEREAVED



IDENTIFIED\_PROVIDER\_PSYCHOLOGIST  
IDENTIFIED\_PROVIDER\_RESEARCHER  
IDENTIFIED\_PROVIDER\_RESIDENTIAL\_WORKER  
IDENTIFIED\_PROVIDER\_SOCIAL\_WORKER  
IDENTIFIED\_PROVIDER\_TEACHER  
IDENTIFIED\_PROVIDER\_OTHER

Intervention type

SCOPE\_INTERVENION\_NOT\_DEFINED  
SCOPE\_INTERVENTION\_...  
IDENTIFIED\_INTERVENTION\_NOT\_STATED  
IDENTIFIED\_INTERVENTION\_ACTIVITY  
IDENTIFIED\_INTERVENTION\_ADVICE\_COUNSELLING  
IDENTIFIED\_INTERVENTION\_BIO-FEEDBACK  
IDENTIFIED\_INTERVENTION\_EDUCATION  
IDENTIFIED\_INTERVENTION\_ENVIRONMENTAL\_MODIFICATION  
IDENTIFIED\_INTERVENTION\_IMMUNISATION  
IDENTIFIED\_INTERVENTION\_INCENTIVES  
IDENTIFIED\_INTERVENTION\_REGULATION\_LEGISLATION  
IDENTIFIED\_INTERVENTION\_PARENT\_TRAINING  
IDENTIFIED\_INTERVENTION\_PROFESSIONAL\_TRAINING  
IDENTIFIED\_INTERVENTION\_REHABILITATION  
IDENTIFIED\_INTERVENTION\_RESOURCE\_ACCESS  
IDENTIFIED\_INTERVENTION\_RISK  
IDENTIFIED\_INTERVENTION\_SCREENING  
IDENTIFIED\_INTERVENTION\_SERVICE\_ACCESS  
IDENTIFIED\_INTERVENTION\_SKILL\_DEVELOPMENT  
IDENTIFIED\_INTERVENTION\_SOCIAL\_SUPPORT  
IDENTIFIED\_INTERVENTION\_TREATMENT  
IDENTIFIED\_INTERVENTION\_OTHER (includes e.g. community mobilisation,  
community development)

Type outcome

SCOPE\_OUTCOME\_NOT\_DEFINED  
SCOPE\_OUTCOME\_...  
IDENTIFIED\_OUTCOME\_NOT\_STATED  
IDENTIFIED\_OUTCOME\_RESOURCE\_ACCESS  
IDENTIFIED\_OUTCOME\_ATTITUDES  
IDENTIFIED\_OUTCOME\_AWARENESS\_BELIEFS  
IDENTIFIED\_OUTCOME\_BEHAVIOUR\_OBSERVED  
IDENTIFIED\_OUTCOME\_BEHAVIOUR\_REPORTED  
IDENTIFIED\_OUTCOME\_CLINICAL\_RISK\_FACTOR  
IDENTIFIED\_OUTCOME\_HEALTH\_PROBLEM\_STATE  
IDENTIFIED\_OUTCOME\_INTENTIONS  
IDENTIFIED\_OUTCOME\_KNOWLEDGE  
IDENTIFIED\_OUTCOME\_LEGISLATION\_REGULATION  
IDENTIFIED\_OUTCOME\_PRACTICAL\_SKILLS  
IDENTIFIED\_OUTCOME\_SELF-EFFICACY  
IDENTIFIED\_OUTCOME\_SERVICE\_USE  
IDENTIFIED\_OUTCOME\_OTHER

**Appendix 4 Search strategies for identifying outcome evaluation studies of sexual health promotion interventions on Medline, EMBASE, PsycLIT, ERIC, the Social Science Citation Index and the Cochrane Controlled Trials Register**

*Development of search strategies to identify outcome evaluations of sexual health promotion interventions*

In order to develop the search strategies a randomly selected subset of 46 “known” outcome evaluations taken from two systematic reviews of the effectiveness of sexual health interventions (Oakley et al. 1996; Peersman et al. 1996) was traced back on each of the five databases using an author/ and or title search. In order to ensure that this set included outcome evaluations employing different study designs the set was established by ordering the total number of 144 outcome evaluations according RCTs, trials and pre- and post-test design/post-test only. Every third outcome evaluation within these three groups was selected for tracing back on the databases. If they were found on a particular database, the keywords with which they were coded on that database were recorded (i.e. MeSH terms for Medline; Descriptors for PsycLIT, EMBASE and ERIC; and text words for the Social Science Citation Index) as illustrated in Figure 1. The outcome evaluation shown in Figure 1 was found on three of the five databases and the terms used to index the outcome evaluation on these three databases were recorded.

Figure 1: Example of how the keywords used to identify the outcome evaluations of sexual health interventions in the “known” set on the five electronic databases were recorded.

	Medline	EMBASE	PsycLIT	ERIC	Social Science Citation Index
Leviton LC, Valdiserri RO, Lyter DW, Callahan CM, Kingsley LA, Huggins J, Rinaldo CR (1990) Preventing HIV infection in gay and bisexual men: Experimental evaluation of attitude change from two risk reduction interventions. <u>AIDS Education and Prevention</u> 2: 95-108.	*Bisexuality-; *Homosexuality-; *HIV-Infections-prevention-and-control; *Knowledge,-Attitudes,-Practice; *Sex-Behavior; Homosexuality-psychology; Peer-Group; Risk-Factors; Social-Support; Adolescence-; Adult-; Aged-; Analysis-of-Variance; Middle-Age; Questionnaires-; Regression-Analysis	Not found	*Human-Immunodeficiency-virus-infection-prevention; *attitude-; *health education; *sexual-behavior; *risk-management; questionnaire-; bisexuality-; homosexuality-	*AIDS; *Behavior-Change; Homosexuality-; *males-; *Peer-Counselling; *Small-Group-Instruction; Comparative-Analysis; Control-Groups; Counsellors-; Disease-Control; Experimental-Groups	Not found

The recorded keywords were examined for each database in turn and a list of the most frequently used keywords to identify a particular outcome evaluations as a sexual health study as well as a prevention study was compiled. For example, the list of MeSH terms used in Medline to identify outcome evaluations as sexual health studies included “Pregnancy-in-Adolescence”; “Condoms-” and “HIV-Infections-prevention-and-control” and the list of MeSH terms most frequently used to identify the outcome evaluation as a prevention study included “Health-Promotion”; “Knowledge-Attitudes-Practice” and “Sex-Behaviour”. For all databases except the Social Science Citation Index these lists of keywords were further expanded by examining the keywords in the context of their location within each thesaurus. All related, broader and narrower keywords were added to the lists depending upon their relevancy. Relevancy was judged according to the added value which these terms would bring to the search. For example, the MeSH Heading “Contraception-” within Medline has numerous related, broader and narrower terms ie: “Contraception” was related to “Contraceptive Agents” and both of these terms had numerous narrower terms. Although examining the most frequently used MeSH terms to identify studies as sexual health suggested that “Contraception” (as a single search term) and “Contraception-Behaviour” were the most likely to be used, the possibility of losing relevant records by only using these terms was examined by exploding “Contraception” and “Contraceptive Agents” to determine if any studies would be missed out. An additional 342 records were retrieved, however only 2 records were relevant and no further outcome evaluations were identified.

Appropriate explosion and single search features were noted (e.g. “Primary-Prevention” in Medline was not exploded to exclude unrelated terms such as “Immunization-” whereas “Lifestyle-” in PsycLIT was exploded to include relevant terms). For Medline and EMBASE, sub-headings for a particular term were also chosen. For example, in Medline, for some of the sexual health keywords only MeSH terms without subheadings or those with the subheadings “prevention-and-control” and/or “psychology”, “ethnology”, “statistics and numerical data” “utilisation” were used. This not only made intuitive sense (these would be more likely to pick up records concerned with prevention rather than treatment) but also resonated with the most frequently used subheadings attached to sexual health keywords used in the identified outcome evaluations. In contrast, for all the prevention keywords and some of the sexual health keywords (e.g. the MeSH heading “Pregnancy-in-Adolescence”) all subheadings were applied to each keyword.

These two lists of keywords were then combined such that to be retrieved a report had to be keyworded with at least one of the chosen sexual health keywords AND at least one of the prevention keywords.

A further check on the adequacy of the chosen prevention terms for retrieving all relevant reports was undertaken for all databases except the Social Science Citation Index. The searches were implemented over short time periods on each database and the results examined. All records which had been retrieved by the sexual health keywords but were cut out once these terms were combined with the prevention terms, were examined. Although no further outcome evaluations were found, many other relevant citations were. Thus, to ensure that these would be picked up in the search the list of prevention keywords was expanded for these four databases. For example the MeSH terms such as “Risk-Taking”, “Primary-Health-Care” and “Patient-Acceptance-of-Health-Care” were included in the Medline search strategy. In this way citations which related more broadly to the effectiveness of sexual health interventions would be located.

### *The search strategies*

The final search strategies for locating outcome evaluations of sexual health interventions employed a whole range of sexual health and prevention terms. Such a wide range had to be used to ensure that the maximum number of available outcome evaluations were located. For example, for the search for Medline, within the sexual health MeSH terms, both “Acquired-immunodeficiency-syndrome-prevention-and-control” and “HIV-infections-prevention-and-control” had to be included to locate all outcome evaluations of HIV-prevention interventions. Within the prevention MeSH terms, a wide range of terms were required from very specific terms such as “Health-Education” and “Health-Promotion” to very general terms such as “Culture” and “Public-Health”.

