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

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

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SM Carr,1* M Lhussier,1 N Forster,1 L Geddes,1 K Deane,2,3 M Pennington,2 S Visram,1 M White,2 S Michie,4 C Donaldson2 and A Hildreth1

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Abstract

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

SM Carr,1* M Lhussier,1 N Forster,1 L Geddes,1 K Deane,2,3 M Pennington,2 S Visram,1 M White,2 S Michie,4 C Donaldson2 and A Hildreth1

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*Corresponding author

Background: There is a need to identify and analyse the range of models developed to date for delivering health-related lifestyle advice (HRLA), or training, for effectiveness and cost-effectiveness in improving the health and well-being of individuals and communities in the UK, with particular reference to the reduction of inequalities.

Objectives: To identify the component intervention techniques of lifestyle advisors (LAs) in the UK and similar contexts, and the outcomes of HRLA interventions.

Data sources: Stakeholder views, secondary analysis of the National Survey of Health Trainer Activity, telephone survey of health trainer leads/coordinators. A search of a range of electronic databases was undertaken [including the Applied Social Sciences Index and Abstracts (ASSIA), EMBASE, NHS Economic Evaluation Database (NHS EED), MEDLINE, Psyc INFO, etc.], as well searching relevant journals and reference lists, conducted from inception to September 2008.

Review methods: Identified studies were scanned by two reviewers and those meeting the following criteria were included: studies carrying out an evaluation of HRLA; those taking place in developed countries similar to the UK context; those looking at adult groups; interventions with the explicit aim of health improvement; interventions that involved paid or voluntary work with an individual or group of peers acting in an advisory role; advice delivered by post, online or electronically; training, support or counselling delivered to patients, communities or members of the public. After quality assessment, studies were selected for inclusion in the review. Data were abstracted from each study according to an agreed procedure and narrative, and realist and economic approaches were used to synthesise the data. Cost-effectiveness analysis of interventions was undertaken.

Results: In total, 269 studies were identified but 243 were excluded. The 26 included studies addressing chronic care, mental health, breastfeeding, smoking, diet and physical activity, screening and human immunodeficiency virus (HIV) infection prevention. Overall, there was insufficient evidence to either support or refute the use of LAs to promote
health and improve quality of life (QoL), and thus uncertainty about the interventions’ cost-effectiveness. However, the economic analysis showed that LA interventions were cost-effective in chronic care and smoking cessation, inconclusive for breastfeeding and mental health and not cost-effective for screening uptake and diet/physical activity. LA interventions for HIV prevention were cost-effective, but not in a UK context.

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

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

Funding: This study was funded by the Health Technology Assessment programme of the National Institute for Health Research.
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<td>AIDS</td>
<td>acquired immunodeficiency syndrome</td>
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<td>ANC</td>
<td>antenatal care</td>
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<td>ART</td>
<td>antiretroviral treatment</td>
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<td>ASSIA</td>
<td>Applied Social Sciences Index and Abstracts</td>
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<tr>
<td>BCCCP</td>
<td>Breast and Cervical Cancer Control Program</td>
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<tr>
<td>BMI</td>
<td>body mass index</td>
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<td>BSTC</td>
<td>barrier-specific telephone counselling</td>
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<td>CA</td>
<td>community activity</td>
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<td>CASP</td>
<td>Critical Appraisal Skills Programme</td>
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<tr>
<td>CCTR</td>
<td>Cochrane Controlled Trials Reports</td>
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<td>CDC</td>
<td>Centers for Disease Control and Prevention</td>
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<tr>
<td>CDSM</td>
<td>Chronic Disease Self-Management</td>
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<tr>
<td>CDSR</td>
<td>Cochrane Database of Systematic Reviews</td>
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<tr>
<td>CHD</td>
<td>coronary heart disease</td>
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<td>CHW</td>
<td>community health worker</td>
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<td>CI</td>
<td>confidence interval</td>
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<td>CINAHL</td>
<td>Cumulative Index to Nursing and Allied Health Literature</td>
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<tr>
<td>CORE</td>
<td>Centre for Outcomes Research and Effectiveness</td>
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<td>CRD</td>
<td>Centre for Reviews and Dissemination</td>
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<tr>
<td>CVD</td>
<td>cardiovascular disease</td>
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<tr>
<td>D</td>
<td>mean difference</td>
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<tr>
<td>DALY</td>
<td>disability-adjusted life-year</td>
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<td>DARE</td>
<td>Database of Abstracts of Reviews of Effects</td>
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<tr>
<td>EQ-5D</td>
<td>European Quality of Life-5 Dimensions</td>
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<td>ES</td>
<td>effects size</td>
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<tr>
<td>GP</td>
<td>general practitioner</td>
</tr>
<tr>
<td>HADS</td>
<td>Hospital Anxiety and Depression Scale</td>
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<tr>
<td>HbA1c</td>
<td>glycated haemoglobin</td>
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<tr>
<td>HCHS</td>
<td>hospital and community health services</td>
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<tr>
<td>HDL</td>
<td>high-density lipoprotein</td>
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<tr>
<td>HIV</td>
<td>human immunodeficiency virus</td>
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<tr>
<td>HRLA</td>
<td>health-related lifestyle advice</td>
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<tr>
<td>HRQoL</td>
<td>health-related quality of life</td>
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<tr>
<td>IBSS</td>
<td>International Bibliography of the Social Sciences</td>
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<tr>
<td>IC</td>
<td>individual counselling</td>
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<td>ICER</td>
<td>incremental cost-effectiveness ratio</td>
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<tr>
<td>IK</td>
<td>indigenous knowledge</td>
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<tr>
<td>ISRCTN</td>
<td>International Standard Randomised Controlled Trial Number</td>
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<tr>
<td>LA</td>
<td>lifestyle advisor</td>
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<tr>
<td>LDL</td>
<td>low-density lipoprotein</td>
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<tr>
<td>LHA</td>
<td>lay health advisor</td>
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<td>MRC</td>
<td>Medical Research Council</td>
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<td>NHANES</td>
<td>National Health and Nutrition Examination Survey</td>
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<td>NHS EED</td>
<td>NHS Economic Evaluation Database</td>
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<tr>
<td>NICE</td>
<td>National Institute for Health and Clinical Excellence</td>
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<td>NRT</td>
<td>nicotine replacement therapy</td>
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<td>OR</td>
<td>odds ratio</td>
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<td>PAG</td>
<td>Project Advisory Group</td>
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<tr>
<td>Abbreviation</td>
<td>Description</td>
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<tr>
<td>PAIS</td>
<td>Public Affairs Information Services</td>
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<tr>
<td>PICOS</td>
<td>Population, Interventions, Comparators, Outcomes and Study Designs</td>
</tr>
<tr>
<td>PPVTR</td>
<td>Peabody Picture Vocabulary Test Revised</td>
</tr>
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<td>PSI</td>
<td>Psychiatric Symptom Index</td>
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<td>QALY</td>
<td>quality-adjusted life-year</td>
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<td>QoL</td>
<td>quality of life</td>
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<tr>
<td>RCT</td>
<td>randomised controlled trial</td>
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<tr>
<td>RR</td>
<td>relative risk</td>
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<tr>
<td>SCI</td>
<td>Science Citation Index</td>
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<tr>
<td>SD</td>
<td>standard deviation</td>
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<tr>
<td>SSCI</td>
<td>Social Sciences Citation Index</td>
</tr>
<tr>
<td>SHA</td>
<td>Strategic Health Authority</td>
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<tr>
<td>STD</td>
<td>sexually transmitted disease</td>
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<tr>
<td>UCL</td>
<td>University College London</td>
</tr>
<tr>
<td>UKPDS</td>
<td>United Kingdom Prospective Diabetes Study</td>
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<td>WHO</td>
<td>World Health Organization</td>
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All abbreviations that have been used in this report are listed here unless the abbreviation is well known (e.g. NHS), or it has been used only once, or it is a non-standard abbreviation used only in figures/tables/appendices, in which case the abbreviation is defined in the figure legend or in the notes at the end of the table.
Executive summary

Review question and objectives

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

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

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

Methods

Data sources

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

Study selection

Studies with the following criteria were included:

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

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

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

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

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

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

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

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

Recommendations for practice

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

Recommendations for a future programme of research

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

- Identifying need:
  - A concept mapping approach may be an appropriate strategy to use in order to identify what people believe helps them adhere to healthy lifestyle advice, and to triangulate this to views of public health professionals and community leaders.
- Target groups:
  - Interventions in groups not addressed in the review (men, transient populations, homeless people, etc.), broader interventions in groups with specific issues (e.g. physical health in mental health population groups), and prevention in general health promotion (such as stop smoking plus diet, exercise and screening) need further development.
  - Research on alternative target groups that may be of broader focus than health related, such as, for example, faith groups, youth groups, community centres, gangs, playschemes, etc.; within each group, existing leaders could be identified and collaborative relationships nurtured to identify, assess and address local needs. Such schemes are likely to lead to community development activities but would require longitudinal funding schemes.
Intervention aim:
- Research is needed on the building of social capital or community development through LA schemes. This would entail a focus on social and structural, rather than individual, determinants of health inequalities.
- A development of research led by, or conducted in collaboration with, community guides would help to develop ways for health-care providers to maximise the potential of pre-existing ‘unofficial’ health improvement activities.

Outcome identification and measurement:
- This review endorses the need for a strategic movement along the Medical Research Council continuum of evidence so that research evolves from scoping practice to evaluating outcomes.
- HRLA schemes would benefit from a development of current methodological advancements to help identify and assess short-, medium- and long-term intervention outcomes. In the long term, this would encourage the publication of promising outcomes and thus strengthen the HRLA evidence base.
- There is a need to establish equity of outcomes between groups of different socioeconomic profiles.
- There is a need to identify what enables long-term effects, i.e. regular low-cost ‘top-up’ interventions or multidimensional interventions with changes in approach over time.

Systematic reviewing in public health:
- A greater engagement with realistic review or synthesis principles would allow exposure of contexts and mechanism components that influence a range of outcomes in HRLA interventions.
- This review supports previously published commentaries on the necessity for the development of quality assessment tools that could allow increased methodological flexibility.

Funding

This study was funded by the Health Technology Assessment programme of the National Institute for Health Research.
Chapter 1

Introduction

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

Background

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

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

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

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

Terminology

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

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

History of the LA role

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

The role of LA is more established in some fields, for example breastfeeding, sexual health, screening, chronic conditions/Expert Patients Programmes. Emerging roles are appearing, for example as exemplified in the development of the role for health improvement activities with offenders.
The development of the role has not been unproblematic and reference to the World Health Organization (WHO) report on community health workers (CHWs) provides an eight-item list of areas of potential weakness:

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

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

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

Definitions and distinguishing features

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

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

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

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

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

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

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

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

Rationale for role/intervention

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

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

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

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

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

**Theoretical basis of health-related lifestyle advisor**

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

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

**Mechanism and models of intervention**

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

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

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

**Challenges of evaluating public health interventions**

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

These comments can potentially be applied to the more generic LA role. Evidence of effectiveness is not readily available and is hindered by acknowledged evaluation challenges for this type
of service provision. Twenty years ago, Walt described the methodological difficulties as 'enormous, further hindered by the financial resources required to conduct rigour evaluation designs and a limited service provision history.' This comment still applies, as the practical difficulties in measuring the impact of public health interventions remain unchanged. Indeed, public health interventions may need to adapt to local circumstances and needs, preventing tight control of the intervention: randomisation of community-based trials can be difficult – possible contamination may preclude individual randomisation, and randomisation at community level may be beyond the resources of the trial – and measurement of lifestyle changes inevitably relies on self-reported data, as observation of health improvements at community level is rarely feasible given the size and duration of a typical study.

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

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

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

Unsurprisingly, then, 'many LHA programmes are only minimally evaluated, if at all, and little published information is available about LHA evaluation strategies' (p. 443). This situation is a consequence of the need for evaluation activities to not disturb the spontaneous and informal processes of natural helping, the difficulty in intermediate outcome measurement of unstructured roles and the generally modest evaluation budgets available to such interventions. Despite recent methodological developments in the public health and health improvement fields, these comments remain highly pertinent.
Chapter 2

Methods

Research question

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

Review question(s)

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

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

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

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

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

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

The concept of health-related LAs is multifaceted and, as such, represents a complex public health intervention. Hence, any assessment of the effectiveness and cost-effectiveness of the models identified needs to take into consideration the nature of this type of intervention and
requires multiple methods of enquiry. The review was therefore framed by a staged approach to intervention development, evaluation and implementation, as exemplified by the Medical Research Council (MRC) framework for the evaluation of complex interventions\(^6\) (Figure 1). The first phase of this review was therefore focused on problem definition and intervention modelling to facilitate development of classification of the various intervention dimensions developed by the research team (Appendix 3). There were three aspects to this phase: eliciting stakeholder views; secondary analysis of the National Survey of Health Trainer Activity;\(^6\) and a telephone survey of health trainer leads/coordinators.

1. *Eliciting stakeholder views* The Project Advisory Group (PAG) (Appendix 4), recruited from different geographical locations, service, user and academic backgrounds and disciplines, was consulted on the key issues surrounding the role of health-related LAs to be taken into account when shaping, planning and executing the systematic review. The PAG membership was influenced by the Centre for Reviews and Dissemination (CRD)\(^6\) guidance to ensure breadth of representation to make certain that ‘the questions addressed are those of importance to decision makers’ (p. 159). Considerable debate was generated with respect to inclusion of health trainers as members of the PAG. The desirability was not in question, but rather the appropriateness of the request at such an early point in the establishment of the services. Advice was sought from local health trainer leads and co-ordinators, who consulted with health trainers. The consensus was that the relevant PAG members would liaise with the health trainers in their areas regarding project issues and be the conduit for bringing that information to the PAG meetings. This also allowed a wider representation of health trainer views than inviting a small number to join the PAG. As a result of the consultation with PAG members, the researchers were able to elicit perceptions of key issues relating to the LA role to help set the parameters for the systematic review phase of the study. This added depth of detail to the knowledge already held by the reviewers.

**FIGURE 1** Medical Research Council framework for the evaluation of complex interventions. RCT, randomised controlled trial.
2. A secondary analysis of the National Audit of Health Trainer Activity Undertaken by Professor Susan Michie and colleagues at the Centre for Outcomes Research and Effectiveness (CORE), University College London (UCL). Data from the UCL audit were recoded, and questions were mapped against the primary classification sampling frame developed by the research team. These data were then analysed to identify key areas of importance for future discussion and sampling. However, owing to the limited number of data (many respondents to the original audit did not provide answers to each question – it was unclear in which instances missing data suggested the question was unanswered or the response was zero or not applicable) and the differences between the original audit data and the project's sampling frame, there were too many missing data to progress with this approach. Accordingly, services were mapped on to the sampling frame in the three key areas in which the audit data were the strongest. These were:

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

These issues were agreed to be capable of providing an accurate sample of services through the country. Although data levels were not high enough to be mapped against each other to provide a complete picture of delivery, they were able to provide enough depth to select services reflecting a range of models for interview. These results, along with the PAG consultation, helped to shape the development of the analytical framework (found in Appendix 3) to be used in the evidence synthesis.

3. Semi-structured telephone interviews with local health trainer leads/co-ordinators in England Conducted in order to refine the classification of intervention dimensions as identified in the analytical framework. Review of the literature, consultation with the PAG and reference to the national audit identified three key dimensions for mapping diversity of models of provision:

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

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

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

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

Population

The population dimension is shown in Table 1.

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

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

Interventions

The interventions dimension is shown in Table 2.

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

TABLE 1 Population dimension of the PICOS framework

<table>
<thead>
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<th>Include</th>
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<tr>
<td>Workplace advisors</td>
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<td>Health champions</td>
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<td>Health activists</td>
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<tr>
<td>LAs</td>
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<td>Age Concern</td>
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<td>Lifestyle coaches</td>
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<td>Citizens Advice Bureau</td>
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<td>Badged/rebadged health trainers</td>
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<td>Expert patient trainers</td>
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<tr>
<td>Healthlink workers</td>
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<tr>
<td>Community parents</td>
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<tr>
<td>Community health educators</td>
<td></td>
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<tr>
<td>Countries: Western Europe, North America, Australia, New Zealand</td>
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</table>
There is a wide continuum from very specific disease-focused, protocol-guided instruction at one end, to social support being available for use as determined by individual users. Again, the decision was taken to adopt a wide and inclusive approach. This did generate some consequences that are detailed further in the results section of this report, which hinge on distinguishing disease management from health improvement interventions.

Comparators

The comparators dimension is shown in Table 3.

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

Outcomes

The outcomes dimension is shown in Table 4.

Study designs

The study designs dimension is shown in Table 5.

As highlighted by Rychetnik et al.71 ‘public health interventions tend to be complex, programmatic and context dependent’. It follows therefore that ‘the evidence base for their effectiveness must be sufficiently comprehensive to encompass that complexity’ (p. 119). Although the traditional hierarchy of evidence is applicable to public health reviews, the CRD guidance69 recommends that a range of study designs may need to be included. Skewing of findings towards certain intervention types may result if only randomised controlled trials (RCTs) and controlled trials were included. A particularly pertinent issue in view of the limited number of RCT designs conducted in public health and, in particular, the field of the LA.

Review methods

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

### TABLE 2 Interventions dimension of the PICOS framework

<table>
<thead>
<tr>
<th>Include</th>
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<tbody>
<tr>
<td>HRLA or training delivered to patients or public in the UK or a sufficiently similar setting.</td>
<td>Advice/training interventions without explicit aim of health improvement</td>
</tr>
<tr>
<td>Individual or groups of peers acting in advisory role, offering training, support or counselling (in person, telephone, online) focuses on delivering HRLA or training in terms of health improvement.</td>
<td>Advice/training related to acute care only</td>
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<tr>
<td>Advice provided electronically or by mail, if iterative interaction</td>
<td>One-off advice-giving</td>
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### TABLE 3 Comparators dimension of the PICOS framework

<table>
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<th>Include</th>
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<tbody>
<tr>
<td>Standard care</td>
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<td>Types of LA</td>
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### TABLE 4 Outcomes dimension of the PICOS framework

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

BP, blood pressure.

### TABLE 5 Study design dimension of the PICOS framework

<table>
<thead>
<tr>
<th>Include</th>
<th>Exclude</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCT</td>
<td>Descriptions</td>
</tr>
<tr>
<td>Non-RCTs</td>
<td>Reviews</td>
</tr>
<tr>
<td>Cohort studies</td>
<td></td>
</tr>
<tr>
<td>Case–study control</td>
<td></td>
</tr>
<tr>
<td>Interrupted time series</td>
<td></td>
</tr>
<tr>
<td>Ethnographic</td>
<td></td>
</tr>
<tr>
<td>Phenomenological</td>
<td></td>
</tr>
<tr>
<td>In-depth qualitative evaluations</td>
<td></td>
</tr>
<tr>
<td>Combined designs</td>
<td></td>
</tr>
</tbody>
</table>
Seven search activities were undertaken:

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

**Search strategy**

**Electronic databases**

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

**BOX 1 Electronic databases searched**

- Applied Social Sciences Index and Abstracts (ASSIA)
- Article 1st
- British Humanities Index
- Cumulative Index to Nursing and Allied Health Literature (CINAHL)
- EMBASE
- Database of Abstracts and Reviews of Effects (DARE)
- FRANCIS
- NHS Economic Evaluation Database (NHS EED)
- International Bibliography of the Social Sciences (IBSS)
- MEDLINE
- Public Affairs Information Services (PAIS)
- PsycINFO
- Science Citation Index (SCI)
- SIRS Researcher
- Social Sciences Citation Index (SSCI)
- Social Services Abstracts
- Sociological Abstracts
- Web of Knowledge
- WorldCat
- Zetoc
Preliminary search strategy
Potential search terms were circulated among the team and the advisory group to develop a potential search string. Initial terms were derived from preliminary searches of the literature and previous research carried out in this area by members of the review team. They were limited to the following:

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

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

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

and

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

and

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

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

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

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

Where multiple options were available, hosts that supported advanced Boolean operators were selected, and in each case the string was modified to best suit the functions available on the hosts. Individual search strategies were developed, where applicable, for each electronic database. Detailed search logs were maintained throughout. Searches were conducted from inception to September 2008, and no language restrictions were applied. The full search strategies for each database searched are presented in Appendix 6.
Differences in terminology and definitions of terms made refinement of the strategy difficult. For example, lay health worker and CHW have similar meanings in different cultures. As discussed in the introduction, the term LHA belongs to a group of roles that, over time, have been given a range of titles, but which have some common principle of recruitment, purpose or operation. The problem of defining role and value, and translating these into a finite list of searchable keywords meant that a very broad strategy was required.

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

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

**Searches of the internet**

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

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

**BOX 2 Search string**

(Health trainer OR lifestyle advi$/ train$ OR lay health worker/adviser OR peer educ$/counsel$/support$ OR health activator/activist OR health aide OR health advocate OR link worker OR community champion OR community health educator OR outreach worker) AND (evaluation OR effectiveness OR cost-effectiveness OR equity OR acceptability OR behaviour change OR health promotion/improvement OR disease prevention) OR searches for specific health-related behaviours: (smoking OR physical activity OR diet OR overweight/obesity OR alcohol OR breastfeeding OR sexual health)
These were then combined with search terms on study methods or general outcome. The number of results returned for each search string can be found in Appendix 8.

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

**TABLE 6** Results obtained for the databases searched

<table>
<thead>
<tr>
<th>Databases searched</th>
<th>Number of results</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASSIA</td>
<td>910</td>
</tr>
<tr>
<td>Article 1st</td>
<td>217</td>
</tr>
<tr>
<td>British Humanities Index</td>
<td>501</td>
</tr>
<tr>
<td>CINAHL</td>
<td>4823</td>
</tr>
<tr>
<td>EMBASE</td>
<td>4863</td>
</tr>
<tr>
<td>FRANCIS</td>
<td>101</td>
</tr>
<tr>
<td>NHS EED</td>
<td>181</td>
</tr>
<tr>
<td>IBSS</td>
<td>0</td>
</tr>
<tr>
<td>MDXHD</td>
<td>N/A</td>
</tr>
<tr>
<td>MEDLINE</td>
<td>10,222</td>
</tr>
<tr>
<td>PAIS</td>
<td>N/A</td>
</tr>
<tr>
<td>PsycINFO</td>
<td>617</td>
</tr>
<tr>
<td>SCI (part of Web of Science)</td>
<td>613</td>
</tr>
<tr>
<td>SIRS Researcher</td>
<td>2</td>
</tr>
<tr>
<td>SSCI (part of Web of Science)</td>
<td>See above</td>
</tr>
<tr>
<td>Social Services Abstracts</td>
<td>768</td>
</tr>
<tr>
<td>Sociological Abstracts</td>
<td>501</td>
</tr>
<tr>
<td>Web of Knowledge</td>
<td>1359</td>
</tr>
<tr>
<td>WorldCat</td>
<td>745</td>
</tr>
<tr>
<td>Zetoc</td>
<td>232</td>
</tr>
</tbody>
</table>

Total (with duplicates removed by ENDNOTE) = 17,673 results

N/A, not available.

Suggestions from experts and those working in the field

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

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

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

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

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

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

Searches of the SCI and SSCI

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

Hand searches of relevant journals

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

Search outcome summary

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

Study selection criteria and procedures

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

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

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

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

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

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

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

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

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

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

Data synthesis

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

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

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

Pawson\textsuperscript{78} exposes the relative approaches of meta-analysis, narrative review and realist synthesis, and makes a case for theoretical development through realist synthesis. The protocol originally developed for this systematic review assumed the existence of a strength of evidence that would allow for a meta-analysis, complemented by exemplar development of successful interventions, through narrative synthesis.
By convention, meta-analysis is designed to utilise results from several related studies (in terms of research hypotheses) by identifying a common measure of effect size that is modelled via meta-regression. The resulting inferences are thus more credible than those obtained via individual studies. The only common factor of the studies included in this review, however, is the fact that they focus on interventions delivered by non-health professionals, and neither the outcomes under investigation nor the methods used are constant. While most of the studies reviewed adopted a quantitative methodology, primary outcome measures were of either the parametric or frequency variety, thereby rendering direct comparisons impossible. Thus it became apparent that the synthesis could not be fulfilled as originally proposed. The statistical treatment of the data available is explained below, before the final synthesis strategy is exposed.

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

In some studies authors have applied multivariate methods to their data, usually resulting in ORs being supplied in terms of the relative effect on outcome of different covariates. Where this is the case, these are cited in the report together with 95% CIs (where provided). Where CIs based on multivariate models are not provided then these have not been estimated. In some cases authors have included baseline values in the model as covariates, either together with likely confounders.
or individually. Unfortunately, resulting statistics are not always comprehensive, nor are effect sizes included.

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

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

\begin{figure}
\centering
\includegraphics[width=\textwidth]{figure3.png}
\caption{Integration of narrative, economic and realist synthesis strategies.}
\end{figure}
As exposed earlier, the review question has been subdivided into two distinct foci: intervention components on one side and on their outcomes on the other. While the combination of narrative synthesis and economic analysis does answer both strands of the review questions to an extent, many of the intervention details would remain unexplored without an additional approach. The concurrent use of the three review strategies enables the production of a review with a clear and explicit audit trail of the different steps included. The narrative synthesis provides a detailed description of the included studies (qualitative and quantitative), and treats them as exemplar cases of LA interventions, with their outcomes classified rather conventionally by intervention focus and following the series of continuums developed in Phase I and presented in Appendix 3. The realist synthesis builds on this emerging theory, by delving into the inconsistencies presented by the studies included to refine and elaborate the theory of how, why and in which circumstances LA interventions are likely to produce successful outcomes. The two qualitative studies included in this review provided a richness of detail that was crucial in theory development. Within the limits of available evidence and methodological constraints further elaborated on p. 109, the combination of the three synthetic approaches enables the most efficient and meaningful management of data, in a way that both answers the review question and maximises the potential of the studies included.
Chapter 3

Results of the review

The results of the review are provided in three sections:

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

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

Studies included in the review are listed in Table 7.

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

Titles identified and screened $n = 22,898$

Gray literature $n = 209$
Google searches (including online reference lists) $n = 15$
Studies identified from contact with expert $n = 12$
Relevant studies from included review $n = 182$

Full copies retrieved and accessed for eligibility $n = 381$

Unable to obtain/further information required to make assessment $n = 37$

Excluded $n = 22,517$

Publication meeting the inclusion criteria $n = 269$

Publication quality assessed as strong/included in review $n = 26$
Publication quality assessed as weak/moderate $n = 243$

Excluded $n = 282$

Studies design/descriptive material $n = 113$ (40.1%)
Review $n = 24$ (8.5%)
Age group (i.e., under 18 years old) $n = 25$ (8.9%)
No health improvement as primary aim $n = 48$ (17.0%)
Lack of trained interventionist $n = 7$ (2.5%)
Basic information (i.e., online support groups) $n = 3$ (1.1%)
Delivered by professional staff $n = 62$ (22.0%)

Foreign language $n = 2$

FIGURE 4 Study selection process.
TABLE 7 Included studies

<table>
<thead>
<tr>
<th>Study ID and main publication reference</th>
<th>Full referencesa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dennis 2002a,b</td>
<td>Dennis CL, Hodnett E, Gallop R, Chalmers B. The effect of peer support on breast-feeding duration among primiparous women: a randomised controlled trial. <em>CMAJ</em> 2002;166:21–8a,b</td>
</tr>
</tbody>
</table>

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TABLE 7  Included studies (continued)

<table>
<thead>
<tr>
<th>Study ID and main publication reference</th>
<th>Full referencesa</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Kennedy A, Gately C, Rogers, A. Process Evaluation of the EPP – Report II: examination of the implementation of the Expert Patients Programme within the structures and locally contexts of the NHS in England. University of Manchester, National Primary Care Research and Development Centre; 2005106</td>
</tr>
</tbody>
</table>

a  Main references shown in bold.
SECTION 1: STUDIES DESCRIBED BY INTERVENTION FOCUS

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

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

BOX 5 Series of intervention dimensions

<table>
<thead>
<tr>
<th>Description of studies</th>
<th>Level of training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study design</td>
<td>Skill level</td>
</tr>
<tr>
<td>Context of intervention</td>
<td>Nature of role</td>
</tr>
<tr>
<td>Population focus</td>
<td>Hours</td>
</tr>
<tr>
<td>Location</td>
<td>Level of formality</td>
</tr>
<tr>
<td>Referral/recruitment</td>
<td><strong>Intensity of intervention</strong></td>
</tr>
<tr>
<td></td>
<td>Frequency/hours/duration</td>
</tr>
<tr>
<td><strong>Mechanism of intervention</strong></td>
<td><strong>Results from studies (outcomes)</strong></td>
</tr>
<tr>
<td>Intervention components</td>
<td>Health status</td>
</tr>
<tr>
<td></td>
<td>Health behaviours</td>
</tr>
<tr>
<td>Theoretical underpinning</td>
<td>Participation</td>
</tr>
<tr>
<td>Aims</td>
<td>Health-care beliefs and knowledge</td>
</tr>
<tr>
<td>Origin</td>
<td>Health-care use</td>
</tr>
<tr>
<td>Approach</td>
<td>Costs</td>
</tr>
<tr>
<td>Topic focus</td>
<td><strong>Discussion</strong></td>
</tr>
<tr>
<td>Main activities</td>
<td></td>
</tr>
<tr>
<td>Mode of delivery</td>
<td></td>
</tr>
<tr>
<td><strong>Role/training</strong></td>
<td></td>
</tr>
<tr>
<td>Practitioner type</td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td>Design</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Anand 2001</td>
<td>RCT</td>
</tr>
<tr>
<td>Andersen 2000</td>
<td>Four-arm cluster</td>
</tr>
<tr>
<td>Barlow 2000</td>
<td>RCT</td>
</tr>
<tr>
<td>Bird 1998</td>
<td>Controlled before and after trial</td>
</tr>
<tr>
<td>Dennis 2002</td>
<td>RCT</td>
</tr>
<tr>
<td>Dixon-Gomez 2003</td>
<td>Ethnographic study</td>
</tr>
<tr>
<td>Dixon-Gomez 2006</td>
<td>Process evaluation</td>
</tr>
<tr>
<td>Earp 2002</td>
<td>Controlled before and after trial</td>
</tr>
<tr>
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<td>Three-arm RCT</td>
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<td>RCT</td>
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<tr>
<td>Gary 2003</td>
<td>Four-arm RCT</td>
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<td>Griffiths 2005</td>
<td>RCT</td>
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<td>Kennedy 2007</td>
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<td>Study</td>
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<td>Keyserling 2002&lt;sup&gt;108,109&lt;/sup&gt;</td>
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<td>Lorig 1999&lt;sup&gt;110&lt;/sup&gt;</td>
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<td>Lorig 2003&lt;sup&gt;111&lt;/sup&gt;</td>
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<td>Lujan 2007&lt;sup&gt;112&lt;/sup&gt;</td>
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<td>May 2006&lt;sup&gt;113&lt;/sup&gt;</td>
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<td>Morrow 1999&lt;sup&gt;114,115&lt;/sup&gt;</td>
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<td>Resnicow 2004&lt;sup&gt;118&lt;/sup&gt;</td>
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<td>West 1998&lt;sup&gt;120&lt;/sup&gt;</td>
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<td>Woodruff 2002&lt;sup&gt;121&lt;/sup&gt;</td>
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<td>Young 2005&lt;sup&gt;122–123&lt;/sup&gt;</td>
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HbA<sub>1c</sub>, glycated haemoglobin; kcal, kilocalorie; N/A, not available; QA, quality assessment.

<sup>a</sup> Quality assessment: 1 = strong; 2 = moderate; and 3 = weak.
<sup>b</sup> By age, gender, ethnicity, socioeconomic status.
<sup>c</sup> Quantitative arm to the study, presented as an attached paper. It is a RCT, with a sample of 250 participants. The outcomes are stratified by age, race and number of arrests in the previous year. The main outcome was engagement with HIV risk behaviours – this decreased significantly in the intervention group.
<sup>d</sup> Stretching and strengthening, exercise, aerobic exercise, cognitive symptom management and communication with physician.
Chronic care


Description of studies

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

Study design

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

Context of intervention

Population focus

Four studies were UK based: three within the general population and one with the Bangladeshi community. Four were US-based, with a population of people over 40, a Hispanic population, Catholic Mexican-American and African-American communities. In Gary 2003, the study took place in East Baltimore, a particularly deprived inner city community. A total of 629 people with any chronic condition were recruited in Kennedy 2007; 476 Bangladesis with diabetes, CVD, respiratory disease or arthritis were recruited in Griffiths 2005 and 602 people with arthritis in Barlow 2000; 476 people with diabetes, stroke or arthritis were recruited in Lorig 1999; and 551 Hispanics in the northern California area, with heart disease, lung disease or type 2 diabetes (other diagnoses were allowed) were recruited in Lorig 2003. The three diabetes studies recruited 150, 186 and 591 people with diabetes.