### **Medline**

- #1 ACQUIRED-IMMUNODEFICIENCY-SYNDROME / prevention-and-control
- #2 HIV-INFECTIONS / prevention-and-control
- #3 explode SEXUALLY-TRANSMITTED-DISEASES / prevention-and-control
- #4 CONDOMS/ all subheadings
- #5 PREGNANCY-IN-ADOLESCENCE / all subheadings
- #6 PREGNANCY-UNWANTED / all subheadings
- #7 CONTRACEPTION/ without-subheadings , psychology , trends , utilization
- #8 CONTRACEPTION-BEHAVIOR / all subheadings
- #9 FAMILY-PLANNING/without-subheadings, education,methods, organization-and-administration, supply-and-distribution, standards , trends , utilization
- #10 ABORTION-INDUCED / without-subheadings, methods, psychology, standards, trends, utilization
- #11 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10
- #12 HEALTH-EDUCATION / all subheadings
- #13 PATIENT-EDUCATION/ all subheadings
- #13 HEALTH-PROMOTION / all subheadings
- #14 BEHAVIOR-THERAPY / all subheadings
- #15 explode HEALTH-BEHAVIOR / all subheadings
- #16 KNOWLEDGE-ATTITUDES-PRACTICE / all subheadings
- #17 ATTITUDE-TO-HEALTH / all subheadings
- #18 KNOWLEDGE / all subheadings
- #19 ATTITUDE / all subheadings
- #20 COGNITION / all subheadings
- #21 CULTURE/ all subheadings
- #22 SEX-BEHAVIOR / without-subheadings, psychology, statistics-and-numerical-data, ethnology
- #23 PRIMARY-PREVENTION / all subheadings
- #24 PUBLIC-HEALTH / all subheadings
- #25 PREVENTIVE-HEALTH-SERVICES / all subheadings
- #26 PREVENTIVE-MEDICINE / all subheadings
- #27 RISK-TAKING / all subheadings
- #28 CHOICE-BEHAVIOR / all subheadings
- #29 PRIMARY-HEALTH-CARE / all subheadings
- #30 PATIENT-ACCEPTANCE-OF-HEALTH-CARE / all subheadings
- #31 HEALTH-SERVICES-ACCESSIBILITY / all subheadings
- #32 #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21 or #22 or #23 or #24 or #25 or #26 or #27 or #28 or #29 or #30 or #31
- #33 #11 and #32
- #34 SEX-EDUCATION/ all subheadings
- #35 #33 or #34

## EMBASE

- #1 ACQUIRED-IMMUNE-DEFICIENCY-SYNDROME / without-subheadings, epidemiology , prevention
- #2 HUMAN-IMMUNODEFICIENCY-VIRUS / without-subheadings, epidemiology , prevention
- #3 HUMAN-IMMUNODEFICIENCY-VIRUS-INFECTION /without-subheadings epidemiology, prevention
- #4 explode SEXUALLY-TRANSMITTED-DISEASE / prevention
- #5 SEXUAL-INTERCOURSE / all subheadings
- #6 PREGNANCY / without-subheadings , prevention
- #7 ADOLESCENT-PREGNANCY / without-subheadings , prevention
- #8 FAMILY-PLANNING / all subheadings
- #9 BIRTH-CONTROL / without-subheadings
- #10 CONTRACEPTION / without-subheadings
- #11 CONDOM / all subheadings
- #12 ORAL-CONTRACEPTION / without-subheadings
- #13 HORMONAL-CONTRACEPTION / without-subheadings
- #14 INDUCED-ABORTION / all subheadings
- #15 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12 or #13 or #14
- #16 explode HEALTH-EDUCATION / all subheadings
- #17 HEALTH-BEHAVIOR / all subheadings
- #18 HEALTH-PROGRAM / all subheadings
- #19 PRIMARY-PREVENTION / all subheadings
- #20 BEHAVIOR-THERAPY / all subheadings
- #21 BEHAVIOR-MODIFICATION / all subheadings
- #22 BEHAVIOR / all subheadings
- #23 SEXUAL-BEHAVIOR / all subheadings
- #24 ATTITUDE / all subheadings
- #25 LIFESTYLE / all subheadings
- #26 DECISION-MAKING / all subheadings
- #27 EDUCATION-PROGRAM / all subheadings
- #28 PREVENTIVE-HEALTH-SERVICE / all subheadings
- #29 PREVENTIVE-MEDICINE / all subheadings
- #30 RISK-MANAGEMENT / all subheadings
- #31 EVALUATION-AND-FOLLOW-UP / all subheadings
- #32 #16 or #17 or #18 or #19 or #20 or #21 or #22 or #23 or #24 or #25 or #26 or #27 or #28 or #29 or #30 or #31
- #33 #32 and #15
- #34 SEXUAL-EDUCATION / all subheadings
- #35 #33 or #34

## PsycLIT

- #1 ACQUIRED-IMMUNE-DEFICIENCY-SYNDROME in DE
- #2 AIDS-ATTITUDES -TOWARD in DE
- #3 HUMAN-IMMUNODEFICIENCY-VIRUS in DE
- #4 VENEREAL-DISEASES in DE
- #5 PSYCHOSEXUAL-BEHAVIOR in DE
- #6 SEXUAL-ABSTINENCE in DE
- #7 SEXUAL-INTERCOURSE-HUMAN in DE
- #8 PREMARITAL-INTERCOURSE in DE
- #9 ADOLESCENT-PREGNANCY in DE
- #10 PREGNANCY-in DE
- #11 ADOLESCENT-FATHERS in DE
- #12 ADOLESCENT-MOTHERS in DE
- #13 UNWED-MOTHERS in DE
- #14 explode FAMILY-PLANNING in DE
- #15 FAMILY-PLANNING-ATTITUDES in DE

- #16 SEXUAL-ATTITUDES in DE
- #17 SEXUAL-RISK-TAKING in DE
- #18 INDUCED-ABORTION in DE
- #19 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18
- #20 explode HEALTH-EDUCATION in DE
- #21 KNOWLEDGE-LEVEL in DE
- #22 HEALTH-KNOWLEDGE in DE
- #23 HEALTH-PROMOTION in DE
- #24 PREVENTION-in DE
- #25 PREVENTIVE-MEDICINE in DE
- #26 RISK-MANAGEMENT in DE
- #27 RISK-PERCEPTION in DE
- #28 RISK-TAKING in DE
- #29 SEXUAL-RISK-TAKING in DE
- #30 HEALTH-BEHAVIOR in DE
- #31 HEALTH-ATTITUDES in DE
- #32 explode LIFESTYLE in DE
- #33 PHYSICAL-ILLNESS-ATTITUDES-TOWARD in DE
- #34 BEHAVIOR-MODIFICATION in DE
- #35 BEHAVIOR-CHANGE in DE
- #36 BEHAVIOR-THERAPY in DE
- #37 PROBLEM-SOLVING in DE
- #38 DECISION-MAKING in DE
- #39 CHOICE-BEHAVIOR in DE
- #40 EDUCATIONAL-PROGRAMS in DE
- #41 PROGRAM-EVALUATION in DE
- #42 #20 or #21 or #22 or #23 or #24 or #25 or #26 or #27 or #28 or #29 or #30 or #31 or #32 or #33 or #34 or #35 or #36 or #37 or #38 or #39 or #40 or #41
- #43 #20 and #43
- #44 AIDS-PREVENTION in DE
- #45 SEX-EDUCATION in DE
- #46 #44 or #45
- #47 #43 or #46

## **ERIC**

- #1 "SEXUALITY-" IN DE
- #2 "ACQUIRED-IMMUNE-DEFICIENCY-SYNDROME" IN DE
- #3 "PREGNANCY-" IN DE
- #4 "PREGNANT-STUDENTS" IN DE
- #5 "ABORTIONS-" IN DE
- #6 "FAMILY-PLANNING" IN DE
- #7 "CONTRACEPTION-" IN DE
- #8 "EARLY-PARENTHOOD" IN DE
- #9 "UNWED-MOTHERS" IN DE
- #10 "VENEREAL-DISEASES" IN DE
- #11 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10
- #12 "HEALTH-EDUCATION" IN DE
- #13 "HEALTH-PROMOTION" IN DE
- #14 "HEALTH-ACTIVITIES" IN DE
- #15 "HEALTH-PROGRAMS" IN DE
- #16 "HEALTH-MATERIALS" IN DE
- #17 "BEHAVIOR-" IN DE
- #18 "BEHAVIOR-CHANGE" IN DE

- #19 "BEHAVIOR-MODIFICATION" IN DE
- #20 "BEHAVIOR-THEORIES" IN DE
- #21 "SOCIAL-BEHAVIOR" IN DE
- #22 "BEHAVIOR-STANDARDS" IN DE
- #23 "BEHAVIORAL-SCIENCE-RESEARCH" IN DE
- #23 "BEHAVIOR-PATTERNS" IN DE
- #25 "KNOWLEDGE-LEVEL" IN DE
- #26 "ATTITUDES-" IN DE
- #27 "ATTITUDE-CHANGE" IN DE
- #28 "ATTITUDE-MEASURES" IN DE
- #29 "BELIEFS-" IN DE
- #30 "PREVENTIVE-MEDICINE" IN DE
- #31 "PREVENTION-" IN DE
- #32 "INTERVENTION-" IN DE
- #33 "EVALUATION-" IN DE
- #34 "EVALUATION-METHODS" IN DE
- #35 "OUTCOMES-OF-EDUCATION" IN DE
- #36 "RISK-" IN DE
- #37 "AT-RISK-PERSONS" IN DE
- #38 #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21 or #22 or #23 or #24 or #25 or #26 or #27 or #28 or #29 or #30 or #31 or #32 or #33 or #34 or #35 or #36 or #37
- #39 #38 and #11
- #44 "SEX-EDUCATION" IN DE
- #45 #43 or #44