Location

The intervention was generally delivered in non-NHS community settings in general practices or community centres, in community-based setting such as churches, neighbourhood centres and clinics, in a faith-based community clinic with telephone follow-up.
follow-up\textsuperscript{111} or in participants' homes with additional telephone contact\textsuperscript{98–100} or by telephone alone.\textsuperscript{121–123}

**Referral/recruitment**

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

**Mechanism**

**Intervention components**

**Theoretical underpinning**

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

**Aims**

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

**Origin**

The original programme was developed by researchers at Stanford University, CA, USA, in collaboration with people with chronic conditions.\textsuperscript{110} The content was culturally adapted for the Bangladeshi community.\textsuperscript{101,102} Barlow 2000\textsuperscript{83} draws on the Arthritis Self-Management Programme.\textsuperscript{128} In Lorig 2003\textsuperscript{111} the intervention was based on the English Chronic Disease Self-Management (CDSM\textsuperscript{125}) programme and the Spanish Arthritis Self-Management Program, adapted for the Hispanic community. The intervention in Young 2005\textsuperscript{121–123} was based on local guidelines for the management of people with type 2 diabetes; these local guidelines were modelled on the National Institute for Health and Clinical Excellence (NICE) guidelines.\textsuperscript{129} The culturally specific 6-month intervention used in Lujan 2007\textsuperscript{112} was developed in collaboration...
with clinic *promotores* and patients, and adhered to the American Diabetes Association curriculum guidelines (collaborative). The origin of the intervention in Gary 2003<sup>98–100</sup> was not specified; it is therefore reasonable to presume that it was developed by the authors.

**Approach**

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

**Topic focus**

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

**Main activities**

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

**Mode of delivery**

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

**Role/training**

**Practitioner type**

Barlow 2000<sup>83</sup>, Griffiths 2005<sup>101,102</sup> and Kennedy 2007<sup>104–107</sup> used peers with common personal experience, i.e. they had a chronic condition, and in the case of Griffiths 2005<sup>101,102</sup> these peers
were from a shared community, i.e. the Bangladeshi community. In Lorig 1999110 the lay leaders were volunteers, some of whom also had a chronic condition (71%): they ranged in age from 21 to 80 years. In Lorig 2003111 most leaders had one or more chronic conditions. Lujan 2007112 used peers from a shared community, i.e. they were bilingual clinic employees. Gary 200398–100 and Young 2005121–123 used practitioners with no specific relationship with the community that they served (though the health advisor was described as ‘local’ in Gary 200398–100 it was not specified whether he or she is also of African-American origin). All the LAs in Young 2005120–122 were call centre operatives who were selected for their professional telephone manners.

Level of training
There was intensive technical training in Griffiths 2005,101,102 In Kennedy,104–107 the training was intensive and involved attendance at a standardised event, assessment of the delivery of two training courses in order to obtain accreditation, followed by observed practice at least once every 12–18 months and attendance at group supervision once a year. Barlow 200083 reports that the leaders are trained by Arthritis Care, but no details on content or duration are provided. In Lorig 1999,110 20 hours’ training with a detailed teaching manual was received. In Lorig 2003111 lay leaders received 4 days’ training in the use of the programme protocol, including two practice teaching sessions, the final session being evaluated to allow progress to course teaching. Lujan 2007112 and Young121–123 used intensive training for their practitioners: two promotores in Lujan et al.112 received 60 hours of training each, and the telecarers in Young 2005121–123 received 3 months of training. The level of training of the health advisor was not specified in Gary 2003. 98–100

Skill level
Gary 2003,98–100 Griffiths 2005,101,102 Kennedy 2007,104–107 Lujan 2007112 and Young 2005121–123 used unqualified lay advisors. In Gary 200398–100 the health advisor was a local high school graduate with no formal training in health care before the study. Lorig 1999110 used volunteers with little previous experience in health education: 23% were health professionals and 15% were students. Lorig 2003111 and Barlow 200083 do not give details.

Nature of role
The tutors were paid £587.10 each to facilitate the 6-week course in Griffiths 2005.101,102 However, it was unclear whether the tutors were paid in Kennedy 2007104–107 as they were described as ‘lay trainers or volunteer tutors’. Barlow 200083 reports only that LAs delivered the programme in pairs, under the auspices of a voluntary organisation, Arthritis Care. In Lorig 1999110 volunteer lay leaders delivered courses in pairs, acted more as facilitators than as lecturers, and received a stipend of US$100 per leader per course of 15 participants. In Lorig 2003111 the lay leaders modelled for participants. All of the LAs were stated (or strongly implied) to be employed by the studies in Gary 2003,96–100 Lujan 2007112 and Young 2005.121–123

Hours
It was unclear in most studies whether the hours were full- or part-time. The health advisors worked part-time in Young 2005,121–123 It was implied that the advisor worked part-time in Gary 200398–100 (was enrolled part-time at college).

Level of formality
The LAs in Griffiths 2005101,102 are stated to be accredited lay tutors, and those in Kennedy 2007104–107 and Richardson et al.107 are stated to be subject to quality assurance. Barlow 200083 reports that training was provided and the course delivered using a manual. Lorig 1999110 documented their intervention in a detailed protocol in a ‘leaders’ manual’, and the content of the course has been published as Living a healthy life with chronic conditions.130 Lorig 2003111 does not provide details. None of the health advisor training schemes were accredited or examined in any way in Gary 2003,98–100 Lujan 2007112 and Young 2005.121–123
Intensity of intervention

Frequency/hours/duration

Barlow 2000,13 Griffiths 2005,101,102 Kennedy 2007,104–107 Lorig 1999110 and Lorig 2003111 examined six sessions, which were delivered over 6 weeks. In Griffiths 2005101,102 the sessions lasted 3 hours (i.e. 18 hours over 6 weeks), in Kennedy 2007,104–107 they lasted 2.5 hours (i.e. 15 hours over 6 weeks) and in Barlow 200014 approximately 2 hours (i.e. 12 hours over 6 weeks). In Lorig 2003111 seven weekly 2.5-hour sessions were delivered (i.e. 17.5 over 7 weeks). Lujan 2007112 provided eight weekly 2-hour classes and telephone follow-up, so they provided approximately 16 hours over 8 weeks. In Young121–123 the intensity of the telephone contact was determined in relation to people’s blood sugar levels at baseline. These calls were performed once every 3 months if the glycated haemoglobin (HbA1c) level was ≤7%, every 7 weeks if HbA1c level was in the range 7.1%–9%, and monthly if HbA1c level was > 9%. Each call lasted 20 minutes and was continued over 12 months. Thus they provided between 1 hour 10 minutes and 4 hours of telephone calls over 1 year. In Gary 200398–100 the health advisor conducted 45- to 60-minute home visits. Sixty-two per cent of participants in the health advisor group received at least three visits and < 20% in the health advisor group received at least seven visits. Many participants (~50%) also received at least one telephone intervention (but the authors did not split this contact according to group). The intervention intensity was calculated on the basis of the number of visits that the authors were aiming to reach (six in 24 months) and was classified as low.

Results from studies

Unless stated otherwise, effect size is derived from Cohen’s d,111 which is defined as the difference between means divided by a common SD, and is in relation to between-group differences. Where feasible and appropriate, post hoc power has been calculated in relation to the studies reviewed, generally in relation to generic outcomes.

Health status

General health was measured by a single question in Kennedy 2007104–107 and did not change significantly. It was not measured in Griffiths 2005101,102 Neither study showed significant effect on health-related quality of life (HRQoL) as measured by the European Quality of Life-5 Dimensions (EQ-5D) instrument.132,133 Psychological well-being was measured with five items in Kennedy 2007104–107 and improved significantly (effect size 0.25 cited by authors). The trial was powered to have a 90% probability of detecting a standardised effect size of 0.25, and, subsequently, the target sample size of n = 600 was exceeded by 4.8%. Depression and anxiety were measured using the Health Assessment Questionnaire [Hospital Anxiety and Depression Scale (HADS)]134 in Griffiths 2005,101,102 but neither changed significantly.

Pain was measured on a five-point Likert scale in Griffiths 2005101,102 and on a five-item questionnaire in Kennedy 2007.104–107 Neither measure changed significantly. In Gary 2003,98–100 Lujan 2007112 and Young 2005121–123 energy significantly improved in the study group compared with controls (effect size 0.18, p = 0.004), but fatigue did not change significantly in Griffiths 2005.101,102 Physiological measures and adverse events were not assessed in either study.

Gary 2003,98–100 Lujan 2007112 and Young 2005121–123 did not assess general health, QoL, psychological well-being, pain, fatigue or adverse events. However, in Young 2005121–123 > 90% of intervention participants agreed that the intervention improved their well-being.

Using self-administered mailed questionnaires, Lorig 1999110 reported significant improvement in treatment subjects compared with controls in five variables: self-rated health, disability, social/role activities limitations, energy/fatigue and health distress (p < 0.02). Post-trial assessment of ability reveals 95% power to detect an effect size (Cohen’s d111) of 0.238, equivalent to detecting, for example, a difference in means between groups of 0.3 assuming a common SD of 1.26 and
a 0.05 (two-sided) significance level. No significant difference was demonstrated for pain or physical discomfort, shortness of breath or psychological well-being. Validated outcomes were used. Using the self-rated health item from the medical outcomes studies and visual numeric scales for pain and fatigue, Lorig 2003 reported improvements in health status with usual care controls (<0.05). Post-trial power was 90% to detect a standardised mean difference of 0.279, implying an ability to detect a difference in means of, for example, 1.0, where the common SD is 3.6 and a 0.05 (two-sided) significance level.

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

Gary 2003, Lujan 2007 and Young 2005 measured HbA1c levels, for which the reference range (that found in healthy persons) is about 4%–5.9%. Young 2005 found a significant (p = 0.003) difference between groups of −0.31% HbA1c (95% CI −0.11 to 0.52) and effect size 0.25 (95% CI 0.07 to 0.43 with estimated pooled variance) at 1 year. The trial was powered to have a 90% probability of detecting a difference of 1% in HbA1c level, assuming a SD of 2% between groups. While there were no significant differences at the 3-month assessment, Lujan 2007 found a significant difference of −0.25% HbA1c levels at 6 months (effect size 0.41, 95% CI 0.08 to 0.73). However, there was a difference in the mean baseline HbA1c level between the intervention and control groups, the intervention mean being 0.45% higher. Levels of HbA1c increased markedly in the control group over 6 months (0.3%). It is generally accepted that HbA1c levels rise over time, but at a typical rate of 0.2% per year. Pretrial power was set at 90%, based on unspecified differences in HbA1c levels and Diabetes Knowledge Questionnaire scores.

Gary 2003 found a similar-sized difference between their groups at 2 years = −0.30% HbA1c (±0.48%, insufficient information for an effect size calculation) – but this was not statistically significant. Gary 2003 measured other surrogate markers of cardiovascular health, such as low-density lipoprotein (LDL) and high-density lipoprotein (HDL) cholesterol levels, triglycerides, systolic and diastolic blood pressure, and body mass index (BMI). Unfortunately, the absolute changes in outcomes are not reported in Gary 2003 only the difference between arms, making it difficult to assess whether the reported effects are due to decreases in the trial arms or increases in the controls. The reported changes in systolic and diastolic blood pressure, HDL and LDL cholesterol and triglycerides are mostly in a similar direction to the primary outcome measure, but are not significant. Neither a target difference nor a difference in power were specified; however, defining a clinically significant difference would seem to be the main issue in studies of this nature. That said, the authors claim that the observed difference of −0.8% between the collective treatment group and controls was clinically significant. Therefore, given the statistically non-significant p-value, one might conclude that the study may have been underpowered. Nonetheless, the study may prove useful and encouraging to anyone planning further work in this area.

Health behaviours

Self-care behaviour was assessed in Griffiths 2005 using the Cognitive Symptom Self-Management Scale from the Chronic Disease Self-Efficacy Scale and improved significantly (effect size 1.16, p = 0.047). The authors state that their study was 80% powered to detect ‘... an effect size associated with improvements in behaviour, health status and healthcare ...’.

Subsequent recruitment figures confirm that the trial was sufficiently powered to detect relatively
small effect sizes. Kennedy 2007\textsuperscript{104–107} measured exercise (six items) and diet (one item), neither of which changed significantly. Lorig 1999\textsuperscript{110} reported significant improvement in four behaviour variables (\(p < 0.01\)): number of minutes exercise per week of stretching/strengthening exercise and aerobic exercise, increased practice of cognitive symptom management and improved communication with physician. At 4-month comparison, Lorig 2003\textsuperscript{111} reported improvements in health behaviours compared with usual care controls (\(p < 0.05\)).

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

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

**Participation**

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

**Health-care beliefs and knowledge**

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

Lujan 2007\textsuperscript{112} measured diabetes knowledge and health beliefs using validated questionnaires. The DKQ\textsuperscript{149} score mean change of the intervention group was significantly higher than that of the control group at the 6-month assessment, with effect size 0.63, 95\% CI 0.29 to 0.97 (baselines of original adjusted for health insurance). With the diabetes health beliefs measure,\textsuperscript{150} a higher score indicates a higher belief in the ability to manage diabetes. The mean changes of the two groups decreased, without a significant difference at the 3-month assessment, the decrease was significantly less \([F(1, 148) = 5.97, p < 0.01]\) for the intervention group than for the control group at the 6-month assessment. The consistent decrease in the diabetes health beliefs mean scores of both of the groups at the two points of assessment indicates that the participants did
not experience an increase in their belief about their ability to manage diabetes, although the intervention group demonstrated more knowledge.

In Gary 200398–100 it was expected that individuals would complete six intervention visits before the 2-year follow-up. Their actual participation fell far short of that goal, primarily because of insufficient staff support and participant non-compliance (although figures were not provided). Overall, more individuals were seen in the health advisor groups, which may be related to the fact that they saw the participants in the convenience of their homes. This may be a surrogate indicator of acceptability, which appears to be better in the health advisor group than in the usual care group.

In Lujan 2007112 96% of participants completed the classes (i.e. attended at least six of the eight classes) and the overall attrition rate was 6% \((n = 9)\). Two of these nine participants also failed to complete the education phase of the intervention. One of the participants, who did not attend either the 3- or 6-month assessment interview, died from pneumonia, two moved to another city, and six reported that they were unable to attend the assessment interviews because of a lack of time. The very high attendance rate of the classes suggests that it was acceptable to most participants.

Young 2005121–123 noted that withdrawal from the study occurred in 10.7% of usual care subjects and 15.7% of telephone-support patients. This suggests that there may have been some negative issues regarding acceptability in the telephone-support group. They assessed satisfaction with treatment using the validated Diabetes Satisfaction and Treatment Questionnaire151 and acceptability of the approach with a purposely designed self-completion questionnaire. Over 90% of participants found the intervention acceptable and agreed that it improved their knowledge and control of diabetes. However, only 50% of intervention participants would rather have this approach than seeing a health professional face to face. Participants generally described the development of strong bonds with the LAs, and liked the personalised format of the intervention. A total of 33% thought it had enhanced their self-knowledge and helped with changes in attitudes and behaviours.

Health-care use
There was no significant difference in health-care visits over 6 months in Kennedy 2007104–107 or in primary care visits over the previous 3 months in Griffiths 2005.101,102 Kennedy 2007104–107 also measured the number of counsellor visits, outpatient appointments, day-case appointments and inpatient days, none of which differed significantly between the two groups. Lorig 1999110 reported that the treatment group had fewer hospitalisations \((p < 0.05)\) and spent, on average, 0.8 fewer nights in hospital \((p = 0.01)\). There were no significant differences in visits to physicians \((p = 0.11)\). At 4-month comparison, Lorig 2003111 reports no difference in days of hospitalisation, but the treatment group did show a trend to fewer physician visits. Barlow 200083 reports on number of physician visits where arthritis was discussed, but did not find any difference at 4 months between intervention and control groups. However, at 12 months they found significantly fewer mean number of visits to the GP, though these data were uncontrolled.

Costs
The delivery of the Expert Patients Programme cost £123 per participant in Griffiths 2005103,102 and £250 per participant in Kennedy 2007.104–107 Kennedy 2007104–107 found lower overall costs in the intervention arm that more than compensated for the estimated cost of the intervention (£250). This difference was driven by a marked (but not statistically significant) reduction in inpatient length of stay. The difference, 0.8 days, has a large impact on overall costs owing to the high cost of inpatient stays (cost of £203–486 applied). It is possible that this difference has arisen from a few patients with extended hospital stays.
In Lorig 1999\textsuperscript{110} the treatment group reduced visits to physicians slightly more than control group but the difference was not significant. The decreases in the number of hospitalisations and in the number of nights of hospitalisation were significant ($p < 0.05$). Assuming a cost of US$1000 per day of hospitalisation, the 6-month health-care costs for each control participating were > US$820 for each treatment subject. The costs of providing the programme for treatment subjects who completed the 6 months were calculated to be US$70 per participant. This includes US$26 for training leaders. No costs are reported in Lorig 2003\textsuperscript{111} and Barlow 2000.\textsuperscript{83}

**Discussion**

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

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

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

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

Emmons 2005,26,97 May 2006,113 West 199830 and Woodruff 2002,120

Description of studies

Four studies were identified that examined the impact of LAs in smoking cessation. May 2006113 was conducted following the positive results from West 199830 It was written up by the same authors, and describes the same intervention strategy, but in two different populations using different control strategies and in a larger and longer-scale study. Emmons 200526,97 examined a smoking cessation intervention for childhood cancer survivors. Woodruff 2002120 examined a culturally appropriate smoking intervention for Latinos.

Study design

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

Context of intervention

Population focus

Two studies26,97,120 were based in the USA, and two in the UK.30,113 West 199830 recruited 172 smokers based in the general population; May 2006112 recruited 564 smokers from three sites across London, UK. Woodruff 2002120 recruited 313 smokers in the Latino community, and Emmons 200526,97 recruited 796 smokers who were childhood cancer survivors.

Location

The intervention was delivered in people's homes via visits and telephone calls120 or telephone calls alone.26,30,97,113

Referral/recruitment

West 199830 recruited smokers from their GP records in south-east London. Participants in May 2006112 were a subset of those participating in a larger RCT of glucose as an aid for smoking cessation. In this study, smokers were recruited through advertisements in local papers, word of mouth and GP referrals. Emmons 200526,97 recruited smokers from the Childhood Cancer Survivors Study152,153 register, and Woodruff 2002120 used 11 trained recruiters, who worked at community events, popular neighbourhood shopping centres, and within their own social networks, to identify Latino smokers.

Mechanism

Intervention components

Theoretical underpinning

West 199830 and May 2006113 did not describe any theoretical underpinning. Woodruff’s intervention154 was based on social cognitive principles, including positive reinforcement, stimulus control, modelling, social support, problem-solving, and practical skills and techniques for quitting. Emmons’ 2005 intervention26,97 was based on theories of behaviour change, in particular, Social Cognitive Theory,154 the Transtheoretical Model,155 the Social–Ecological Model156 and on principles of motivational interviewing.157
**Aims**
West 1998, May 2006 and Woodruff 2002 aimed to improve rates of smoking cessation. Emmons 2005 aimed to get cancer survivors to stop smoking, enhance self-efficacy and social support, increase knowledge about the health risks of smoking, reduce barriers to quitting, help participants to set goals and provide feedback regarding behaviour change.

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

**Approach**
West 1998 and May 2006 used a buddy system where people attempting to stop smoking were paired up to support each other. Woodruff 2002 and Emmons 2005 were mainly information-giving approaches with some support.

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

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

**Mode of delivery**
All of the interventions were delivered on a one-to-one basis. The support was delivered via telephone or face-to-face meetings in addition to telephone calls. The contacts were supported with videos and pamphlets and access to free NRT.
Role/training

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

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

Skill level
West 1998, May 2006 and Woodruff 2002 used unqualified lay trainers. The level of qualification of the counsellors in Emmons 2005 was not stated.

Nature of role
The smoking buddies in West 1998 and May 2006 were unpaid, whereas the promotores in Woodruff 2002 were paid a modest stipend and the peer counsellors in Emmons 2005 were salaried.

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

Level of formality
West 1998 and May 2006 were very informal (untrained peers), Emmons 2005 did not describe if training was provided, and Woodruff 2002 provided training but competency afterwards was not assessed.

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

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

Results from studies
Health status
No measures of health status were assessed in any of the studies.
Health behaviours

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

Emmons 2005\textsuperscript{26,97} uses self-reported smoking status at 8 and 12 months; both West 1998\textsuperscript{30} and Woodruff 2002\textsuperscript{120} use expired air CO\textsubscript{2} monitoring to verify self-reported abstinence, at 1 month and 3 months, respectively. Significantly more remained abstinent from smoking in the buddy support group after 4 weeks [15% difference, effect size 2.79 (95% CI 1.26 to 6.22)] in West 1998\textsuperscript{30} but not in May 2006\textsuperscript{113} (adjusted OR 1.16, 95% CI 0.76 to 1.78). Woodruff 2002\textsuperscript{120} reports that 20.3% of the intervention group had quit at 3 months compared with 8.7% of the comparison group, the comparison group being a statistically significant 2.5 times more likely than the intervention group to be smoking at the 3-month assessment after adjusting for gender and amount smoked per day at baseline. However, these results are based on a per-protocol analysis that ignores differential attrition in the intervention arm. Applying a more conservative intention-to-treat analysis, and assuming that all of those lost to follow-up have relapsed, gives a quit rate of 17.3% in the intervention group and 8.3% in the control group. Emmons 2005\textsuperscript{26,97} reported that the quit rate was significantly higher in the peer counselling group than the control group (16.8% vs 8.5%, $p < 0.0003$) at 8 months. This difference was maintained at the 12-month follow-up (15% vs 9%, $p < 0.01$). Controlling for baseline self-efficacy and depression, the peer counselling group was more likely to quit smoking by the 12-month follow-up compared with the control group (12-month OR 1.99, 95% CI 1.27 to 3.14). Post hoc power for this trial was around 87% for a difference of 8.5% (quit rate) between groups, albeit that power to detect differences in proportions was dependent on the location of the difference.

Participation

None of the studies assessed any measures of participation.

Health-care beliefs and knowledge

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

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

Health-care use

West 1998\textsuperscript{30} and Emmons 2005\textsuperscript{26,97} reported the rates of use of NRT. There was no significant difference in the use of NRT in the two groups in West 1998,\textsuperscript{29} with about 50% of both groups using it. Emmons 2005\textsuperscript{26,97} reported that at the 8-month follow-up, 33% of participants in the peer-support condition reported that they had used NRT during the previous 6 months, compared with 8% of the control (self-help) participants. At the 12-month follow-up, 16% of the provider counselling participants indicated that they had used NRT in the previous 4 months compared with 6% of self-help participants. No significance values were given. A total of 14% of those in the self-help group who used NRT reported that they had quit compared with 26% of the peer counselling group, although this difference did not reach significance using intention-to-treat analyses.
Emmons 2005\textsuperscript{96,97} does not appear to have recorded NRT use in the control group for the first 2 months of the trial, and this oversight may explain why there is no attempt to adjust for it in the results. NRT has well-established effectiveness data with an OR for the patches of 1.67. There is no mention of NRT in Woodruff 2002\textsuperscript{120} and it does not appear to form a planned constituent of the intervention.

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

**Costs**

No costs were given in West 1998\textsuperscript{30} May 2006\textsuperscript{113} or Woodruff 2002\textsuperscript{120}. Emmons 2005\textsuperscript{96,97} stated that the total intervention delivery cost per person was US$298.17 for the peer counselling group and US$1.25 for the self-help group. Therefore, the incremental cost-effectiveness of the peer counsellor (PC) condition compared with the self-help (SH) control \[\frac{(\text{cost}_{\text{PC}} - \text{cost}_{\text{SH}})}{\text{quit rate}_{\text{PC}} - \text{quit rate}_{\text{SH}}})\] was US$5371 per additional quit at 12 months.

**Discussion**

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

- Dennis 2002\textsuperscript{88} and Morrow 1999\textsuperscript{114,115}

**Description of studies**
Two studies were identified which examined interventions to promote breastfeeding. Morrow 1999\textsuperscript{114,115} examined the effect on exclusive breastfeeding and Dennis 2002\textsuperscript{88} on breastfeeding duration.

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

**Context of the intervention**

**Population focus**
The studies were based in semiurban settings in North America: Mexico City, Mexico\textsuperscript{114,115} and Toronto, ON, Canada.\textsuperscript{88} Morrow 1999\textsuperscript{114,115} recruited 130 pregnant women, whereas Dennis 2002\textsuperscript{88} recruited 258 primiparous breastfeeding mothers.

**Location**
The interventions were delivered in mothers’ homes by home visits\textsuperscript{114,115} or via telephone.\textsuperscript{88}

**Referral/recruitment**
Study mothers were identified in Morrow 1999\textsuperscript{114,115} by a semiannual door-to-door census and continuous reporting of new pregnancies in the community by study staff and mothers. Eligible mothers were identified within two community hospitals for the Dennis 2002\textsuperscript{88} study.

**Mechanism**

**Intervention components**

**Theoretical underpinning**
None stated in either study.

**Aims**
The studies aimed to promote exclusive breastfeeding\textsuperscript{114,115} and to increase breastfeeding duration and increase satisfaction with the breastfeeding experience.\textsuperscript{88}

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

**Approach**
Peers imparted information on breastfeeding and supported mothers.

**Topic focus**
Unsurprisingly, the focus of these two studies was exclusively breastfeeding.
Main activities
Both the interventions emphasised the benefits of breastfeeding, provided general breastfeeding information and dispelled myths. Morrow 1999\textsuperscript{114,115} also provided information on preparation for birth and emphasised the importance of exclusive breastfeeding. They also included counselling to key family members to support the mothers.

Mode of delivery
Morrow 1999\textsuperscript{114,115} delivered the intervention face to face in the mother's home supported by a culturally adapted set of visual aids. Dennis 2002\textsuperscript{88} provided the intervention via telephone.

Role/training
Practitioner type
Morrow 1999\textsuperscript{114,115} used peers from a shared community, some of whom had the common personal experience of breastfeeding. Dennis 2002\textsuperscript{88} exclusively used peers with common personal experience of breastfeeding.

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

Skill level
Both studies used unqualified lay tutors.

Nature of role
The advisors in Morrow 1999\textsuperscript{114,115} had previously worked as field data collectors, so it is implied that they were paid. The advisors in Dennis 2002\textsuperscript{88} were volunteers, i.e. unpaid.

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

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

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

Health behaviours
Dennis 2002\textsuperscript{88} and Morrow 1999\textsuperscript{114,115} reported that their intervention groups were significantly more likely to be breastfeeding at 3 months [Morrow 1999\textsuperscript{114,115} exclusive breastfeeding only (RR = 1.11); Dennis 2002\textsuperscript{88} all breastfeeding, \(p = 0.01\) RR = 1.21] but this effect was not observed.
at 3 months when it was measured in Morrow 1999.114,115 Dennis 2002 also noted that the rates of exclusive breastfeeding were significantly higher in the intervention group up to 3 months post partum (p = 0.01, RR = 1.21). Morrow 1999114,115 also provides details of the differential responses in breastfeeding outcomes to peer counselling, finding that multiparous women and those with uncertainty about infant feeding plans were more likely to respond to peer counselling by initiating breastfeeding. It was also demonstrated that peer counselling had the ability to counteract the negative effects of early supplementation on breastfeeding among the subgroup of breastfeeding mothers who have introduced formula within the first day post partum. The study by Morrow 1999114,115 was powered on a hypothesised difference between a combined intervention group (three and six visits) and a control group; however, results are also reported in relation to differences between the three groups. Post hoc power was 95% in relation to the observed difference of 20% between the combined study group and controls. Dennis 2002 powered their study at 90% to detect a difference of 20% located at 60% and 80%; post hoc recruitment figures confirmed power at 90%.

Neither study assessed any other measure of health behaviour.

**Participation**

Neither study assessed any measure of participation.

**Health-care beliefs and knowledge**

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

**Health-care use**

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

**Costs**

Neither study assessed any measure of costs.

**Discussion**

These medium-sized, well-described and well-conducted studies evaluated the efficacy of HRLA for breastfeeding in two semiurban communities in North America (Mexico City, Mexico and Toronto, ON, Canada). The studies did not assess measures of general health or QoL, our review’s primary outcomes. However, both studies claimed a change in rates of breastfeeding as their primary outcome that did change significantly in the groups in receipt of peer support. The
positive effects on mother’s health of breastfeeding are very long term and so would be hard to measure in these sorts of studies. However, Morrow et al.\textsuperscript{114,115} did measure the rates of diarrhoea in the baby’s first 3 months and found significantly lowered rates in the children of mothers in the peer support group. Both studies showed high rates of satisfaction with the programmes, but some complaints reported in Dennis 2002\textsuperscript{88} show that appropriate training of peer counsellors is essential. Neither study gave any indication of the costs of the interventions.
Mental health

- Ireys 2001.103

Description of study

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

Study design

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

Context of intervention

Population focus

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

Location

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

Referral/recruitment

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

Mechanism of intervention

Intervention components

Theoretical underpinning

The theoretical underpinning is not stated.

Aims

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

Origin

The programme described in Ireys 2001103 incorporated elements from previous studies.162–165

Approach

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

Topic focus

The focus of the intervention was on mental health, particularly anxiety and depression.
Main activities
Throughout, the intervention identified examples of naturally occurring sources of support, pointed out examples of effective parenting by the mother and discussed opportunities for strengthening these sources of support and existing parenting skills.

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

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

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

Skill level
The study used unqualified lay trainers.

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

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

Formality
The graduation of advisors suggests formal training.

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

Results from studies
Health status
Levels of anxiety were measured using an 11-item anxiety subscale of the Psychiatric Symptom Index (PSI).166 Whereas participants in the control group reported higher levels of anxiety after baseline, participants in the experimental group reported lower levels of anxiety post intervention compared with baseline scores. The interventions’ effect (reduction in anxiety scores) was especially pronounced for mothers who were highly anxious at baseline, with mean anxiety scores for the highly anxious experimental group mothers decreasing from 33.3 at baseline to 26.4 at 12 months post baseline, and those for the highly anxious mothers in the control group remaining unchanged. Maternal physical health was also an important factor in determining
effects of the intervention. The mean anxiety score for mothers in the experimental group who reported that they were in good, fair or poor health at baseline decreased from 26.4 to 23.9 during the intervention period, whereas for those mothers in the control group who reported being in good, fair or poor health the mean anxiety score increased. Whereas mothers in the experimental group who reported being in very good or excellent health also showed a decrease in anxiety (from 13.4 to 11.5), those in the control group reporting very good or excellent health reported an increase in anxiety in this period (from 15.2 to 17.9). No relationship was found between the effects of the intervention and the number of reported stressful life events or the dose of the intervention. No effect was demonstrated on symptoms of depression as reported on the Beck Depression Inventory. The second step model (using baseline as a covariate) resulted in a standardised 'B coefficient' of 0.145 ($p \leq 0.05$); however, this effect disappears when other covariates are included in the model. Specifically, the effect of each and all of the stage 3 factors make a substantial contribution to the regression coefficient ($R^2 = 0.51$), suggesting that 51% of the variance in post-test PSI anxiety score is explained by the stage 3 model, i.e. it is the most predictive model. In other words, the intervention group was no longer a significant factor.

Health behaviours
Not measured.

Health-care beliefs and knowledge
Not measured.

Health-care use
Not measured.

Costs
No details given.

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

Andersen 2000,42,81,82 Bird 1998,84–87 Earp 200216,63,93,94 and Paskett 2006,116,117

Description of studies

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

Study design

Two high-quality RCTs,42,81,82,116,117 and two high-quality controlled trials16,63,84–87,93,94 were identified. Women were the unit of randomisation in Paskett 2006116,117 and participants were randomly assigned to LHAs or no advisor and followed up after 12–14 months. Communities (as defined by a zip code or group of adjacent zip codes) were the unit of randomisation to one of three intervention arms or to a non-intervention control arm in Andersen 200042,81,82 The interventions were implemented by volunteer groups, and were ‘individual counselling’ (IC), ‘community activities’ (CA) and a combination of both (IC + CA). In the two controlled trials16,63,84–87,93,94 the intervention was delivered to one community, whereas the control community received no intervention. Samples of women from all of the communities were surveyed after 3 years.

Context of intervention

Population focus

All four studies were based in the USA. Bird 199884–87 surveyed 645 Vietnamese-American women in two urban communities (San Francisco, CA – intervention; Sacramento, CA – control). In Andersen 2000,42,81,82 a cohort of 352 women aged 50–80 years from each of the 40 communities (giving a total of 14,080 participants) was randomly selected and surveyed to assess intervention effectiveness. The communities were located predominantly in rural areas of Washington state. Earp 2002,16,63,93,94 surveyed 993 rural African-American women in 10 counties in NC, USA; five counties were allocated to each group and they were also geographically separated by the Pamlico Sound. The studies of Bird 199884–87 and McPhee et al.,85,86 were conducted in the context of the Breast and Cervical Cancer Control Program (BCCCCP), which covers screening fees for all age-eligible, low-income women. Paskett 2006116,117 assessed the impact of LHAs who were randomly assigned to 453 women individually, with a control group of 444 women receiving normal care. These 897 women were from a rural, low-income, triracial (white, Native American and African-American) population within a county ranked the eighth poorest of the 100 counties in North Carolina and in which one-half of the adults are high school graduates.