### **the Social Science Citation Index**

- #1 HIV/AIDS
- #2 HIV
- #3 AIDS
- #4 Acquired immunodeficiency syndrome
- #5 Human immunodeficiency virus
- #6 Sexually transmitted disease\*
- #7 chlamydia
- #8 gonorrhea
- #9 syphilis
- #10 genital herpes
- #11 unwanted pregnancy
- #12 pregnancy prevention
- #13 adolescent pregnancy
- #14 teenage pregnancy
- #15 contraception
- #16 condom
- #17 family planning
- #18 sexual behavi\*
- #19 abortion
- #20 termination of pregnancy
- #21 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20
- #22 health education
- #23 health promotion
- #24 health behavi\*
- #25 behavi\* change

- #26 risk behavi\*
- #27 risk taking
- #28 education program
- #29 health program
- #30 intervention\*
- #31 evaluation\*
- #32 prevent\*
- #33 #22 or #23 or #24 or #25 or #26 or #27 or #28 or #29 or #30 or #31 or #32
- #34 knowledge
- #35 attitude
- #36 behavi\*
- #37 #34 and #35 and #36
- #38 #37 or #33
- #39 #21 and #38
- #40 sex\* education
- #41 #39 or #40

### **the Cochrane Controlled Trials Register**

#### *Terms for specific interventions*

- #1 "sex educatio\*"
- #2 "sexual educatio\*"
- #3 "HIV/AIDS educatio\*"
- #4 "AIDS educatio\*"
- #5 "HIV testing"
- #6 "HIV antibody testing"
- #7 "family planning"
- #8 condoms
- #9 condom
- #10 pregnancy near preventi\*
- #11 "pregnancy prevention"
- #12 AIDS near prevention
- #13 HIV near preventi\*
- #14 AIDS and knowledge
- #15 AIDS and attitud\*
- #16 AIDS near risk next reduc\*
- #17 HIV near risk near reduc\*
- #18 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17

#### *Terms for unwanted pregnancy*

- #19 abortion
- #20 "unwanted pregnancy"
- #21 #19 or #20

#### *Terms for sexual health*

- #22 adolescen\* near pregnan\*
- #23 bisexua\*
- #24 homosexua\*
- #25 prostitut\*
- #26 sexua\* near abstin\*
- #27 sex NEAR behavio\*

- #28 "sexual behavior\*"
- #29 #23 or #24 or #25 or #26 or #27 #28

*Terms for health promotion*

- #30 attitud\* near health
- #31 "health behavior\*"
- #32 knowledge AND attitud\* AND practice
- #33 knowledge AND attitud\* AND behavior\*
- #34 "behavior\* therapy"
- #35 "cogniti\* therapy"
- #36 counsel\*
- #37 "health educatio\*"
- #38 "public health"
- #39 "patient educatio\*"
- #40 "health promotio\*"
- #41 "preventi\* health servic\*"
- #42 "schoo\* health servic\*"
- #43 "preventi\* medicine"
- #44 "primary prevention"
- #45 prevention near progra\*
- #46 skil\* near develo\*
- #47 skil\* near building
- #48 "risk taking"
- #49 "risk behavior\*"
- #50 #30 or #31 or #32 or #33 or #34 or #35 or #36 or #37 or #38 or #39 or #40 or #41 or #42 or #43  
#44 or #45 or #47 or #48 or #49

*Terms for sexually transmitted diseases*

- #51 "sexually transmitted diseas\*"
- #52 chlamydi\* or gonorrhea or syphilis
- #53 herpes next genita\*
- #54 HIV or AIDS
- #55 "acquired immune deficiency syndrome"
- #56 "acquired immunodeficiency syndrome"
- #57 #51 or #52 or #53 or #54 or #55 or #56

*Combining searches*

- #58 #50 and #57 (health promotion and STDs)
- #59 #50 and #21 (health promotion and unwanted pregnancy)
- #60 #50 and #29 (health promotion and sexual health)
- #61 #58 or #59 or #60
- #62 #61 or #18 (sexual health promotion hits)

## Appendix 5 Increasing the specificity of the Medline sexual health search strategy

### Use of 'essential' MeSH terms to increase specificity

The choice of essential MeSH terms to include in the search was guided by undertaking a sensitivity analysis in relation to the proportion of the “gold standard” of outcome evaluations found when each MeSH heading was cut out of the search in turn. The “gold standard” consisted of the 72 outcome evaluations found by implementing the ‘original’ Medline sexual health search strategy developed in Chapter 5 (see Appendix 4) for Jan 1996 to September 1997. This provided a way of calculating the value of each MeSH term in the search. Separate analyses of sexual health MeSH terms and prevention MeSH terms was undertaken.

**Table 1** shows the total number of records found by each sexual health MeSH term in the Medline search strategy, the number of outcome evaluations found and the number of outcome evaluations which would *be missed* when a MeSH heading was *not* included in the search.

**Table 1** Number of outcome evaluations identified by sexual health MeSH terms and number lost if MeSH term is *not* used.

	Total nr records found	Nr OEs found	Nr OEs <i>not</i> identified		Total nr records found	Nr OEs found	Nr OEs <i>not</i> identified
ACQUIRED-IMMUNODEFICIENCY-SYNDROME / prevention-and-control	221	30	13	PREGNANCY-UNWANTED / all subheadings	22	0	0
HIV-INFECTIONS / prevention-and-control	388	38	10	CONTRACEPTION/ without-subheadings, psychology, trends, utilization	63	3	0
Explode SEXUALLY-TRANSMITTED-DISEASES / prevention-and-control	667	17	0	CONTRACEPTION-BEHAVIOR/ all subheadings	70	2	0
CONDOMS/ all subheadings	226	24	1	FAMILY-PLANNING/ without-subheadings, education, methods, organization-and-administration, supply-and-distribution, standards, trends, utilisation	92	1	0
PREGNANCY-IN-ADOLESCENCE / all subheadings	99	7	1	ABORTION-INDUCED/ without-subheadings, methods, psychology, standards, methods, utilisation	32	0	0

The results in **table 1** suggest that the MeSH terms “pregnancy-unwanted” and “abortion-induced” are not essential for the total number of outcome evaluations identified by Medline. Similarly when “sexually-transmitted-diseases-prevention-and-control”, “contraception-”, “contraception-behaviour” and “family-planning” are not used in the search no outcome evaluations are lost. Thus, the ‘original’ Medline search can be limited to the following essential sexual health terms:- “Acquired-Immunodeficiency-Syndrome-prevention-and-control”; “HIV-Infections-prevention-and-control”; “Condoms-all-subheadings” and “Pregnancy-in-Adolescence-all subheadings”.

**Table 2** shows the total number of records found by each prevention MeSH term in the Medline search strategy, the number of outcome evaluations found and the number of outcome evaluations which would be missed if a MeSH term was *not* included in the search.

**Table 2** Number of outcome evaluations (trials) identified by MeSH prevention terms and number lost if MeSH term is not used.

	Total nr records found	Nr OEs found	Nr OEs <i>not</i> identified		Total nr records found	Nr OEs found	Nr OEs <i>not</i> identified
HEALTH-EDUCATION / all subheadings	172	38	3	SEX-BEHAVIOUR / all subheadings	355	31	0
PATIENT-EDUCATION / all subheadings	59	6	0	PRIMARY-PREVENTION / all subheadings	10	2	1
HEALTH-PROMOTION / all subheadings	64	4	1	PUBLIC-HEALTH / all subheadings	43	0	0
BEHAVIOR-THERAPY / all subheadings	3	2	0	PREVENTIVE-HEALTH-SERVICES / all subheadings	22	3	0
explode HEALTH-BEHAVIOR / all subheadings	66	3	1	PREVENTIVE-MEDICINE / all subheadings	2	0	0
KNOWLEDGE-ATTITUDES-PRACTICE / all subheadings	339	39	1	RISK-TAKING / all subheadings	176	16	2
ATTITUDE-TO-HEALTH/ all subheadings	76	6	0	CHOICE-BEHAVIOR / all subheadings	10	0	0
KNOWLEDGE / all subheadings	2	0	0	PRIMARY-HEALTH-CARE / all subheadings	15	0	0
ATTITUDE / all subheadings	17	0	0	PATIENT-ACCEPTANCE-OF-HEALTH-CARE / all subheadings	31	0	0
COGNITION / all subheadings	5	0	0	HEALTH-SERVICES-ACCESSIBILITY / all subheadings	41	1	0
CULTURE / all subheadings	18	0	0	SEX-EDUCATION/ all subheadings	166	24	5

These results suggest that the MeSH terms “Patient-Education”, “Behavior-Therapy”, “Attitude-to-Health”, “Knowledge-”, “Attitude-”, “Cognition-”, “Culture-”, “Sex-Behavior”, “Public-health”, “Preventive-Health-Services”, “Preventive-Medicine”, “Choice-Behavior”, “Primary-Health-Care”, “Patient-Acceptance-of-Health-Care” and “Health-Services-Accessibility” are not essential for the total number of outcome evaluations found by the ‘original’ Medline search strategy. Thus, the ‘original’ Medline search can be limited to the following essential prevention terms: “health-education”, “health-promotion”, “health-behaviour”, “knowledge-attitudes-practice”, “primary-prevention”, “risk factors” and “sex-education”.

Using these results as a guideline to increase the specificity of the ‘original’ Medline search strategy, the essential sexual health MeSH terms and the essential prevention MeSH terms were combined in ‘search 1’:

### *Search 1*

- #1 ACQUIRED-IMMUNODEFICIENCY-SYNDROME / prevention-and-control
- #2 HIV-INFECTIONS / prevention-and-control
- #3 CONDOMS/ all subheadings
- #4 PREGNANCY-IN-ADOLESCENCE / all subheadings
- #5 #1 or #2 or #3 or #4
- #6 HEALTH-EDUCATION / all subheadings
- #7 HEALTH-PROMOTION / all subheadings
- #8 HEALTH-BEHAVIOR / all subheadings
- #9 KNOWLEDGE-ATTITUDES-PRACTICE / all subheadings
- #10 PRIMARY-PREVENTION / all subheadings
- #11 RISK-TAKING / all subheadings
- #12 #6 or #7 or #8 or #9 or #10 or #11
- #13 #5and #12
- #14 SEX-EDUCATION/ all subheadings
- #15 #13 or #14

A further limit on the prevention MeSH terms could be achieved by only using the above set of essential prevention MeSH terms which identify the greatest number of outcome evaluations. These MeSH terms would be “health-education” and “knowledge-attitudes-practice”. These prevention MeSH terms were combined with the essential sexual health MeSH terms in ‘search 2’:

### *Search 2*

- #1 ACQUIRED-IMMUNODEFICIENCY-SYNDROME / prevention-and-control
- #2 HIV-INFECTIONS / prevention-and-control
- #3 CONDOMS/ all subheadings
- #4 PREGNANCY-IN-ADOLESCENCE / all subheadings
- #5 #1 or #2 or #3 or #4
- #6 HEALTH-EDUCATION / all subheadings
- #7 KNOWLEDGE-ATTITUDES-PRACTICE / all subheadings
- #8 #6 or #7
- #9 #5and #8

### *Use of study design terms to increase specificity*

The study design MeSH terms were based on the Cochrane optimal search strategy for identifying RCTs (Dickersin et al. 1994) and terms used by Roe et al (1997) to identify outcome

evaluations of healthy eating interventions. These terms were combined using the “and” command with the ‘original’ Medline sexual health search strategy to create ‘search 3’:

### *Search 3*

- #1 Randomized-Controlled-Trial in PT
  - #2 Clinical-Trial in PT
  - #3 Comparative-Study in TG
  - #4 RANDOMIZED-CONTROLLED-TRIALS /all subheadings
  - #5 RANDOM-ALLOCATION / all subheadings
  - #6 explode CLINICAL-TRIALS / all subheadings
  - #7 RESEARCH-DESIGN / all subheadings
  - #8 explode EVALUATION-STUDIES / all subheadings
  - #9 FOLLOW-UP-STUDIES / all subheadings
  - #10 PROSPECTIVE-STUDIES / all subheadings
- (all above reproduced from the Cochrane optimal search as presented in Dickersin et al. (1995))*
- #12 explode OUTCOME-and-PROCESS-ASSESSMENT-HEALTH-CARE / all subheadings
  - #13 INTERVENTION-STUDIES/ all subheadings
  - #14 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12 or #13
  - #15 #14 AND ‘Medline sexual health search strategy A’

**Appendix 6 Search strategies for identifying health promotion studies in the workplace on Medline, EMBASE, PsycLIT, ERIC and the Social Science Citation Index**

*Development of search strategies*

In order to develop highly sensitive search strategies, previous ‘simple search strategies’ for identifying outcome evaluations of health promotion interventions in the workplace on four electronic databases (Medline, EMBASE, PsycLIT and the Social Sciences Citation Index) were examined with the aim of increasing their sensitivity. These search strategies were previously used to locate studies for a systematic review of the effectiveness of health promotion interventions in the workplace (Peersman et al. 1997). Altogether 139 outcome evaluations were found. The search strategies found 96 (69%) of the total number of outcome evaluations. The 43 reports of outcome evaluations which were not found by the electronic search strategies were traced back on each of the five databases using an author/ and or title search. If they were found on a particular database, the keywords with which they were coded on that database were recorded (i.e. MeSH terms for Medline; Descriptors for PsycLIT, EMBASE and ERIC; and text words for the Social Science Citation Index). One example is shown in **Table 1**. This study was found in two of the five databases only, but the keywording was different in each case.

**Table 1** Example of how the keywords used to identify the outcome evaluations of health promotion interventions in the workplace on the five electronic databases were recorded.

	Medline	EMBASE	PsycLIT	ERIC	Social Science Citation Index
Friesen CA, & Hoerr SL. (1990). Nutrition education strategies for work-site wellness: Evaluation of a graduate course targeted to work-site wellness majors. <u>Journal of the American Dietetic Association</u> 90(6), 854-856.	*Education,- Graduate; *Health-Education; *Nutrition-Education; *Occupational-Health-Services; Chi-Square Distribution	Not found	nutrition; public health;	Not found	Not found

In this way, reasons why the searches did not pick up outcome evaluations could be explored and a more sensitive search strategy developed. Of the 43 outcome evaluations not found by the ‘simple search strategies’, 25 were found on Medline, 10 were found on PsycLIT, 16 were found on EMBASE, 15 were found on the Social Science Citation Index, and 1 was found on ERIC. **Table 2** shows the proportion of outcome evaluations according to the reason why they were not found by the search strategies. These reasons were categorized into 4 areas. The range of keywords used in the simple search strategies to retrieve studies relevant to health promotion was often inadequate for the broad range of keywords actually applied within the databases. For example, for Medline the MeSH term ‘Behavior-Therapy’ and for EMBASE the descriptors ‘Health-Program’ and ‘Education-Program’ were often used to describe reports of outcome evaluations as a health promotion study. A similar problem occurred for the range of keywords to retrieve studies in a workplace setting. For example, for Medline the MeSH terms ‘Occupational-

Health-Services' and 'Occupational-Medicine' and for PsycLIT the descriptors 'Employee-Assistance-Programs' were often used to keyword reports as set in the workplace. None of the simple search strategies used free-text workplace setting terms and as **table 2** shows, there were several reports which could only be identified as set in the workplace if a free text term was used in the search. Finally, the simple search strategies did not use specific disease terms to retrieve reports. As **table 2** shows some reports were often not keyworded with a general health promotion term but only with the specific disease or health promotion/state the report described (e.g. for Medline the MeSH terms 'Smoking-prevention-and-control' and 'Physical-Fitness').

**Table 2** Reasons why outcome evaluations were not found by simple search strategies implemented on Medline, EMBASE, PsycLIT, ERIC and the Social Science Citation Index.

	Nr of outcome evaluations not found	Number (%) of outcome evaluations not found			
		Inadequate use of health promotion keywords	Inadequate use of workplace keywords	Non-use of free-text workplace terms	Inadequate use of specific disease keywords
Total	43*				
Medline	25**	4 (16)	20 (80)	4 (16)	7 (28)
EMBASE	16	2 (13)	5 (31)	9 (56)	7 (44)
PsycLIT	10	2 (20)	3 (30)	6 (60)	6 (60)
ERIC	1	1 (100)	0 (0)	0 (0)	0 (0)
Social Science Citation Index***	15	3 (20)	0 (0)	14 (93)	10 (67)

\* Numbers do not add up due to overlap between databases

\*\* Numbers do not add up as one outcome evaluation can appear in more than one category

\*\*\* Reasons for the Social Science Citation Index refer to free-text terms only

Using the four reasons for not locating a study as a guide, more detailed search strategies were developed for Medline, EMBASE, PsycLIT and the Social Science Citation Index. For example, on Medline the MeSH term 'Behavior-Therapy' was used as an additional keyword to identify studies as health promotion, four additional MeSH terms were used to identify studies set in the workplace (e.g. 'Occupational-Health-Services'), free-text terms such as 'workplace', 'worksite' and 'employee' were added to the search and a range of disease-specific and health problem-specific MeSH terms were added to the search (e.g. 'Cardiovascular-Diseases-prevention-and-control', 'Cholesterol-blood', 'Smoking-prevention-and-control'). Keywords were combined within the search such that health promotion terms or disease/health problem-specific terms were combined using the AND command with workplace setting MeSH terms and free-text workplace setting terms. The search strategy for ERIC was not developed any further since it contributed only a small proportion of studies to the set of outcome evaluations in the update of the systematic review of the effectiveness of health promotion interventions in the workplace (Peersman et al. 1997).