Location

The interventions were delivered in participants’ homes (Bird 1998,84–87 by telephone, Paskett 2006116,117), in community settings (beauty parlours, churches, bingo halls, clubs, stores, libraries, golf courses)16,63,84–87,93,94 or in health settings within the community (health fairs, mobile mammography van days).16,63,93,94

Referral/recruitment

The LHAs spoke to any woman with whom they came into contact in their social group.16,63,84–87,93,94 In Paskett 2006116,117 women who had been clients of the clinic for at least 2 years and had not had a mammogram in the prior year were randomly selected from the health records of their health-care provider. Participants were randomly selected from a list of women purchased from a mailing list company in Andersen 200042,81,82.
Results of the review

Mechanism

**Intervention components**

**Theoretical underpinning**

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

**Aims**

All four studies aimed to increase the uptake of mammogram screening. Bird 1998 also aimed to increase the uptake of cervical smear tests (Pap smears). Paskett 2006 also aimed to identify and address barriers to the uptake of mammograms.

**Origin**

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

**Approach**

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

**Topic focus**

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

**Main activities**

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

The interventions were delivered face to face on a one-to-one basis or in small groups. Bird 1998 and Earp 2002 made presentations to groups in the community, whereas Andersen 2000 and Paskett 2006 also used telephone contact. Supportive written information pamphlets were used in all four interventions. CAs, such as video showings and mammography-themed bingo nights, were also organised around the promotion of mammography.

Role/training

Practitioner type

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

Level of training

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

Skill level

Two studies used unqualified lay trainers, whereas Paskett 2006 used a former nurse, social worker and a research study interviewer. Skill level is unspecified in Andersen 2000.

Nature of role

Bird 1998 paid their lay trainers on a sessional basis. Paskett 2006 states that their LHAs were paid. The advisors in Earp 2002 were volunteers. In Andersen 2000, volunteers received modest incentives and tokens of appreciation but were not paid.

Hours

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

Level of formality

Paskett 2006 conducted an examination after training but training was not externally accredited. The advisors in Earp 2002 had a graduation ceremony and received a certificate for their training. In the Andersen 2000 and Bird 1998 studies few details were reported about training.

Intensity of intervention

Frequency/hours/duration

In Bird 1998 the lay advisors provided 10- to 15-minute teaching sessions with discussion afterwards. The average number of these sessions was 232. They were provided over the 30 months of the study. Earp 2002 did not state any parameters of intensity. Andersen 2000 mentions that health advisors were asked to attempt to call at least 10 women monthly over the 3 years' study duration but give no indication of a possible number of contacts or duration of contact per person. The Paskett 2006 intervention lasted 9–12 months in total; lay trainers worked for 75–105 minutes for the first two sessions, with the second visit being...
2–3 weeks after the first; they then provided two telephone calls (of unknown duration) following the second visit during months 2 and 6 of the intervention. Participants in Paskett 2006 also received two postcard reminders at months 4 and 8, along with a last visit, of unknown duration, in months 10–12.

**Results from studies**

**Health status**


**Health behaviours**

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

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

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

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

Andersen 2000 studied the effect of IC and (IC + CA)/or CA on women who were underusers of mammography at baseline, and on the prevention of relapse for those women who had had mammograms at regular intervals at the baseline interview. Each intervention demonstrated increases in mammography use in both regular users (relapse prevention) and underusers relative to the control communities. The only statistically significant difference is observed among regular users in the CA arm, where 2.9% more women report a mammogram. Andersen 2000 combines the impact of the intervention among regular and underusers to obtain a percentage increase in the number of women using mammography of 2.5% in the CA arm. Given the similar costs for each intervention the authors conclude that CAs are the most cost-effective. This was a large-scale study (\( n = 6592 \)), providing high power to detect small differences between three treatment groups and controls.
Participation
Not measured in Andersen 2000,42,81,82 Bird 1998,84–87 Earp 200216,63,93,94 and Paskett 2006.116,117

Health-care beliefs and knowledge
Bird 199884–87 measured whether the women had ever heard of mammography (OR 7.0) or Pap smears (OR 52.7), both of which were significantly increased in the intervention population.

Earp 200216,63,93,94 measured increase in awareness of mammography-promoting interventions and materials over the period of the intervention (3 years), which did not differ significantly between the two groups. However, there was a difference between high- and low-income groups, in that although women with a high income had more exposure to the intervention the changes for this group were smaller.

Paskett 2006116,117 measured knowledge (12 items), barriers (12 items) and beliefs (four items) of mammograms and breast cancer with an unvalidated questionnaire developed for their study. The knowledge scores did not differ significantly between the groups. The barrier score was significantly smaller in the LHA group (insufficient data reported to calculate an effect size). The proportion of women reporting inaccurate beliefs was statistically significantly reduced (p = 0.034) in the LHA group (insufficient data reported to calculate an effect size).

Andersen 200042,81,82 did not measure health-care beliefs or knowledge.

Health-care use
Not measured in Andersen 2000,42,81,82 Bird 1998,84–87 Earp 200216,63,93,94 and Paskett 2006.116,117

Costs
Not measured in Bird 199884–87 and Paskett 2006.116,117 stated that the total cost of the intervention was US$329,054. The difference in mammography rates between the two groups was 15.2%, which translates into 66 additional mammograms in the LHA group; therefore, each additional mammogram in the advisor group cost US$4986.

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

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

Discussion
These four large, well-described and well-conducted studies evaluated the efficacy of HRLA for increasing attendance at screening in rural communities and one urban community in North America. One study promoted screening for breast and cervical cancers,84–87 whereas the other three promoted mammography uptake alone.16,63,81,82,93,94,116,117 The studies did not assess measures of general health or QoL, our review’s primary outcomes. However, all three studies claimed a change in rates of attendance at screening for breast cancer (mammography) as their
primary outcome, which did increase significantly in the groups in receipt of peer support. Bird 1998\textsuperscript{41-47} also showed significant increases in the uptake of cervical cancer screening (Pap smears).

Bird 1998\textsuperscript{41-47} and Earp 2002,\textsuperscript{16,63,93,94} increased knowledge of screening with LHAs. Paskett 2006\textsuperscript{116,117} developed their own knowledge, barriers and beliefs scale, which did not show improvement in overall knowledge but did show a reduction in barriers and erroneous beliefs in the group with LHAs. In Andersen 2000\textsuperscript{42,81,82} the IC was targeted at reducing women's personal barriers to accessing mammography, but this was no more effective than CA or a combination of IC and CA at reducing relapses by regular users at baseline. Only the CA intervention arm made a statistically significant difference in mammography use.
Diet and physical activity


Description of studies

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

Study design

All of the identified studies were RCTs. The control group received no intervention/usual care in Resnicow 2004118 and Anand 2007.80 Keyserling 2002108,109 had two comparator groups: one received a clinic-based intervention with IC with a nutritionist and the other received minimal intervention consisting of mailed pamphlets only. Staten 2004119 had two comparator groups: one received provider counselling and the other received provider counselling and health education. Elder 200695,96 had two comparator groups; one received tailored mailed print materials and the other received targeted mailed ‘off-the-shelf’ materials.

The unit of randomisation was the participants in three studies95,96,108,109,118 and cluster randomisation in two studies: households80 and church congregations.118

Context of intervention

Population focus

All five studies were conducted in North America: in a Canadian Aboriginal community;80 in uninsured women, over the age of 50 years, from a mainly Hispanic community;119 in a Latinas community;95,96 in African-American church communities;118 and in African-American women with type 2 diabetes108,109. In Anand 2007,80 57 households (174 individuals) were recruited; 357 participants in Elder 2006;95,96 200 in Keyserling 2002;108,109 1022 participants in Resnicow 2004;118 and 326 in Staten 2004.119 The rural or urban nature of the studies was not well defined in any of the studies but was probably rural in Anand 200780 (on the reservation) and probably urban in Staten 2004119 (clinics in Tucson). In Anand 200780 the household structure was chosen to build upon the strength of family ties and promote healthy lifestyle role modelling. Two of the studies restricted the age of their participants: over 40 years of age108,109 or over 50 years of age.119

Location

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

Referral/recruitment

Participants were recruited via clinics in two studies,108,109,119 by telephoning people in the region with Hispanic surnames,95,96 by recruiting within church communities on a first-come first-served basis,118 and by recruiting eligible households within the reservation.80 In Staten 2004119 the clinics from which participants were recruited were participating in the National Breast and Cervical Cancer Early Detection Program.
Results of the review

Mechanism

Intervention components

Theoretical underpinning

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

Aims

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

Origin

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

Approach

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

Topic focus

The focus of the intervention was healthy diet promotion alone in two studies,\(^ {95,96,118}\) whereas three studies examined the promotion of healthy diet and greater levels of physical activity.\(^ {80,108,109,119}\)

Main activities

The dietary interventions included personalised dietary counselling.\(^ {95,96}\) In Resnicow 2004\(^ {118}\) the intervention was made up of different elements, including church-wide activities, such as health fairs, serving fruit and vegetables after services or church programmes, sponsoring food demonstrations, and having pastor sermons related to health; the distribution of a cookbook with recipes and information about the health benefits of fruit and vegetables, tips for shopping and storing fruit and vegetables and cooking techniques; the distribution of an 18-minute video targeting fruit and vegetable intake using spiritual and secular motivational messages; and one-to-one lay counselling regarding fruit and vegetable intake. The diet and physical activity interventions included 'A New Leaf … Choices for Healthy Living with Diabetes' intervention.
including individual, clinic-based counselling with a nutritionist, as well as telephone calls with a LA.\textsuperscript{108,109} Health counsellors assessed and set dietary and physical activity goals for each household member, and provided traditional recipes, grocery store tours and food preparation classes. A water cooler was provided per household, as well as two 18-l containers and 24 bottles of spring water (which were provided per week per household), and an after-school activity programme for children was provided to the whole community (both intervention and control groups had access).\textsuperscript{108} Staten's intervention included provision of counselling from nurse practitioners regarding the benefits of and barriers to increasing physical activity and consumption of fruit and vegetables, and gave an individualised behaviour change prescription, two health education seminars (one on nutrition and one on physical activity), and a monthly health newsletter, while CHWs provided information support and organised bimonthly walks.\textsuperscript{119}

**Mode of delivery**

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

**Role/training**

**Practitioner type**

Three studies used peers from a shared community (aboriginal;\textsuperscript{40} African-American churchgoers;\textsuperscript{118} Spanish language-dominant role models within the community\textsuperscript{95,96}). Two studies used peers with common personal experience from a shared community [African-American women with type 2 diabetes;\textsuperscript{108,109} Hispanic women most of whom (five of the six) were over 50 years of age\textsuperscript{119}].

**Level of training**

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

**Skill level**

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

Nature of role
Four of the five studies did not specify whether the CHWs were paid. It is stated that advisors were volunteers in Resnicow 2004\textsuperscript{118}.

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

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

Intensity of intervention
Frequency/hours/duration
Three studies used medium-intensity intervention\textsuperscript{80,95,96,119} and two used a low-intensity approach.\textsuperscript{108,109,118}

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

Results from studies
Health status
None of the studies identified measured general health status, QoL, pain, fatigue or adverse events. One study measured psychological outcomes: Keyserling 2002\textsuperscript{108,109} measured mental well-being on a validated scale,\textsuperscript{197} but this did not differ significantly between the groups. Three of the studies measured specific physiological measures: Staten 2004\textsuperscript{119} found no significant reductions between waist measurements in the CHW group versus the group that had provider counselling and health education (linear regression adjusted for BMI, ethnicity and age, – insufficient information to calculate effect size). There were significant reductions in systolic blood pressure (approximately 5.4 mmHg – insufficient information to calculate effect size) the CHW group versus both other groups (linear regression unadjusted). They also measured BMI, diastolic blood pressure, total cholesterol, glucose and triglycerides, but these physiological measures did not differ significantly between the groups. Keyserling 2002\textsuperscript{108,109} measured HbA\textsubscript{1c} levels, total cholesterol levels, HDL cholesterol levels and weight, but these physiological measures did not differ significantly between the groups. Anand 2007\textsuperscript{79} found that, overall, there were no statistically significant changes in body weight, waist circumference, skinfold thickness or body fat percentage in the intervention versus the usual care group. Resnicow 2004\textsuperscript{118} did not assess any measures of health status. Elder 2006\textsuperscript{95,96} measured BMI, but failed to report the results.

Health behaviours
Three studies assessed physical activity levels: Keyserling 2002\textsuperscript{108,109} measured exercise over a period of 1 week using Caltrac accelerometers – devices worn on the hip and designed to detect and record movement; Staten 2004\textsuperscript{119} and Anand 2007\textsuperscript{79} rely on self-reported data. Keyserling 2002\textsuperscript{108,109} determined that the CHW group was significantly more active at 12 months than the
minimal intervention group [effect size approximate (unadjusted 3.0) ~52 kcal/day], but not significantly different from the group that had access to the clinic intervention. Staten 2004119 and Anand 200780 found no significant difference between the groups’ physical activity levels.

Dietary changes were measured in all five studies:

- **Total food energy**  Elder 200695,96 showed a significant difference in energy immediately after the intervention. This effect did not last to the 6- and 12-month follow-up time points. Keyserling 2002108,109 and Anand 200780 showed no differences in total daily energy intake.

- **Fats**  Resnicow 2004118 found significant reductions in the amount of fat eaten (effect size = 0.26). Anand 200780 also found a significant reduction in trans fatty acid consumption ($p = 0.02$, mean difference (D) = 0.8, effect size (ES) = 0.34, 95% CI −0.65 to −0.02) and a reduced consumption of ‘fats, oils and sweets’ by approximately two servings per day ($p = 0.006$, D = 1.9, ES = 0.12, 95% CI −0.44 to 0.19, compared with the control). However, there were no differences in the percentage of daily calories from fats or in the consumption of ‘milk, yoghurt and cheese’. Elder 200695,96 found significant reductions in dietary total fat and total saturated fat consumption. These effects did not last to the 6- and 12-month follow-up time points. Keyserling 2002108,109 found no significant differences between the groups’ percentage of calories from saturated fat or dietary cholesterol.

- **Carbohydrates**  Elder 200695,96 showed a significant reduction in total carbohydrates, glucose and fructose immediately after the intervention, but this difference was not seen at 6 and 12 months’ follow-up. Anand 200780 found no difference in percentage of calories from carbohydrates or the types of food served (such as ‘bread, cereal, rice, pasta’).

- **Proteins**  Anand 200780 found no difference in percentage of calories from protein or the types of food served (such as ‘meat, poultry, fish, dried beans, eggs, nuts’).

- **Fruit and vegetables**  Resnicow 2004118 found significant improvements in the levels of fruit and vegetables eaten (effect size of 0.39 for the two-item measure and 0.18 for the 17-item measure), but Staten 2004119 and Anand 200780 found no significant differences in the consumption of fruit and vegetables between their groups.

- **Drinks**  Only Anand 200780 measured consumption of drinks and they found that water consumption increased by ~0.4 of a serving per day ($p = 0.04$, D = 0.04, ES = 0.35, CI 0.03 to 0.67), and carbonated drink consumption decreased by ~0.2 servings per day ($p = −0.02$, D = 0.02, ES = 0.16, 95% CI −0.15 to 0.48).

**Participation**

Resnicow 2004118 measured the levels of social support to eat more fruit and vegetables on a scale developed for this study and found it was significantly improved (effect size 0.39). Keyserling 2002108,109 measured social well-being on a validated scale but this did not differ significantly between the groups.

Three studies80,95,96,119 did not measure participation.

**Health-care beliefs and knowledge**

One study measured health-care beliefs: Resnicow 2004118 measured autonomous/intrinsic motivation and controlled/extrinsic motivation with a validated outcome measure and self-efficacy with a measure developed for this study and found that these all significantly improved in the intervention group (effect sizes of 0.21, 0.33 and 0.22, respectively).