## *The search strategies*

### **Medline**

#### ***Simple Search***

- #1 explode HEALTH-BEHAVIOR/ all subheadings
- #2 explode HEALTH-EDUCATION/ all subheadings
- #3 HEALTH-PROMOTION/ all subheadings
- #4 explode PRIMARY-PREVENTION/ all subheadings
- #5 #1 or #2 or #3 or #4
- #6 explode WORK/ all subheadings
- #7 WORKPLACE/ all subheadings
- #8 #6 or #7
- #9 #5 and #8

#### ***Detailed Search***

- #1 explode HEALTH-BEHAVIOR/ all subheadings
- #2 explode HEALTH-EDUCATION/ all subheadings
- #3 HEALTH-PROMOTION/ all subheadings
- #4 PRIMARY-PREVENTION/ all subheadings
- #5 explode BEHAVIOR-THERAPY/ all subheadings
- #6 ALCOHOL-DRINKING/ without-subheadings, prevention-and-control, psychology
- #7 ALCOHOLISM/ prevention-and-control
- #8 SEAT-BELTS/ without-subheadings
- #9 ACCIDENT-PREVENTION/ all subheadings
- #10 ACCIDENTS-OCCUPATIONAL/ prevention-and-control, psychology
- #11 LUNG-NEOPLASMS/ prevention-and-control, psychology
- #12 explode BREAST-NEOPLASMS/ prevention-and-control, psychology
- #13 explode DIGESTIVE-SYSTEM-NEOPLASMS/ prevention-and-control, psychology
- #14 CARDIOVASCULAR-DISEASES/ prevention-and-control, psychology
- #15 explode DIET-THERAPY/ without-subheadings, psychology
- #16 NUTRITION/ education
- #17 HYPERCHOLESTEROLEMIA/ prevention-and-control, psychology
- #22 SOCIAL-SUPPORT/ all subheadings
- #23 explode STRESS-PSYCHOLOGICAL / without-subheadings, prevention-and-control, psychology, therapy
- #24 PHYSICAL-FITNESS/ without-subheadings, psychology
- #25 EXERCISE/ without-subheadings, psychology
- #26 SMOKING/ prevention-and-control, psychology, therapy
- #27 TOBACCO-USE-DISORDER/ prevention-and-control, therapy
- #28 OBESITY/ prevention-and-control, psychology, therapy
- #29 WEIGHT-LOSS/ without-subheadings
- #30 HYPERTENSION/ prevention-and-control, psychology
- #31 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21 or #22 or #23 or #24 or #25 or #26 or #27 or #28 or #29 or #30
- #32 explode WORK/ all subheadings
- #33 WORKPLACE/ all subheadings
- #34 OCCUPATIONAL-HEALTH / without-subheadings
- #35 explode OCCUPATIONAL-DISEASES/ prevention-and-control, psychology, therapy
- #36 OCCUPATIONAL-HEALTH-SERVICES/ without-subheadings, organization-and-administration, standards

- #37 OCCUPATIONAL-MEDICINE/ without-subheadings
- #38 WORK-PLACE
- #39 WORK-PLACES
- #40 WORK-SITE
- #41 WORK-SITE-BASED
- #42 WORK-SITES
- #43 WORKPLACE
- #44 WORKPLACE-
- #45 WORKPLACES
- #46 WORKSETTING
- #47 WORKSITE
- #48 WORKSITE-BASED
- #49 WORKSITES
- #50 EMPLOYEES
- #51 #32 or #33 or #34 or #35 or #36 or #37 or #38 or #39 or #40 or #41 or #42 or #43 or #44 or #45 or #46 or #47 or #48 or #49 or #50
  
- #52 #31 and #51

## **EMBASE**

### ***Simple Search***

- #1 exp HEALTH-EDUCATION/ all subheadings
- #2 HEALTH-PROMOTION/ all subheadings
- #3 exp HEALTH-BEHAVIOR/ all subheadings
- #4 PRIMARY-PREVENTION/ all subheadings
- #5 #1 or #2 or #3 or #4
- #6 exp WORK/ all subheadings
- #7 #5 and #6

### ***Detailed Search***

- #1 exp HEALTH-EDUCATION/ all subheadings
- #2 HEALTH-PROMOTION/ all subheadings
- #3 exp HEALTH-BEHAVIOR/ all subheadings
- #4 PRIMARY-PREVENTION/ all subheadings
- #5 EDUCATION-PROGRAM/ all subheadings
- #6 RISK-FACTOR/ all subheadings
- #7 BEHAVIOR-THERAPY/ all subheadings
- #8 PREVENTIVE-HEALTH-SERVICE/ all subheadings
- #9 HEALTH-PROGRAM/ all subheadings
- #10 OBESITY- /all subheadings
- #11 BODY-WEIGHT/ all subheadings
- #12 WEIGHT-REDUCTION/ all subheadings
- #13 HYPERTENSION-/ all subheadings
- #14 NUTRITION/ all subheadings
- #15 DIET-/ all subheadings
- #16 DIETARY-INTAKE/ all subheadings
- #17 FEEDING-BEHAVIOR/ all subheadings
- #18 EATING-HABIT/ all subheadings
- #19 FOOD-PREFERENCE/ all subheadings
- #20 NUTRITIONAL-HEALTH/ all subheadings
- #21 NUTRITIONAL-STATUS/ all subheadings

- #22 NUTRITIONAL-VALUE/ all subheadings
- #23 EATING-/ all subheadings
- #24 CHOLESTEROL-BLOOD-LEVEL/ all subheadings
- #25 STRESS-/ all subheadings
- #26 EMOTIONAL-STRESS/ all subheadings
- #27 MENTAL-STRESS/ all subheadings
- #28 ISCHEMIC-HEART-DISEASE/ all subheadings
- #29 LUNG-CANCER/ all subheadings
- #30 EXERCISE-/ all subheadings
- #31 FITNESS-/ all subheadings
- #32 CARDIOVASCULAR-DISEASE/ all subheadings
- #33 BREAST-CANCER/ all subheadings
- #34 CANCER-SCREENING/ all subheadings
- #35 NECK-PAIN/ all subheadings
- #36 HYPERCHOLESTEROLEMIA-/ all subheadings
- #37 SOCIAL-SUPPORT/ all subheadings
- #38 ACCIDENT-PREVENTION/ all subheadings
- #39 CANCER-PREVENTION/ all subheadings
- #40 HEART-INFARCTION-PREVENTION/ all subheadings
- #41 CIGARETTE-SMOKING/ all subheadings
- #42 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16  
or #17 or #18 or #19 or #20 or #21 or #22 or #23 or #24 or #25 or #26 or #27 or #28 or #30 or #31  
or #32 or #33 or #34 or #35 or #36 or #37 or #38 or #39 or #40 or #41
  
- #43 WORK/ all subheadings
- #44 WORK ENVIRONMENT/ all subheadings
- #45 ABSENTEEISM/ all subheadings
- #46 BURNOUT/ all subheadings
- #47 WORK-CAPACITY/ all subheadings
- #48 WORK-SCHEDULE/ all subheadings
- #49 WORKLOAD/ all subheadings
- #50 WORKPLACE/ all subheadings
- #51 EMPLOYEE/ all subheadings
- #52 WORKER/ all subheadings
- #53 OCCUPATIONAL-HEALTH/ all subheadings
- #54 OCCUPATIONAL-HEALTH-SERVICE/ all subheadings
- #55 OCCUPATIONAL-MEDICINE/ all subheadings
- #56 employee.tw.
- #57 employees.tw.
- #58 workplace.tw.
- #59 workplaces.tw.
- #60 work-place.tw.
- #61 work-places.tw.
- #62 work place.tw.
- #63 worksite.tw.
- #64 worksites.tw.
- #65 work-site.tw.
- #66 work-sites.tw.
- #67 #43 or #44 or #45 or #46 or #47 or #48 or #49 or #50 or #51 or #52 or #53 or #54 or #55 or #56 or  
#57 or #58 or #59 or #60 or #61 or #62 or #63 or #64 or #65 or #66
  
- #68 #42 and #67

## **PsycLIT**

### ***Simple Search***

- #1 HEALTH-BEHAVIOR in DE
- #2 HEALTH-CARE-PSYCHOLOGY in DE
- #3 explode HEALTH-CARE-PSYCHOLOGY in DE
- #4 explode HEALTH-EDUCATION in DE
- #5 ACCIDENT-PREVENTION in DE
- #6 AIDS-PREVENTION in DE
- #7 DRUG-ABUSE-PREVENTION in DE
- #8 PREVENTIVE-MEDICINE in DE
- #9 PRIMARY-MENTAL-HEALTH-PREVENTION in DE
- #10 RELAPSE-PREVENTION in DE
- #11 explode HEALTH-SCREENING in DE
- #12 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11
  
- #13 WORK-PLACE
- #14 WORK-PLACES
- #15 WORK-SITE
- #16 WORK-SITE-LEVEL
- #17 WORK-SITES
- #18 WORKPACE
- #19 WORKPLACE
- #20 WORKPLACE-BASED
- #21 WORKPLACE-RELATED
- #22 WORKPLACES
- #23 WORKSITE
- #24 WORKSITE-BASED
- #25 WORKSITE-WIDE
- #26 WORKSITES
- #27 #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21 or #22 or #23 or #24 or #25 or #26
  
- #28 #12 and #27

### ***Detailed Search***

- #1 HEALTH-BEHAVIOR in DE
- #2 HEALTH-CARE-PSYCHOLOGY in DE
- #3 explode HEALTH-CARE-PSYCHOLOGY in DE
- #4 explode HEALTH-EDUCATION in DE
- #5 ACCIDENT-PREVENTION in DE
- #6 AIDS-PREVENTION in DE
- #7 DRUG-ABUSE-PREVENTION in DE
- #8 PREVENTION-MEDICINE in DE
- #9 PRIMARY-MENTAL-HEALTH-PREVENTION in DE
- #10 RELAPSE-PREVENTION in DE
- #11 CANCER-SCREENING in DE
- #12 HIV-TESTING in DE
- #13 PHYSICAL-EXAMINATION in DE
- #14 explode HEALTH-SCREENING in DE
- #15 BEHAVIOR-THERAPY in DE
- #16 DIETS- in DE

- #17 EATING- in DE
- #18 FOOD-INTAKE in DE
- #19 NUTRITION in DE
- #20 WEIGHT-CONTROL in DE
- #21 OBESITY- in DE
- #22 FOOD-PREFERENCES in DE
- #23 FOOD- in DE
- #24 EATING-ATTITUDES in DE
- #25 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21 or #22 or #23 or #24
- #26 EMPLOYEE-ASSISTANCE-PROGRAMS in DE
- #27 explode PERSONNEL in DE
- #28 WORK-PLACE
- #29 WORK-PLACES
- #30 WORK-SITE
- #31 WORK-SITE-LEVEL
- #32 WORK-SITES
- #33 WORKPACE
- #34 WORKPLACE
- #35 WORKPLACE-BASED
- #36 WORKPLACE-RELATED
- #37 WORKPLACES
- #38 WORKSITE
- #39 WORKSITE-BASED
- #40 WORKSITE-WIDE
- #41 WORKSITES
- #42 EMPLOYEE
- #43 EMPLOYEES
- #44 #26 or #27 or #28 or #29 or #30 or #31 or #32 or #33 or #34 or #35 or #36 or #37 or #38 or #39 or #40 or #41 or #42 or #43
- #45 #25 and #44

## **The Social Science Citation Index**

### ***Simple Search***

- #1 Health Promotion
- #2 Health Education
- #3 Health Behavior\*
- #4 Health Behaviour\*
- #5 Prevention
- #6 #1 or #2 or #3 or #4 or #5
- #7 Work-site\*
- #8 Work-place\*
- #9 Workplace\*
- #10 Worksite\*
- #11 #7 or #8 or #9 or #10
- #12 #6 and #11

***Detailed Search***

- #1 Health Promotion
- #2 Health Education
- #3 Health Behavior\*
- #4 Health Behaviour\*
- #5 Prevention
- #6 Nutrition\*
- #7 Diet\*
- #8 Food
- #9 Fat\*
- #10 Eating
- #11 Cholesterol\*
- #12 Cardiovascular
- #13 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12
  
- #14 workplace\*
- #15 work place
- #16 worksite\*
- #17 work site
- #18 employee\*
- #19 #14 or #15 or #16 or #17 or #18
  
- #20 #13 and #19

**Appendix 7 Development and results of search strategies for identifying health promotion interventions aiming to encourage healthy eating in the workplace**

Several search techniques were undertaken to form an overall search strategy to identify relevant outcome evaluations. Firstly the ‘detailed searches’ described in Appendix 6 were implemented on four electronic databases (Medline; EMBASE; PsycLIT and the Social Science Citation Index). They were then modified such that the disease-specific or health problem terms were restricted to only those relevant to healthy eating. For example, on Medline the specific disease/health problem MeSH terms were limited to “Cardiovascular-Diseases”, “Digestive-System-Neoplasms”, “Hypercholesterolemia”, “Nutrition-”, “Diet-Therapy”, “Cholesterol-blood”, “Feeding-Behavior”, “Dietary-Fats” and “Cholesterol-Dietary”. Searching was also undertaken on two other electronic databases: CABHealth and the Cochrane Controlled Trials Register (CCTR). In addition, bibliographies of relevant systematic reviews and identified outcome evaluations were scanned.

A total of 52 separate outcome evaluations were found. A breakdown of the number of outcome evaluations found by each part of the strategy is shown in **Table 1**.

**Table 1** Number of outcome evaluations (trials) found by the overall search strategy

	Nr of outcome evaluations	Nr of trials
<b>Detailed Search</b>	<b>48</b>	<b>27</b>
Medline	33	17
EMBASE	36	20
PsycLIT	15	9
Social Science Citation Index	12	9
<b>Other</b> (CABHealth, CCTR, Reference)	<b>4</b>	<b>4</b>
<b>Total</b>	<b>52</b>	<b>31</b>

The number found by the detailed search strategies on Medline, EMBASE, PsycLIT and the Social Science Citation Index was 48 and a further 4 outcome evaluations were uniquely found by other sources (CCTR, CABHealth, referenced in other reports).

***Appendix 8 The 52 reports of outcome evaluations of workplace health promotion interventions to encourage healthy eating***

The 52 outcome evaluations were reported in the following 59 reports. Five outcome evaluations were reported in more than one report and one report described two outcome evaluations. These cases are cross-referenced in the list.

Aldana, S.G., Jacobson, B.H., Kelley, P.L. & Quirk, M. (1994) The Effectiveness of a Mobile Worksite Health Promotion Program in Lowering Employee Health Risk. American Journal of Health Promotion, 8, 254-256.

<<EPIC 3090>>

Angotti, C.M., Levine, M.S. (1994) Review of 5 years of a combined dietary and physical fitness intervention for control of serum cholesterol. Perspectives in Practice, 94, 634-638.

<<EPIC 3175>>

Baer, J.T. (1993) Improved plasma cholesterol levels in men after a nutrition education program at the worksite. Journal of the American Dietetic Association, 93, 658-663.

<<EPIC 3176>>

Baier, C.A., Grodzin, C.J., Port, J.D., Leksas, L. & Tancredi, D.J. (1992) Coronary risk factor behavior change in hospital personnel following a screening program. American Journal of Preventive Medicine, 8, 115-122.

<<EPIC 3177>>

Barnard, R.J. & Anthony, D.F. (1980) Effect of health maintenance programs on Los Angeles City firefighters. Journal of Occupational Medicine, 22, 667-669.

<<EPIC 3205>>

Barratt, A., Reznik, R., Irwig, L., Cuff, A., Simpson, J.A. & Oldenburg, B. (1994) Work-Site Cholesterol Screening and Dietary Intervention: The Staff Healthy Heart Project. American Journal of Public Health, 84, 779-782.

<<EPIC 3098 >>

Bertera, R.L. (1993) Behavioral risk factor and illness day changes with workplace health promotion: two year results. American Journal of Health Promotion, 7, 365-373.

<<EPIC 3178>>

Bjurstrom, L.A. & Alexiou, N.G. (1978) A program of heart disease intervention for public employees. A five year report. Journal of Occupational Medicine, 20, 521-531.

<<EPIC 3179>>

Blanke, K., Stanek, K. & Stacy, R.D. (1990) Comparison of the success of nutrition education to lower dietary cholesterol and fat with and without spouse support for individuals with elevated blood

cholesterol. Health Values, 14, 33-37.

<<EPIC 3180>>

Briley, M.E., Montgomery, D.H. & Blewett, J. (1992) Worksite nutrition education can lower total cholesterol levels and promote weight loss among police department employees. Journal of the American Dietetic Association, 92, 1382-1384.

<<EPIC 3044 - linked to 3115 >>

Bruno, R., Arnold, C., Jacobson, L., Winick, M. & Wynder, E. (1983) Randomized controlled trial of a nonpharmacologic cholesterol reduction program at the worksite. Preventive Medicine, 12, 523-532.

<<EPIC 3181>>

Byers, T., Mullis, R., Anderson, J., Dusenbury, L., Gorsky, R. & Kimber, C. (1995) The Costs and Effects of a Nutritional Education Program Following Work-Site Cholesterol Screening. American Journal of Public Health, 85, 650-655.

<<EPIC 3106>>

Connell, C.M., Sharpe, P.A. & Gallant, M.P. (1995) Effect of health risk appraisal on health outcomes in a university worksite health promotion trial. Health Education Research, 10, 199-209.

<<EPIC 3118>>

Crouch, M., Sallis, J.F., Farquhar, J.W., Haskell, W.L., Ellsworth, N.M. & King, A.B. (1986) Personal and Mediated Health Counseling for Sustained Dietary Reduction of Hypercholesterolemia. Preventive Medicine, 15, 282-291.

<<EPIC 3203>>

De Valk, R.H.W. (1990) Voedingsinterventie in de bedrijfsgeneeskunde. Ned Tijdschr Geneeskd, 134, 338-341.

<<EPIC 3182 - linked to EPIC 3197>>

Edye, B.V., Mandryk, J.A., Frommer, M.S., Healey, S. & Ferguson, D.A. (1989) Evaluation of a worksite programme for the modification of cardiovascular risk factors. Medical Journal of Australia 150, 574-581.

<<EPIC 3202>>

Elton, P.J., Ryman, A., Hammer, M. & Page, F. (1994) Randomised controlled trial in northern England of the effect of a person knowing their own serum cholesterol concentration. Journal of Epidemiology and Community Health, 48, 22-25.

<<EPIC 3047>>

Erfurt, J.C. & Holtyn, K. (1991) Health promotion in small business: what works and what doesn't work. Journal of Occupational Medicine, 33, 66-73.

<<EPIC 3183>>

Fielding, J.E., Mason, T., Knight, K., Klesges, R. & Pelletier, K.R. (1995) A Randomized Trial of the IMPACT Worksite Cholesterol Reduction Program. American Journal of Preventive Medicine, 11,

120-123.

<<EPIC 3100>>

Fisher, S.P. & Fisher, M.M. (1995) Development, implementation, and evaluation of a health promotion program in a college setting. Journal of American College Health, 44, 81-83.

<<EPIC 3108>>

Francisco, V.T., Paine, A.L., Fawcett, S.B., Johnston, J. & Banks, D. (1994) An experimental evaluation of an incentive program to reduce serum cholesterol levels among health fair participants. Archive Family Medicine, 3, 246-251.

<<EPIC 3200>>

Fries, J.F., Fries, S.T., Parcell, C.L. & Harrington, H. (1992) Health risk changes with a low cost individualized health promotion program: effects at up to 30 months. American Journal of Health Promotion, 6, 364-371.