One study measured health-care knowledge: Keyserling 2002108,109 measured diabetes knowledge with a validated scale (see Dunn et al.198). Although they stated that there was a significant overall group effect ($p = 0.037$) they did not conduct the analysis to determine which group(s) produced this effect and whether it was significant.
The patient acceptability of the intervention was measured specifically in two studies.\(^{108,109,118}\) Resnicow 2004\(^{118}\) measured satisfaction with the programme; 77% of participants reported being very satisfied with the cookbook and educational materials, and 72% of those receiving at least one call reported being very satisfied with their volunteer advisors. Keyserling 2002\(^{108,109}\) measured programme acceptability. For clinic-based IC, 94% of 117 respondents reported being very satisfied with the amount of information and help the nutritionist gave about diet, and 88% were very satisfied with the counselling provided to enhance physical activity, whereas 15% reported having some difficulty getting to the clinic for these visits. For the community diabetes advisor component, 85% of 59 respondents felt the number of telephone calls was appropriate, 86% felt the role of community diabetes advisors in the programme was important, and 83% strongly agreed that talking to someone else with diabetes was very helpful. One study measured attrition rates between the groups, which can be suggested to be a surrogate marker of acceptability: Elder 2006\(^{95,96}\) found that the total attrition rate over 12 months was 21%; 23% in the promotora group, 24% in the tailored print group and 18% in the control group.

Two studies\(^{40,119}\) did not assess any measure of health-care knowledge or beliefs.

**Health-care use**

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

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

**Costs**

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

**Discussion**

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

The five studies identified did not measure if the LHAs had any effect on general health or QoL, our review’s primary outcomes. Three of the studies assessed a variety of physiological measures, the majority of which did not differ significantly between the groups. However, Staten 2004\(^{119}\) found small but statistically significant reductions in systolic blood pressure. Three studies assessed physical activity levels: Keyserling 2002\(^{108,109}\) found that they were significantly increased compared to a minimal intervention group but not when compared with the group with access to counselling sessions from the clinic. However, the size of the increase was small (~52 kcal/day)
and may well be within the range of measurement inaccuracy. Neither Staten 2004\textsuperscript{119} nor Anand 2007\textsuperscript{80} found any significant differences in physical activity levels.

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

Dickson-Gomez 2003\textsuperscript{89,90} and Dickson-Gomez 2006\textsuperscript{91,92}

Description of studies

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

Study design

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

Context of intervention

Population focus

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

Location

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

Referral/recruitment

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

Mechanism

Intervention components

Theoretical underpinning

Dickson-Gomez 2003\textsuperscript{89,90} used cognitive and affective process strategies from theories of behaviour change and added a social component derived from theories of social influence, social diffusion and social identity (this was particularly relevant, as in the training sessions emphasis was put on superordinate goals of protecting one’s community).\textsuperscript{199–203} Dickson-Gomez 2006\textsuperscript{91,92} used theories of peer modelling, dynamic social impact theory and diffusion theory
(which provides a framework for understanding the process by which innovations such as harm reduction practices are accepted, rejected or transformed by drug users).

**Aims**

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

**Origin**

The intervention was developed by the researchers\(^89,90\) or developed by the researchers with knowledge developed from previous collaborative research.\(^91,92\)

**Approach**

The LA\(\text{s}\) were encouraged to conduct HIV education and risk reduction in their community.\(^89,90\)

They also imparted information, demonstrated techniques (e.g. needle cleaning) and counselled participants.\(^91,92\)

**Topic focus**

HIV transmission prevention within drug-users, via safe sex and clean-needle promotion.\(^89-92\)

**Main activities**

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

**Mode of delivery**

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

**Role/training**

**Practitioner type**

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

**Level of training**

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

**Skill level**

Both of the studies used unqualified LAs.\(^89-92\)
Results of the review

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

Hours
Dickson-Gomez 2003\textsuperscript{89,90} and 2006\textsuperscript{91,92} did not employ their peer health advisors.

Level of formality
Dickson-Gomez 2003\textsuperscript{89,90} and 2006\textsuperscript{91,92} did not formally assess the competencies of their LAs.

Intensity of intervention
Frequency/hours/duration
The interventions in Dickson-Gomez 2006\textsuperscript{91,92} were opportunistic, and the frequency and duration of which were not specified. In Dickson-Gomez 2003\textsuperscript{89,90} interventions were also opportunistic – the peer educators conducted a median of 20 contact forms (range 1–111).

Results from studies
Dickson-Gomez 2003\textsuperscript{89,90} comprised both a qualitative and quantitative element (reported in two separate articles); the qualitative element is summarised here, whereas the quantitative element is reported below.

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

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

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

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

Dickson-Gomez 2006\textsuperscript{91,92} was a qualitative study and did not have results that could be categorised in the same way as those from quantitative studies. The results section focused on the challenges of conducting outreach in public or private drug use sites; the main challenge in public spaces was the drug users' fear of attracting the police. Access to private spaces depended on the
familiarity of the LAs with the space (whether using it themselves regularly), its gatekeeper and the presence, or not, of the ethnographer (which could arouse suspicion). The discussion focused on understanding how or why peer-led interventions work and contrasted traditional outreach with the HRLA model. Some LAs were older, well known and well respected within the drug use community, which enabled them to have a large impact on the HIV infection prevention practices. The strength of the personal ties that LAs had with other drug users was the most important asset in conducting the prevention work. Many LAs incorporated work into their daily routine and carried their backpacks filled with condoms, bleach kits and crack kits with them as they hung out on the streets or in parks. Because a lot of LAs were homeless they were spending a lot of time on the street, which enabled them to reach otherwise hard to reach subpopulations of drug users. Some LAs emphasised the importance of conducting outreach while people were using drugs, so that they could correct misuse of the prevention materials, demonstrate proper needle cleaning and tailor the intervention to the observed needs. LAs had more up-to-date information about drug-using sites and were less likely to be greeted with suspicion or hostility than traditional outreach workers. Some LAs allowed other drug users to use their homes and conducted HIV infection prevention there, which was seen as highly efficient.

Health status
In Dickson-Gomez 200691,92 many LAs reported positive experiences related to their own health and well-being, including their knowledge about risk and prevention.

Health behaviours
Dickson-Gomez 200389,90 report significant differences between intervention and control participants in overall drug use and unsafe practices: reduction in injection drug use (48% intervention vs 25% control, \( p < 0.05 \)); increase in cessation (44% intervention vs 22% control, \( p < 0.05 \)); and reductions in unhygienic needle use (69% intervention vs 30% control, \( p < 0.10 \)). Some success in reducing risky sexual behaviour is also reported: reduction in unprotected vaginal sex with casual partners (16% intervention vs 4% control, \( p < 0.05 \)); reduction in number of casual partners (18% intervention vs 7% control, \( p = 0.05 \)). There were no changes observed in condom use with regular partners. Regression modelling suggested that the intervention condition was almost three times more likely to result in a reduction in injection drug use than the control condition (OR 2.8) and a significant reduction in the use of unhygienic needles (\( \chi^2 = 3.57, p < 0.01 \)) at follow-up. The experimental condition was found to be more than seven times as likely to result in the increased use of condoms with casual partners. However, these results were based on a regression model that ignored any reported increases in risky behaviour (those reporting the same level or increased levels of risky behaviour were coded 0).

Dickson-Gomez 200691,92 presents a comparison of pre- and postintervention self-reported data on risk behaviours. The experimental condition was found to report a greater decrease of the number of casual sexual partners (\( \chi^2 = 3.33, p = 0.05 \)), and in multiple logistic regression analysis the experimental condition was found to be more than seven times as likely to report increase use of condoms with casual partners.

In Dickson-Gomez 200691,92 the programme had a positive impact on many LAs who sought to reduce their drug consumption or stop all together (\( p \leq 0.001 \)). Outreach work provided them with an alternative means of engaging with other drug-using community members. LAs also gained a greater sense of self in doing something useful for their community; many saw outreach work as a first step towards employment and a stable housing arrangement. LAs reported increased usage of condoms (\( p = 0.000 \)), a reduction in the number of sex partners (\( p \leq 0.001 \)), increases in cooking of drug solutions (\( p = 0.007 \)), use of rubber tips among crack users (\( p \leq 0.001 \)), and stopping sharing cookers/drug solutions (\( p = 0.35 \)). A total of 21.3% of
LA$s$ reported having entered a drug treatment programme in the 2 months prior to the closing interview.

**Participation**

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

**Health-care beliefs and knowledge**

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

**Health-care use**

No study in this category assessed health-care use.

**Costs**

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

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

**Discussion**

The two qualitative studies$^{89-92}$ examined the nature of the role and practices of peer health advisors, as they promoted HIV infection prevention within their drug and sexual networks and in their neighbourhood.

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

Dickson-Gomez 2006$^{91,92}$ found that the project had had a profound impact on many LA$s$. Beyond attempts to become free of drugs, many LA$s$ were taking very seriously their role to promote harm reduction practices among active drug users. This was further reinforced by positive feedback and support from community members, which suggests a high degree of acceptability of the intervention. However, Dickson-Gomez 2006$^{91,92}$ highlighted the fact that LA$s$ have many competing needs, such as finding housing, food, money and drugs, which sometimes, in the short term, have to take priority over outreach work. In the long term, funding LA$s$ would be key to the success and sustainability of the scheme.
SECTION 2: INTERVENTIONS CONTEXT, MECHANISMS AND OUTCOMES

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

**Context**  
*See Box 6.*

**BOX 6 Context**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Whole population within a specified locality</th>
<th>Population focus</th>
<th>Particular target groups or local communities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bottom up, emergent</td>
<td>Origins</td>
<td>Top down, mandated</td>
</tr>
<tr>
<td></td>
<td>Community setting</td>
<td>Context</td>
<td>Health-care setting</td>
</tr>
</tbody>
</table>

**Mechanisms**  
*See Box 7.*

**BOX 7 Mechanisms**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Informal</th>
<th>Generic, focus on overall health and well-being</th>
<th>Level of formality</th>
<th>Formal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Community outreach</td>
<td>Topic focus</td>
<td>Targeted, focus on specific health topics or behaviours</td>
</tr>
<tr>
<td></td>
<td></td>
<td>One-off contact</td>
<td>Referral</td>
<td>Biomedical referral model</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Peer or lay led</td>
<td>Frequency</td>
<td>Iterative, ongoing intervention</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unqualified, low/no skill</td>
<td>Practitioner type</td>
<td>Professionally driven</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unpaid volunteers</td>
<td>Skill level</td>
<td>Qualified, highly skilled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Part-time/sessional workers</td>
<td>Nature of role</td>
<td>Paid employees</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Group or community work</td>
<td>Hours</td>
<td>Full-time advisors/trainers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Community development and engagement</td>
<td>Mode of delivery</td>
<td>One-to-one intervention</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nurturing and supporting</td>
<td>Main activities</td>
<td>Evidence-based lifestyle advice, goal-setting</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Approach</td>
<td>Information-giving and signposting</td>
</tr>
</tbody>
</table>
In this section, the previous grouping of included studies by intervention focus will be disaggregated to one that enables a rich description of intervention characteristics. In order to attempt to establish potential links between intervention characteristics and achievements, this section is prefaced with an assessment of intervention success (Table 9). It is worth noting here that, in a realist perspective, the aim of a synthesis is to refine a programme theory. Thus the hierarchy of evidence applied in the quality assessment process does not apply here. The assessment of intervention success stands not as an equivalent metric to the pooled estimate obtained in standard meta-analyses, but rather as a crude indicator of the extent to which the combination of intervention and contextual components has achieved its intended aim. This is

### BOX 8 Outcomes

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Key outcomes</th>
<th>Health behaviour change within individual clients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enhanced capacity and social capital within communities</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TABLE 9 Degree of success**

<table>
<thead>
<tr>
<th>Degree of success</th>
<th>Studies</th>
<th>Intervention focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Gary 2003^{96-102} Griffiths 2005^{101,102} Kennedy 2007^{104-107} Lujan 2007^{113}</td>
<td>Chronic care</td>
</tr>
<tr>
<td></td>
<td>Morrow 1999^{114,115} Barlow 2000^{85} Lorig 1999^{110} Young 2005^{111-113}</td>
<td>Breastfeeding</td>
</tr>
<tr>
<td></td>
<td>Anand 2007^{85} Elder 2005^{91-93} Keyserling 2002^{108,109} Dickson-Gomez 2006^{97,98}</td>
<td>Chronic care</td>
</tr>
<tr>
<td></td>
<td>Ireys 2001^{103} Paskett 2006^{116,117} Andersen 2000^{118,119,120} Emmons 2003^{29,30} May 2006^{113}</td>
<td>Diet/physical activity</td>
</tr>
<tr>
<td></td>
<td>Woodruff 2002^{110}</td>
<td>HIV infection prevention</td>
</tr>
<tr>
<td></td>
<td>West 1998^{99}</td>
<td>Mental health</td>
</tr>
<tr>
<td></td>
<td>Bird 1998^{84}</td>
<td>Screening uptake</td>
</tr>
<tr>
<td></td>
<td>Bird 2002^{85,86,87,88}</td>
<td>Smoking cessation</td>
</tr>
<tr>
<td></td>
<td>Earl 2002^{85,86,87,88}</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Resnicow 2004^{118}</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lorig 2003^{118}</td>
<td>Chronic care</td>
</tr>
<tr>
<td></td>
<td>Staten 2004^{119}</td>
<td>Diet/physical activity</td>
</tr>
<tr>
<td></td>
<td>Dickson-Gomez 2003^{89,90}</td>
<td>HIV infection prevention</td>
</tr>
<tr>
<td></td>
<td>Earp 2002^{89,90,91,92}</td>
<td>Screening uptake</td>
</tr>
<tr>
<td></td>
<td>鸟 1998^{84-87}</td>
<td>Smoking cessation</td>
</tr>
</tbody>
</table>
thus a broad assessment, defined as the greatest impact for the least cost, but with a weighting for hard-to-reach communities. It was developed collaboratively by the research team. This was determined by developing a calculation based on six criteria:

1. whether they measured general health or QoL (as the focus of this review)
2. whether their primary outcome changed significantly
3. the effect size and relevant contextual information – as missing data prevented the generation of sizes for all studies, in some cases contextual information was used, for example a 0.3% reduction in HbA1c level represents approximately a 3% drop in cardiovascular risks.
4. impact on health in hard-to-reach communities was also deemed of greater value than in communities with regular contact with health-care organisations.
5. health-related LA’s training intensity
6. intervention intensity (see Appendix 11)
7. cost consideration.

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

All of the included studies with a low degree of success were focused on chronic care. Young 2005

For screening, Paskett 2006 and Andersen 2000owe their medium success rating to the fact that they conducted an intensive training (thus more costly) and did not describe training intensity, compared with the Earp 2002 and Bird 1998 in which the training was of moderate intensity.

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

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

Dickson-Gomez 2003 was allocated a higher rating than Dickson-Gomez 2006 as a related quantitative study could be identified, which identified successful outcomes.
Context of intervention

See Box 9.

**BOX 9  Context of intervention**

<table>
<thead>
<tr>
<th>Whole population within a specified locality</th>
<th>Population focus</th>
<th>Particular target groups or local communities</th>
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</thead>
<tbody>
<tr>
<td>Bottom up, emergent</td>
<td>Origins</td>
<td>Top down, mandated</td>
</tr>
<tr>
<td>Community setting</td>
<td>Context</td>
<td>Health-care setting</td>
</tr>
</tbody>
</table>

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

**Population focus**

See Box 10.

**BOX 10  Population focus**

<table>
<thead>
<tr>
<th>Whole population within a specified locality</th>
<th>Population focus</th>
<th>Particular target groups or local communities</th>
</tr>
</thead>
</table>

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

1. people with a shared belief or cultural background
2. people living in a restricted geographical area
3. people with a shared illness experience
4. people at a similar stage of life
5. people engaging in risky behaviours
6. people seeking to engage with services
7. people with similar economic status
8. homeless people.
The data presentation format (Table 10) was selected to allow highlighting of the challenging issue of multiple community definition and allegiances manifested in this review. This emphasises what can sometimes be called a hidden complexity in the aim of recruiting LAs from the ‘relevant’ community.