<<EPIC 3184>>

Gambera, P.J., Schneeman, B.O. & Davis, P.A. (1995) Use of the food guide pyramid and US dietary guidelines to improve dietary intake and reduce cardiovascular risk in active-duty Air Force members. Journal of the American Dietetic Association, 95, 1268-1273.

<<EPIC 3206>>

Gemson, D.H. & Sloan, R.P. (1995) Efficacy of computerized health risk appraisal as part of a periodic health examination at the worksite. American Journal of Health Promotion, 9, 462-466.

<<EPIC 3139>>

Gemson, D.H., Sloan, R.P., Messeri, P. & Goldberg, I.J. (1990) A Public Health Model for Cardiovascular Risk Reduction. Archives International Medicine, 150, 985-989.

<<EPIC 3198>>

Glasgow, R.E., Terborg, J.R., Hollis, J.F., Severson, H.H. & Boles, S.M. (1995) Take Heart: Results from the initial phase of work-site Wellness Program. American Journal of Public Health, 85, 209-216.

<<EPIC 3070 - linked to 3007>>

Glasgow, R.E., Terborg, J.R., Hollis, J.F., Severson, H., Fisher, K.J. & Boles, S.M. (1994) Modifying dietary and tobacco use patterns in the worksite: the Take Heart Project. Health Education Quarterly, 21, 69-82.

<<EPIC 3007 - linked to 3070>>

Glasgow, R.E., Terborg, J.R., Strycker, L.A., Boles, S.M. & Hollis, J.F. (1997) Take Heart II: Replication of a worksite health promotion trial. Journal of Behavioral Medicine, 20, 143-161.

<<EPIC 3201>>

Goetzel, R., Sepulveda, M., Knight, K., Eisen, M., Wade, S., Wong, J. & Fielding, J. (1994)

Association of IBM's "A Plan for Life" Health Promotion Program with Changes in Employees' Health Risk Status. Journal of Occupational and Environmental Medicine, 36, 1005-1009.

<<EPIC 3083>>

Goetzel, R.Z., Kahr, T.Y., Aldana, S.G. & Kenny, G.M. (1996) An Evaluation of Duke University's Live for Life Health Promotion Program and Its Impact on Employee Health. American Journal of Health Promotion, 10, 340-341.

<<EPIC 3085>>

Gomel, M., Oldenburg, B., Simpson, J.M. & Owen, N. (1993) Work-site cardiovascular risk reduction: A randomised trial of health risk assessment, Education, counselling and incentives. American Journal of Public Health, 83, 1231-1238.

<<EPIC 3001 - linked to 3002>>

Grove, D.A., Reed, R.W. & Miller, L.C. (1979) A health promotion program in a corporate setting. Journal of Family Practice, 9, 83-88.

<<EPIC 3199>>

Hanlon, P., McEwen, J., Carey, L., Gilmour, H. & Tannahill, C. (1995) Health checks and coronary risk: further evidence from a randomised controlled trial. British Medical Journal, 311, 1609-1613.

<<EPIC 3185>>

Harper, A.S., Farrally, M.R., Emery, A.M., McGlew, T.J. & Lyon, A. (1990) The Vale of Leven health promotion project. British Journal of General Practice, 40, 64-66.

<<EPIC 3186>>

Hartman, T.J., Himes, J.H., McCarthy, P.R. & Kushi, L.H. (1995) Effects of a low-fat, worksite intervention on blood lipids and lipoproteins. Journal of Occupational and Environmental Medicine, 37, 690-696.

<<EPIC 3082 - linked to 3038 >>

Hartman, T.J., McCarthy, P.R. & Himes, J.H. (1993) Use of eating pattern messages to evaluate eating behaviors in a worksite cholesterol education program. Journal of the American Dietetic Association, 93, 1119-1123.

<<EPIC 3038 - linked to 3082 >>

Henritze, J., Brammell, H.L. & McGloin, J. (1992) LIFE CHECK: A successful, low touch, low tech, in-plant, cardiovascular disease risk. American Journal of Health Promotion, 7, 129-136.

<<EPIC 3187>>

Masur-Levy, P., Tavis, D.R. & Elsey-Pica, L. (1990) Cardiovascular risk changes in a work-site health promotion program. Journal of the American Dietetic Association, 90, 1427-1428.

<<EPIC 3188>>

Montgomery, D.H. & Briley, M.E. (1995) Long-term dietary intake changes in police department

employees who participated in a worksite nutrition education program. Clinical Nutrition, 10, 78-84.  
<<EPIC 3115 linked to 3044>>

Oldenburg, B., Owen, N., Parle, M. & Gomel, M. (1995) An Economic Evaluation of Four Work Site Based Cardiovascular Risk Factor Interventions. Health Education Quarterly, 22, 9-19.  
<<EPIC 3002 - linked to 3001>>

Ostwald, S.K. (1989) Changing Employees' Dietary and Exercise Practices: An experimental study in a small company. Journal of Occupational Medicine, 31, 90-97.  
<<EPIC 3012>>

Perovich, S. & Sandoval, W. (1995) Outcomes of a worksite cholesterol education program over a 5-year period. Journal of the American Dietetic Association, 95, 589-590.  
<<EPIC 3112>>

Pilon, B.A. & Renfroe, D. (1990) Evaluation of an employee health risk appraisal program. American Association of Occupational Health Nurses, 38, 230-235.  
<<EPIC 3189>>

Puska, P., Niemensivu, H., Puhakka, P., Alhainen, L., Koslela, K., Moisio, S. & Viri, L. (1988) Results of a one-year worksite and mass media based intervention on health behaviour and chronic disease risk factors. Scandinavian Journal of Social Medicine, 16, 241-50.  
<<EPIC 3190>>

Quigley, H.L.L. (1986) Bean cholesterol reduction program. Journal of Nutrition Education, 18, S58-S59.  
<<EPIC 3204>>

Rastam, L. & Frick, J.O. (1996) Nurses counseling for hypercholesterolemia: efficient strategy in middle-aged men. Cardiovascular Risk Factors, 6, 36-41.  
<<EPIC 3191>>

Reed, G., Moore, L., Coleman, L. (1991) Heart healthy education. Effectiveness of teaching methods in the workplace. American Association of Occupational Health Nurses, 39, 109-113.  
<<EPIC 3192>>

Rodnick, J.E. (1982) Health behaviour changes associated with health hazard appraisal counseling in an occupational setting. Preventive Medicine, 11, 583-594.  
<<EPIC 3193>>

Schar, M. (1969) Health education as a preventive measure. What is the effect of instruction about risk factors? Munch Med Wochenschr, 111, 1402-1405.  
<<EPIC 3207>>

Selbst, M., Bell, M.M. & Thome, M.J. (1992) The impact of a cholesterol screening and intervention

program among unskilled and semiskilled workers. American Journal of Health Promotion, 6, 261-3.  
<<EPIC 3194>>

Shi, L. (1992) The impact of increasing intensity of health promotion intervention on risk reduction. Evaluation and the Health Professions, 15, 3-25.  
<<EPIC 3195>>

Spilman, M., Goetz, A., Schulz, J., Bellingham, R., & Johnson, D. (1986) Effects of a corporate health promotion program. Journal of Occupational Medicine, 28, 285-289.  
<<EPIC 3196>>

Thorsteinsson, R., Johannesson, A., Jonsson, H., Thorhallsson, T. & Sigurdsson, J.A. (1994) Effects of dietary intervention on serum lipids in factory workers. Scandinavian Journal of Primary Health Care, 12, 93-99.  
<<EPIC 3171>>

World Health Organisation European Collaborative Group (1983) Multifactorial trial in the prevention of coronary heart disease: 3. Incidence and mortality results. European Heart Journal, 83, 141-147.  
<<EPIC 3168 - linked to 3208, 3209, 3210, 3211>>

World Health Organisation European Collaborative Group (1986) European Collaborative Trial of Multifactorial Prevention of Coronary Heart Disease: Final Report on the 6-year Results. Lancet, April, 869-872.  
<<EPIC 3211 - linked to 3168, 3208, 3209, 3210>>

World Health Organization European Collaborative Group (1974) An international controlled trial in the multifactorial prevention of coronary heart disease. International Journal of Epidemiology, 3, 219-224.  
<<EPIC 3208 - linked to 3168, 3209, 3210, 3211>>

World Health Organization European Collaborative Group (1980) Multifactorial trial in the prevention of coronary heart disease: 1. Recruitment and initial findings. European Heart Journal, 1, 73-80.  
<<EPIC 3209 - linked to 3168, 3208, 3210, 3211 >>

World Health Organization European Collaborative Group (1982) Multifactorial trial in the prevention of coronary heart disease: 2. Risk factor changes at two and four years. European Heart Journal, 3, 184-190.  
<<EPIC 3210 - linked to 3168, 3208, 3209, 3211>>

Yang, M.C., Lairson, D.R., Frye, N., Herd, J.A. & Falck, V.T. (1988) The effects of wellness program attendane on physiologic measures, health practices and diet habits. Health Education Research, 3, 293-303.  
<<EPIC 3169>>

**Appendix 9 Study design terms used to limit healthy eating search strategies to outcome evaluations only**

**Medline (Based on the Cochrane Optimal Search)**

- #1 Randomized-Controlled-Trial in PT
- #2 Randomized-Controlled-Trials/ all subheadings (MeSH term)
- #3 Random-Allocation/ all subheadings (MeSH term)
- #4 Double-Blind-Method/ all subheadings (MeSH term)
- #5 Single-Blind-Method/ all subheadings (MeSH term)
- #6 Clinical-Trial in PT
- #7 explode Clinical-Trials / all subheadings (MeSH term)
- #8 (clin\* near trial\*) in TI or AB
- #9 (singl\* or double\* or treble\* or triple\*) near (blind\* or mask\*) in TI or AB
- #10 Placebos-/all subheadings (Mesh term)
- #11 placebo\* in TI or AB
- #12 random\* in TI or AB
- #13 Research-Design/ all subheadings (Mesh term)
- #14 Comparative-Study in TG
- #15 explode Evaluation-Studies / all subheadings (Mesh term)
- #16 Follow-Up-Studies/ all subheadings (Mesh term)
- #17 Prospective-Studies / all subheadings (Mesh term)
- #18 (control\* or prospectiv\* or volunteer\*) in TI or AB
- #19 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18

**EMBASE**

- #1 Randomised-Controlled-Trial in DE
- #2 Follow-Up in DE
- #3 Major Clinical Study in EM
- #4 Controlled Study in EM
- #5 Human Experiment in EM
- #6 Clinical-Trial in DE
- #7 Evaluation-and-Follow-Up in DE
- #8 random\* in TI or AB
- #9 (control\* or prospectiv\*) in TI or AB
- #10 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9

**PsycLIT**

- #1 Program- Evaluation in DE
- #2 Educational-Program-Evaluation in DE
- #3 Evaluation- in DE
- #4 Prospective-Studies in DE
- #5 Follow-Up-Studies in DE
- #6 Longitudinal-Studies in DE
- #7 Treatment-Outcomes in DE
- #8 Post-Treatment-Follow-Up in DE
- #9 Experimental-Design in DE
- #10 random\* in TI or AB

- #11 (control\* or prospectiv\*) in TI or AB
- #12 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11

### **Social Science Citation Index**

- #1 evaluat\*
- #2 random\*
- #3 trial
- #4 control\*
- #5 experiment\*
- #6 follow up
- #7 follow-up
- #8 longitudinal\*
- #9 prospectiv\*
- #10 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9

Appendix 10 Characteristics of the 52 workplace health promotion interventions (see Appendix 8 for references)

		Advice/ counsel	bio- feedback	Environmt modifict	Access to resources	Access to services	Info/ educatio n	Legis/ regul	Physical activity	Practical skill	screen	social sup	other
300 1 300 2	rct	group 3,4	all groups				group 2,3,4						group 4: incentives
300 7 307 0	rct			not specified						not specified			incentives
301 2	rct	intensive group	all groups	low fat meals	exercise facilities for moderate group		all groups		intensive group				
303 8 308 2	trial						✓						
304 4 311 5	pp	✓					✓						
304 7	rct		✓				✓						
308 3	pp		✓			plan for life courses	✓						
308 5	pp	✓	✓		fitness centre;	lifestyle improvement programme etc; targeted high risk programs	✓						special events, contests, goal oriented challenges

rct = randomised controlled trial; trial = non-randomised trial; pp = pre- and post-test

Appendix 10 Characteristics of the 52 workplace health promotion interventions (see Appendix 8 for references)

		Advice/ counsel	bio- feedback	Environmt modifict	Access to resources	Access to services	Info/ educatio n	Legis/ regul	Physical activity	Practical skill	screen	social sup	other
309 0	pp	✓	✓				✓						
098	trial	✓	✓			medical referral for high blood pressure	group 1: self help; group 2: group course						
310 0	rct	✓	✓			cholesterol screening; medical referral; priority enrolment to related course							medical treatment
310 6	rct		all groups			medical referral for all	✓			choose & prepare foods low in fat, high in fibre			
310 8	trial	✓			provision of time blocks for individual activities	access to group activities			✓	resus. course			
311 2	pp	✓					✓			calculatio n of fat intake			
311 8	rct	groups 2,3 printed	groups 1,2,3			groups 1,2: counselling, classes, walking contests	groups 1,2,3						

rct = randomised controlled trial; trial = non-randomised trial; pp = pre- and post-test

Appendix 10 Characteristics of the 52 workplace health promotion interventions (see Appendix 8 for references)

		Advice/ counsel	bio- feedback	Environmt modifict	Access to resources	Access to services	Info/ educatio n	Legis/ regul	Physical activity	Practical skill	screen	social sup	other
3139	rct	group 1: personal group 2: also written back-up	both groups										
3169	pp		✓			smoking cessation & exercise classes	✓						
3171	pp			food in the canteen			✓						
3175	pp	✓					✓		✓				records of exercise and dietary intake
3176	trial	✓	✓				✓			dietary record			
3177	pp	✓	✓		displays		✓						questionnaire to foster long term change
3178	trial	✓	✓	smoking policy; food in vending machines & cafeterias; healthy food labelling		education classes	✓	✓					
3179	pp	✓	✓		library & staff		✓		✓				

rct = randomised controlled trial; trial = non-randomised trial; pp = pre- and post-test

Appendix 10 Characteristics of the 52 workplace health promotion interventions (see Appendix 8 for references)

		Advice/ counsel	bio- feedback	Environmt modifict	Access to resources	Access to services	Info/ educatio n	Legis/ regul	Physical activity	Practical skill	screen	social sup	other
318 0	rct						group 1: alone group 2: with spouse			reading food labels & keeping diet record			recipe tasting
318 1	rct	✓	✓				✓			food behaviour change technique & self manage skills			
318 2	pp	✓	✓	canteen meals									
318 3	pp	✓	✓			wellness programmes & follow-up counselling; medical referral	✓						
318 4	pp	✓	✓				✓						
318 5	rct	all groups	for 3 groups			medical referral for high blood pressure & high cholesterol	all groups						

rct = randomised controlled trial; trial = non-randomised trial; pp = pre- and post-test

Appendix 10 Characteristics of the 52 workplace health promotion interventions (see Appendix 8 for references)

		Advice/ counsel	bio- feedback	Environmt modifict	Access to resources	Access to services	Info/ educatio n	Legis/ regul	Physical activity	Practical skill	screen	social sup	other
318 6	pp	✓	✓	cafeteria menu		counselling service; exercise groups	✓	smokin g restrict	✓				
318 7	pp	✓	✓	healthy food labeling; changes in canteen food	nicorette gum; fitness equipment.	medical referral for high blood pressure and major health concerns; smoking cessation and nutrition courses	✓						
318 8	pp					1 referral with hypertension to medical evaluation/ treatment	✓				✓		
318 9	pp	✓	✓			classes & access to nurse; medical referral	✓						
319 0	trial	✓	✓				✓						
319 1	trial	✓	✓		written info on how to lower cholesterol levels (comparison group only)	cholesterol test	✓						

rct = randomised controlled trial; trial = non-randomised trial; pp = pre- and post-test

Appendix 10 Characteristics of the 52 workplace health promotion interventions (see Appendix 8 for references)

		Advice/ counsel	bio- feedback	Environmt modifict	Access to resources	Access to services	Info/ educatio n	Legis/ regul	Physical activity	Practical skill	screen	social sup	other
319 2	rct	all groups	all groups			access to occupational nurse (all groups)	all groups						
319 3	pp	✓	✓			1 medical referral	✓						
319 4	rct	all groups	all groups			1 medical referral (all groups)							
319 5	rct	all levels	all levels	level 4: exercise space	health resource centre (level 2,3,4); health fairs (level 4)	targeted education (level 2,3,4)	all levels	no- smoking policy (level 4)		level 3,4: weight control, smoking cessation stress manage		level 3,4	level 4: incentives
319 6	trial		both groups			classes; cancer screening	both groups						
319 7	pp	✓	✓										

rct = randomised controlled trial; trial = non-randomised trial; pp = pre- and post-test

Appendix 10 Characteristics of the 52 workplace health promotion interventions (see Appendix 8 for references)

		Advice/ counsel	bio- feedback	Environmt modifict	Access to resources	Access to services	Info/ educatio n	Legis/ regul	Physical activity	Practical skill	screen	social sup	other
3198 2 intens ities	rct (pp)	both groups; group 1 repeated	both groups				both groups						
3199	pp	✓	✓			referral to medical care	✓			self- monitor behaviour modificat		✓	maintenanc e activities
3200 2 intens ities	rct	both groups	both groups			both groups access to health groups	both groups						1 group : incentives
3201	trial		✓				✓		✓	not specified but nutrition and smoking		✓	
3202	rct	✓	both groups			extra counselling	✓						
3203 3 intens ities/c ontrol	rct	group 1,2,3 but 2,3 repeated	group 1,2,3 but 2,3 repeated group 3: telephon e				group 2			group 2 rehearsal, self- monitor, goal setting			
3204	pp	✓	✓				✓			cooking/.f ood technique			

rct = randomised controlled trial; trial = non-randomised trial; pp = pre- and post-test

*Appendix 10 Characteristics of the 52 workplace health promotion interventions (see Appendix 8 for references)*

		Advice/ counsel	bio- feedback	Environmt modifict	Access to resources	Access to services	Info/ educatio n	Legis/ regul	Physical activity	Practical skill	screen	social sup	other
320 5	pp					weight control clinic	✓		✓				
320 6 2 inter vent ions	rct	group 2					group2		both groups	group 2: dietary skills		group 2	
320 7	rct		✓				✓						
321 1	rct	✓	both groups			both groups/referral	✓						

rct = randomised controlled trial; trial = non-randomised trial; pp = pre- and post-test