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

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

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

<table>
<thead>
<tr>
<th>Study</th>
<th>Intervention focus</th>
<th>ISa</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dennis 200288</td>
<td>Breastfeeding</td>
<td>M</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morrow 199913,115</td>
<td></td>
<td>M</td>
<td>✓</td>
<td></td>
<td></td>
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</tr>
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<td>Barlow 200083</td>
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<td>M</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Gary 200310,120</td>
<td></td>
<td>L</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>Griffiths 2005102,101</td>
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<td>L</td>
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<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
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<tr>
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<td>✓</td>
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<td></td>
</tr>
<tr>
<td>Lorig 2003101</td>
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<td>Lujan 2007113</td>
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<td>✓</td>
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<td></td>
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<td>Young 2005121,123</td>
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<tr>
<td>Anand 200780</td>
<td>Diet and physical activity</td>
<td>M</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Elder 200680,86</td>
<td></td>
<td>M</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Keyserling 2002108,110</td>
<td></td>
<td>M</td>
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<td>✓</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Resnicow 2004118</td>
<td></td>
<td>H</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staten 2004119</td>
<td></td>
<td>H</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Dickson-Gomez 2003102,190</td>
<td>HIV infection prevention</td>
<td>H</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Dickson-Gomez 2005102,192</td>
<td></td>
<td>M</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ireys 2001192</td>
<td>Mental health</td>
<td>M</td>
<td>✓</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Andersen 200013,132</td>
<td>Screening uptake</td>
<td>M</td>
<td>✓</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bird 199810,113</td>
<td></td>
<td>H</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earp 200213,131,134</td>
<td></td>
<td>H</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paskett 2008113,117</td>
<td></td>
<td>M</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emmons 2005105,107</td>
<td>Smoking cessation</td>
<td>M</td>
<td>✓</td>
<td>✓</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>May 2006115</td>
<td></td>
<td>M</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>West 199819</td>
<td></td>
<td>H</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
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<td>Woodruff 2002192</td>
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<td>M</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Intervention success: H, high; M, medium; L, low.
b. Study populations described as of low economic status; the assumption is made that the study sample was equally deprived.
intervention success. On the other hand, targeting people with a shared illness experience or at a similar stage of life does not seem to, in itself, lead to successful interventions. Determining people’s participation by their place of living or by their socioeconomic status does not seem to bear any impact on intervention success.

**Location of intervention delivery**

See Box 11.

**BOX 11 Location of intervention delivery**

<table>
<thead>
<tr>
<th>Community setting</th>
<th>Context</th>
<th>Health-care setting</th>
</tr>
</thead>
</table>

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

Griffiths 2005101,102 is the only study that described an intervention that took place in both general practices and community centres. Keyserling 2002108,109 describes an intervention that was both based in a clinic and made home telephone calls. Ireys 2001103 and Bird 199884–87 describe an intervention that takes place in the home and which also involved organised activities in the community. Staten 2004119 described an intervention in the home and clinic, with the organisation of group walks in the local area, and Resnicow 2004118 describes an intervention that took place both in the home and in African-American churches. It has to be noted that although Keyserling 2002,108,109 Lujan 2007112 and Griffiths 2005101,102 conducted the intervention in a primary care clinic, this was with people with a chronic condition who were probably well used to being in health-care settings.

In Dickson-Gomez 200389,90 while most outreach activities took place in the community, the LAs (for whom the intervention was deemed to lead to risk reduction behaviour) were trained in small groups in an unspecified location. Sometimes, the community was not the most conducive location, as outreach on the street was following the same patterns as other street interactions and could become a struggle for power or be seen as an infringement on adolescents’ hard-won territory. Conversely, in the home, the street code becomes less important than family relationships.

In Dickson-Gomez 200691,92 location was quite crucial, as the authors highlight that different types of outreach could be conducted in different locations. For example, conducting outreach where drug users were getting high enabled them to correct risky practices, and it would be difficult to demonstrate appropriate needle cleaning on the streets. Because LAs were active drug users, they had the most up-to-date knowledge about the sites most used, as public drug use sites frequently changed location.

In Dickson-Gomez 200691,92 50% of the LAs considered themselves homeless. This had a great impact on their ability to reach other drug users at times and in places where they would not otherwise be reached.
### TABLE 11  Intervention location

<table>
<thead>
<tr>
<th>Location</th>
<th>Studies</th>
<th>Intervention focus</th>
<th>IS*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home (visits/telephone/both)</td>
<td>Dennis 200218</td>
<td>Breastfeeding</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Morrow 199914,115</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Gary 200394–100</td>
<td>Chronic care</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>Young 2005123–123</td>
<td></td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>Anand 200780</td>
<td>Diet/physical activity</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Elder 200695,96</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Keyserling 2002108,109</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Resnicow 2004118</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Staten 2004119</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Ireys 2001103</td>
<td>Mental health</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Andersen 200042,81,82</td>
<td>Screening uptake</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Bird 199984–87</td>
<td></td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>Paskett 2006114,117</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Emmons 200558,97</td>
<td>Smoking cessation</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>West 199897</td>
<td></td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>May 2006113</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Woodruff 2002120</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>Health-care setting</td>
<td>Griffiths 2005103,102</td>
<td>Chronic care</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>Lujan 200712</td>
<td></td>
<td>L</td>
</tr>
<tr>
<td>Community</td>
<td>Keyserling 2002108,109</td>
<td>Diet/physical activity</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Barlow 200093</td>
<td>Chronic care</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Griffiths 2005103,102</td>
<td></td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>Kennedy 2007104–107</td>
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<td>L</td>
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<tr>
<td></td>
<td>Lorig 1999102</td>
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<td>M</td>
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<td>L</td>
</tr>
<tr>
<td></td>
<td>Resnicow 2004118</td>
<td>Diet/physical activity</td>
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</tr>
<tr>
<td></td>
<td>Staten 2004119</td>
<td></td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>Dickson-Gomez 200380,82</td>
<td>HIV infection prevention</td>
<td>H</td>
</tr>
<tr>
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<td>Dickson-Gomez 200681,82</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Ireys 2001103</td>
<td>Mental health</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Andersen 200042,81,82</td>
<td>Screening uptake</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Bird 199984–87</td>
<td></td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>Earp 200281,82,83,94</td>
<td></td>
<td>H</td>
</tr>
</tbody>
</table>

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

Andersen 200042,81,82 described two intervention arms, one consisting of telephone counselling and the other one of an array of CAs. Although they compared the effectiveness of either approach or a combination of both, it seems that intervention effectiveness was linked more to the amount of time volunteers spent implementing the intervention than to the intervention setting per se.

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

Mechanism

See Box 12.

BOX 12 Mechanism

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Community outreach</th>
<th>Referral</th>
<th>Biomedical referral model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Part-time/sessional workers</td>
<td>Hours</td>
<td>Full-time advisors/trainers</td>
</tr>
</tbody>
</table>

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

Intervention aim

See Box 13.

BOX 13 Intervention aim

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

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

Of note is the fact that no intervention tackled health maintenance, in any population. That is to say, studies on chronic conditions, for example, focused on the management of the chronic condition or on health issues directly related to it, rather than on other aspects of people’s health. An exception to this, however, is Kennedy 2007104–107 who examined exercise and diet. Similarly, for people identified at risk of a particular issue, interventions focused on preventing this from happening, rather than encouraging them to be otherwise healthy or to take up screening (e.g. in Anand 200780 participants had an average BMI of 34.8 at the onset of the study).

It is of note that with the exception of Gary 200398–100 and Keyserling 2002108,109 (although other issues such as social issues or smoking cessation, are said to be addressed, no outcomes have been measured for these) all of the studies targeting people with a shared illness experience focused on that illness in their intervention. This is also true of studies that targeted people engaging in risky
behaviours: they all focused on these behaviours, rather than, for example, on diet and physical activity. The reverse is also true: studies that focused on diet/physical activity, breastfeeding or screening uptake did not identify engagement in risky behaviours (i.e. smoking).

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

**Theoretical underpinnings**

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

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

<table>
<thead>
<tr>
<th>TABLE 12 Intervention aim</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention activity</td>
</tr>
<tr>
<td>------------------------</td>
</tr>
<tr>
<td>Health promotion</td>
</tr>
<tr>
<td>Chronic condition</td>
</tr>
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<td></td>
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<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td>Dickson-Gomez 2003</td>
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<tr>
<td></td>
</tr>
<tr>
<td>Emmons 2005</td>
</tr>
<tr>
<td>May 2006</td>
</tr>
<tr>
<td>Woodruff 2002</td>
</tr>
<tr>
<td>Barlow 2000</td>
</tr>
<tr>
<td>Gary 2003</td>
</tr>
<tr>
<td>Griffiths 2005</td>
</tr>
<tr>
<td>Kennedy 2007</td>
</tr>
<tr>
<td>Lorig 1999</td>
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<tr>
<td>Lorig 2003</td>
</tr>
<tr>
<td>Lujan 2007</td>
</tr>
<tr>
<td>Young 2005</td>
</tr>
<tr>
<td>Andersen 2000</td>
</tr>
<tr>
<td>Bird 1998</td>
</tr>
<tr>
<td>Earp 2002</td>
</tr>
<tr>
<td>Paskett 2006</td>
</tr>
</tbody>
</table>

a Intervention success: H, high; M, medium; L, low.
### TABLE 13 Theoretical underpinnings

<table>
<thead>
<tr>
<th>Aim</th>
<th>Theoretical underpinning</th>
<th>Studies</th>
<th>IS*</th>
<th>Intervention focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behaviour change</td>
<td>Stages of Change Model</td>
<td>Elder 2006&lt;sup&gt;75,76&lt;/sup&gt;</td>
<td>M</td>
<td>Diet/physical activity</td>
</tr>
<tr>
<td>Transtheoretical model of change</td>
<td>Keyserling 2002&lt;sup&gt;108,110&lt;/sup&gt;</td>
<td>M</td>
<td>Diet/physical activity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Paskett 2006&lt;sup&gt;116,117&lt;/sup&gt;</td>
<td>M</td>
<td>Screening uptake</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Emmons 2005&lt;sup&gt;19,17&lt;/sup&gt;</td>
<td>M</td>
<td>Smoking cessation</td>
<td></td>
</tr>
<tr>
<td>Motivational interviewing</td>
<td>Resnicow 2004&lt;sup&gt;118&lt;/sup&gt;</td>
<td>H</td>
<td>Diet/physical activity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Emmons 2005&lt;sup&gt;19,17&lt;/sup&gt;</td>
<td>M</td>
<td>Smoking cessation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Young 2005&lt;sup&gt;125–123&lt;/sup&gt;</td>
<td>M</td>
<td>Chronic care</td>
<td></td>
</tr>
<tr>
<td>Behaviour modification principles</td>
<td>Keyserling 2002&lt;sup&gt;108,110&lt;/sup&gt;</td>
<td>M</td>
<td>Diet/physical activity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gary 2003&lt;sup&gt;110–112&lt;/sup&gt;</td>
<td>L</td>
<td>Chronic care</td>
<td></td>
</tr>
<tr>
<td>Cognitive and affective process strategies from theories of behaviour change</td>
<td>Dickson-Gomez 2003&lt;sup&gt;110–112&lt;/sup&gt;</td>
<td>H</td>
<td>HIV infection prevention</td>
<td></td>
</tr>
<tr>
<td>Behavioural change theory</td>
<td>Earp 2002&lt;sup&gt;16,13,35&lt;/sup&gt;</td>
<td>H</td>
<td>Screening uptake</td>
<td></td>
</tr>
<tr>
<td>The communication behaviour change model</td>
<td>Paskett 2006&lt;sup&gt;116,117&lt;/sup&gt;</td>
<td>M</td>
<td>Screening uptake</td>
<td></td>
</tr>
<tr>
<td>Theoretical model of self-efficacy</td>
<td>Griffiths 2005&lt;sup&gt;129,112&lt;/sup&gt;</td>
<td>L</td>
<td>Chronic care</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lorig 1999&lt;sup&gt;112&lt;/sup&gt;</td>
<td>M</td>
<td>Chronic care</td>
<td></td>
</tr>
<tr>
<td>Self-efficacy theory</td>
<td>Barlow 2000&lt;sup&gt;93&lt;/sup&gt;</td>
<td>M</td>
<td>Chronic care</td>
<td></td>
</tr>
<tr>
<td>Social learning/social influence</td>
<td>Social learning theory</td>
<td>Anand 2007&lt;sup&gt;60&lt;/sup&gt;</td>
<td>M</td>
<td>Diet/physical activity</td>
</tr>
<tr>
<td></td>
<td>Paskett 2006&lt;sup&gt;116,117&lt;/sup&gt;</td>
<td>M</td>
<td>Screening uptake</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kennedy 2007&lt;sup&gt;114–117&lt;/sup&gt;</td>
<td>L</td>
<td>Chronic care</td>
<td></td>
</tr>
<tr>
<td>Social Cognitive Theory/principles</td>
<td>Keyserling 2002&lt;sup&gt;108,110&lt;/sup&gt;</td>
<td>M</td>
<td>Diet/physical activity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Emmons 2005&lt;sup&gt;19,17&lt;/sup&gt;</td>
<td>M</td>
<td>Smoking cessation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Woodruff 2002&lt;sup&gt;120&lt;/sup&gt;</td>
<td>M</td>
<td>Smoking cessation</td>
<td></td>
</tr>
<tr>
<td>Theories of social influence, social diffusion and social identity</td>
<td>Dickson-Gomez 2003&lt;sup&gt;110–112&lt;/sup&gt;</td>
<td>H</td>
<td>HIV Prevention</td>
<td></td>
</tr>
<tr>
<td>Normative influence</td>
<td>Anand 2007&lt;sup&gt;60&lt;/sup&gt;</td>
<td>M</td>
<td>Diet/physical activity</td>
<td></td>
</tr>
<tr>
<td>Network diffusion model and Dynamic Social Impact Theory</td>
<td>Dickson-Gomez 2006&lt;sup&gt;110–112&lt;/sup&gt;</td>
<td>M</td>
<td>HIV infection prevention</td>
<td></td>
</tr>
<tr>
<td>Social–Ecological Model</td>
<td>Resnicow 2004&lt;sup&gt;118&lt;/sup&gt;</td>
<td>H</td>
<td>Diet/physical activity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Earp 2002&lt;sup&gt;16,13,35&lt;/sup&gt;</td>
<td>H</td>
<td>Screening uptake</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Emmons 2005&lt;sup&gt;19,17&lt;/sup&gt;</td>
<td>M</td>
<td>Smoking cessation</td>
<td></td>
</tr>
<tr>
<td>Social support</td>
<td>Gary 2003&lt;sup&gt;110–112&lt;/sup&gt;</td>
<td>L</td>
<td>Chronic care</td>
<td></td>
</tr>
<tr>
<td>Middle range theory of community empowerment</td>
<td>Lujan 2007&lt;sup&gt;112&lt;/sup&gt;</td>
<td>L</td>
<td>Chronic care</td>
<td></td>
</tr>
<tr>
<td>Communication/learning principles</td>
<td>Active learning discovery approach</td>
<td>Keyserling 2002&lt;sup&gt;108,110&lt;/sup&gt;</td>
<td>M</td>
<td>Diet/physical activity</td>
</tr>
<tr>
<td></td>
<td>Adult learning principles</td>
<td>Keyserling 2002&lt;sup&gt;108,110&lt;/sup&gt;</td>
<td>M</td>
<td>Diet/physical activity</td>
</tr>
<tr>
<td></td>
<td>Gary 2003&lt;sup&gt;110–112&lt;/sup&gt;</td>
<td>L</td>
<td>Chronic care</td>
<td></td>
</tr>
<tr>
<td>Theories of persuasion</td>
<td>Anand 2007&lt;sup&gt;60&lt;/sup&gt;</td>
<td>M</td>
<td>Diet/physical activity</td>
<td></td>
</tr>
<tr>
<td>Minority Health Communication Model</td>
<td>Paskett 2006&lt;sup&gt;116,117&lt;/sup&gt;</td>
<td>M</td>
<td>Screening uptake</td>
<td></td>
</tr>
<tr>
<td>Theories of decision-making</td>
<td>Andersen 2000&lt;sup&gt;4,11,82&lt;/sup&gt;</td>
<td>M</td>
<td>Screening uptake</td>
<td></td>
</tr>
</tbody>
</table>

a Intervention success: H, high; M, medium; L, low.
self-efficacy models. Although Ireys 2001 do not reference supportive theory, they based the intervention on previous studies that stated the importance of social networks for well-being.

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

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

**Intervention approach**

See Box 14.

### BOX 14 Intervention approach

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

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

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

Dickson-Gomez 2006 describe on the surface a very straightforward distribution of prevention materials and slogans, but because they achieved very good penetration of an otherwise hard-to-reach population group, it would be insufficient to describe the intervention as information-giving. Because many LAs were living on the streets, they were available to drug users in a way that no other outreach worker could be. Some of the LAs who had a home, and were making it available to drug-using members of their close network, were in a privileged position to nurture these drug users to use harm reduction strategies. They described drug users knocking on their door in the middle of the night to ask for prevention material as they became known for their prevention work.
Interventions that used a strategy of nurturing to facilitate behaviour change tended to be less successful than others; this is true too of interventions that used multipronged approaches (interventions using three of the strategies listed).

**Intervention delivery mode**

See Box 15.

**BOX 15** Intervention delivery mode

<table>
<thead>
<tr>
<th>Informal</th>
<th>Level of formality</th>
<th>Formal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group or community work</td>
<td><strong>Mode of delivery</strong></td>
<td>One-to-one intervention</td>
</tr>
</tbody>
</table>

These two continuums were combined in one bidimensional figure (Figure 5), with the intention of mapping out the breadth of intervention delivery modes and, potentially, identifying gaps.
Figure 5 situates included studies according to whether they targeted individuals, groups or the general population, and according to the degree of formality of the intervention. Degree of formality was assessed by taking into account the degree of intervention standardisation of both the number and content of contacts with study participants.

Most interventions are situated in the upper half of the chart, indicating greater intervention formality, and towards the left-hand side, indicating a preference for individually targeted interventions. Interventions targeted at people with chronic conditions most often targeted groups, as per the Lorig 1999110 model. Anand 200780 is the only intervention targeting families and allowing LHAs to tailor frequency and content of contact. Dickson-Gomez 2003,89,90 and 200691,92 are the only interventions describing opportunistic meetings with drug users, at times and places most suited to them. The review does not include any informal intervention targeted at wider population groups. Interventions that were either highly formalised and targeting the general population or informal but targeting the individual tended to be more successful.

**Role/training**

**Practitioner type**

See Box 16.

**BOX 16 Role/training**

<table>
<thead>
<tr>
<th>Role/training</th>
<th>Practitioner type</th>
<th>Professionally driven</th>
</tr>
</thead>
</table>
None of the studies included described a professionally driven intervention. Equally, none distinguished between peer and lay roles. Table 15 describes three kinds of peer roles: peer with common personal experience; peer with a shared community; peer with both a common experience and community; and not a peer.

It is of note that studies that tended to use peers with a common cultural/socioeconomic background were more often conducting general health promotion activities (Table 15). The detail of peership is unclear in Gary 200398–100 as although the LA is described as ‘local’; the details of this locality (geographical or cultural) or their gender (75% of the participants were female) or life experience with regards to diabetes are not given.

In Dickson-Gomez 200389,90 LAs were older, previous or current drug-using African-Americans, targeting younger people often involved in selling drugs. The study highlights how intervention by men could lead to a struggle for respect, whereas there was more chance of a successful outreach encounter when the LA was more mature woman who could be perceived as a mother figure.

### Table 15 Practitioner type

<table>
<thead>
<tr>
<th>Practitioner type</th>
<th>Studies</th>
<th>Intervention focus</th>
<th>Details of ‘peership’</th>
<th>IS^a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peer with common personal experience</td>
<td>Dennis 2002^91</td>
<td>Breastfeeding</td>
<td>Multiparous volunteers with at least a 6 months’ positive experience of breastfeeding</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Kennedy 2007^104–107</td>
<td>Chronic care</td>
<td>People with chronic conditions</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>Lorig 2003^14</td>
<td></td>
<td></td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>Lorig 1999^110</td>
<td></td>
<td></td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Barlow 2000^15</td>
<td></td>
<td></td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Ireyes 2001^103</td>
<td>Mental health</td>
<td>Mothers with children with the same chronic conditions</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Emmons 2005^106,107</td>
<td>Smoking cessation</td>
<td>Smoking survivors of childhood cancer</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>May 2006^113</td>
<td></td>
<td>Smoking buddies</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>West 1998^33</td>
<td></td>
<td>Smoking buddies</td>
<td>H</td>
</tr>
<tr>
<td>Peer with a shared community</td>
<td>Morrow 1999^114,115</td>
<td>Breastfeeding</td>
<td>Resident of San Pedro Mártir, Mexico</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Lujan 2007^112</td>
<td>Chronic care</td>
<td>Mexican-Americans</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>Anand 2007^78</td>
<td>Diet/physical activity</td>
<td>Aboriginal origin</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Elder 2006^5,96</td>
<td></td>
<td>Spanish-Latinas</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Restnicow 2004^118</td>
<td></td>
<td>African-American churchgoers</td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>Staten 2004^118</td>
<td></td>
<td>Hispanic women</td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>Dickson-Gomez 2003^89,90</td>
<td>HIV infection prevention</td>
<td>African-American people living in Baltimore, MD</td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>Andersen 2000^82,83</td>
<td>Screening uptake</td>
<td>Women between 50 and 80 years old from 40 communities in Washington state</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Bird 1998^44–47</td>
<td></td>
<td>Vietnamese-speaking women</td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>Earp 2002^16,63,22,24</td>
<td></td>
<td>African-American women in five counties of NC</td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>Paskett 2006^16,117</td>
<td></td>
<td>Native American and African-American women</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Woodruff 2002^130</td>
<td>Smoking cessation</td>
<td>Latino paraprofessional community members</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Dickson-Gomez 2006^1,52</td>
<td>HIV infection prevention</td>
<td>Drug using experiences in the intervention area</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Griffiths 2005^151,152</td>
<td>Chronic care</td>
<td>Bangladeshi people with chronic diseases</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>Keyserling 2002^158,169</td>
<td>Diet/ physical activity</td>
<td>African-American women with type 2 diabetes</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Gary 2003^88–102</td>
<td>Chronic care</td>
<td>A local high school graduate</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>Young 2005^121–123</td>
<td></td>
<td>Call centre operatives</td>
<td>M</td>
</tr>
</tbody>
</table>

^a Intervention success: H, high; M, medium; L, low.
In Earp 200216,63,94 women who were interviewed about their experiences of interactions with LAs indicated that ‘the LAs own mammography behaviour did not influence whether they listened to the LAs’ advice or decided to get mammograms’, perhaps questioning the need for health-related LAs to have common personal experience. In Earp 200216,63,94 however, those who had received counselling from LAs did assign credibility to the LAs for having had personal or professional experience of breast cancer.

Although in Resnicow 2004118 efforts were made to recruit LAs with a college degree or graduate-level education, and a background in a helping profession, they were classified as peers with a shared community as, in common with the study participants, they were African-American churchgoers. Where possible, advisors in Ireys 2001103 were also in close geographical proximity to the participants.

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

**Level of training**

See Box 17.

**BOX 17 Level of training**

<table>
<thead>
<tr>
<th>Unqualified, low/no skill</th>
<th>Skill level</th>
<th>Qualified, highly skilled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unpaid volunteers</td>
<td>Nature of role</td>
<td>Paid employees</td>
</tr>
</tbody>
</table>

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

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

The level of LA training was only partly related to their experience, as both people who were not peers116,117,121–123 and people who both had a personal experience and a cultural/socioeconomic background in common with study participants91,92,108,109,114,115 received intensive training before the start of the intervention. This is true too of their professional background, as, although the LAs were provided with a moderate technical training, they had previously been professionally trained in Resnicow 2004.118 Of note is Paskett 2006116,117 in which some LAs were professionally qualified (as a nurse and social worker), but nevertheless received intensive training in order to enable them to increase awareness of the importance of mammogram screening and increase the uptake of it.
May 2006,113 Staten 2004119 and West 199830 are the only studies in which LAs received no training, as they were ‘buddies’ in a smoking cessation intervention, and attempting to stop smoking themselves in May 2006113 and West 1998,30 and women previously trained as CHWs in Staten 2004.119 The training in Elder 200695,96 is different from most of the other studies, as the sessions were based on informal discussions between those training to become promotores.

Interventions that used moderate or no technical training tended to be the most successful.
**Intensity of intervention**

See Box 18.

**BOX 18**

<table>
<thead>
<tr>
<th>One-off contact</th>
<th>Frequency</th>
<th>Iterative, ongoing intervention</th>
</tr>
</thead>
</table>

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

**TABLE 17** Intervention intensity

<table>
<thead>
<tr>
<th>Intensity of intervention</th>
<th>Studies</th>
<th>Intervention focus</th>
<th>Details</th>
<th>IS*</th>
</tr>
</thead>
<tbody>
<tr>
<td>High intensity</td>
<td>Barlow 2000</td>
<td>Chronic care</td>
<td>Six 2-hour sessions held weekly</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Griffiths 1998</td>
<td></td>
<td>Six weekly 3-hour sessions</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>Kennedy 2002</td>
<td></td>
<td>Six 2.5-hour group sessions held weekly</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>Lorig 1999</td>
<td></td>
<td>Seven 2.5-hour group sessions held weekly</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Lorig 2003</td>
<td></td>
<td>Six 2.5-hour group sessions held weekly</td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>Lujan 2007</td>
<td></td>
<td>Eight weekly group sessions; telephone conversation and postcards biweekly for 16 weeks</td>
<td>L</td>
</tr>
<tr>
<td>Medium intensity</td>
<td>’Morrow 1999</td>
<td>Breastfeeding</td>
<td>Three or six sessions</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Anand 2007</td>
<td>Diet/physical activity</td>
<td>Regular home visits</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Elder 2005</td>
<td></td>
<td>Fourteen home visits/telephone calls and 12 newsletters</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Staten 2004</td>
<td></td>
<td>Provider counselling, monthly newsletter, two health education sessions, two weekly telephone calls</td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>Dickson-Gomez 2002</td>
<td>HIV infection prevention</td>
<td>Intervention was the training of LAs</td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>Ireys 2001</td>
<td>Mental health</td>
<td>Seven visits of 60–90 minutes, telephone calls, three special events over a 15-month period</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Woodruff 2002</td>
<td>Smoking cessation</td>
<td>Four home visits, 1–2 hours long, three telephone calls 15–30 minutes long, over 78 days</td>
<td>M</td>
</tr>
<tr>
<td>Low intensity</td>
<td>Dennis 2002</td>
<td>Breastfeeding</td>
<td>Five or more telephone calls over 3 months</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Gary 2003</td>
<td>Chronic care</td>
<td>Sixty-two per cent of participants received at least three visits over the 2 years</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>Young 2003</td>
<td></td>
<td>Four to 12 20-minute telephone calls over 12 months</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Keyserling 2002</td>
<td>Diet/physical activity</td>
<td>On average, 9.7 calls per participant</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Resnicow 2004</td>
<td></td>
<td>Not all participants got intervention exposure</td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>Andersen 2000</td>
<td>Screening uptake</td>
<td>One telephone call/3 years and/or CA</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Bird 1998</td>
<td></td>
<td>Not all participants got intervention exposure</td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>Earp 2002</td>
<td></td>
<td>Not all participants got intervention exposure</td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>Paskett 2006</td>
<td></td>
<td>Regular home visits and follow-up telephone calls</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Emmons 2006</td>
<td>Smoking cessation</td>
<td>Up to six telephone calls over a period of 7 months</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>May 2006</td>
<td></td>
<td>In the first week, 2.7 telephone calls. This dropped to 1.2, 1.1 and 0.7 in the following weeks</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>West 1998</td>
<td></td>
<td>On average, 3.5 times over the 4-weeks study</td>
<td>H</td>
</tr>
</tbody>
</table>

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

b. Studies for which contact duration was not stated and was estimated at 20 minutes/telephone call and 30 minutes/home visit.

c. Study in which neither the number nor the duration of contacts was reported; it was classified as ‘medium intensity’.

d. Studies in which the general population was targeted, and in which not all participants were exposed to the intervention – they were therefore classified as ‘low intensity’.
individual); the nature of the contacts with the LA (group sessions, telephone calls, face to face); supporting intervention components (leaflets, newsletters, provision of NRT, referral to other professionals, etc.); and the average number of sessions, average duration of sessions and the overall duration of the intervention. An intensity score was developed from this (see Appendix 11). Scores < 15 are considered as a low intervention intensity; 16–69, medium intervention intensity; and > 70, high intervention intensity.

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

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

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

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

### Outcomes

See Box 19.

**Box 19 Outcomes**

<table>
<thead>
<tr>
<th>Enhanced capacity and social capital within communities</th>
<th>Key outcomes</th>
<th>Health behaviour change within individual clients</th>
</tr>
</thead>
</table>

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

**Health status (body function)**

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

**Health behaviours (activity)**

Because most interventions included had a single intervention focus, their outcome measurement related to the behaviour change required to tackle that focus.
<table>
<thead>
<tr>
<th>Measure</th>
<th>Studies</th>
<th>Intervention focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>General health</td>
<td>Barlow 2000[83]</td>
<td>Chronic care</td>
</tr>
<tr>
<td></td>
<td>Kennedy 2007[104–107]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lorig 1999[102]</td>
<td></td>
</tr>
<tr>
<td>QoL (measured by EQ-5D)</td>
<td>Griffiths 2005[101,102]</td>
<td>Chronic care</td>
</tr>
<tr>
<td></td>
<td>Kennedy 2007[104–107]</td>
<td></td>
</tr>
<tr>
<td>Psychological well-being (included anxiety and depression, positive and negative affect)</td>
<td>Barlow 2000[83]</td>
<td>Chronic care</td>
</tr>
<tr>
<td></td>
<td>Griffiths 2005[101,102]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kennedy 2007[104–107]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lorig 1999[102]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ireys 2001[103]</td>
<td>Mental health</td>
</tr>
<tr>
<td>Physiological measures (HbA1c, cholesterol, blood pressure)</td>
<td>Gary 2003[98–100]</td>
<td>Chronic care</td>
</tr>
<tr>
<td></td>
<td>Lujan 2007[112]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Young 2005[113–123]</td>
<td>Diet/physical activity</td>
</tr>
<tr>
<td></td>
<td>Keyserling 2002[108,109]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Staten 2004[119]</td>
<td></td>
</tr>
<tr>
<td>Pain</td>
<td>Barlow 2000[83]</td>
<td>Chronic care</td>
</tr>
<tr>
<td></td>
<td>Griffiths 2005[101,102]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kennedy 2007[104–107]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lorig 1999[102]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lorig 2003[111]</td>
<td></td>
</tr>
<tr>
<td>Fatigue</td>
<td>Barlow 2000[83]</td>
<td>Chronic care</td>
</tr>
<tr>
<td></td>
<td>Griffiths 2005[101,102]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kennedy 2007[104–107]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lorig 1999[102]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lorig 2003[111]</td>
<td></td>
</tr>
<tr>
<td>Weight/BMI/waist circumference, skinfold thickness, body fat percentage</td>
<td>Gary 2003[98–100]</td>
<td>Chronic care</td>
</tr>
<tr>
<td></td>
<td>Anand 2007[125]</td>
<td>Diet/physical activity</td>
</tr>
<tr>
<td></td>
<td>Keyserling 2002[108,109]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Staten 2004[119]</td>
<td></td>
</tr>
</tbody>
</table>

a. Also measured shortness of breath.

Health-care beliefs and knowledge (personal factors)

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

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

In Dickson-Gomez 2006 LAs reported increased knowledge about HIV infection risk prevention, and many reported engaging in safer practices, reducing their drug consumption or stopping usage altogether.
### TABLE 19 Measurement of health behaviours

<table>
<thead>
<tr>
<th>Measure</th>
<th>Studies</th>
<th>Intervention focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical activity (duration of exercise, energy expenditure)</td>
<td>Gary 200398–100</td>
<td>Chronic care</td>
</tr>
<tr>
<td></td>
<td>Kennedy 2007104–107</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lorig 199910</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lorig 2003111</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Anand 200780</td>
<td>Diet/physical activity</td>
</tr>
<tr>
<td></td>
<td>Keyserling 2002108,109</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Staten 2004119</td>
<td></td>
</tr>
<tr>
<td>Self-care</td>
<td>Griffiths 2005103,104</td>
<td>Chronic care</td>
</tr>
<tr>
<td></td>
<td>Gary 200398–100</td>
<td>Chronic care</td>
</tr>
<tr>
<td>Consumption of tobacco</td>
<td>Emmons 2005101,102</td>
<td>Smoking cessation</td>
</tr>
<tr>
<td></td>
<td>May 2006115</td>
<td></td>
</tr>
<tr>
<td></td>
<td>West 199810</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Woodruff 2002110</td>
<td></td>
</tr>
<tr>
<td>Diet (energy intake, intake of fats, fruits and vegetables)</td>
<td>Gary 200398–100</td>
<td>Chronic care</td>
</tr>
<tr>
<td></td>
<td>Kennedy 2007104–107</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Anand 200780</td>
<td>Diet/physical activity</td>
</tr>
<tr>
<td></td>
<td>Elder 200610</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Keyserling 2002108,109</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Resnicow 2004118</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Staten 2004119</td>
<td></td>
</tr>
<tr>
<td>Breastfeeding</td>
<td>Dennis 200288</td>
<td>Breastfeeding</td>
</tr>
<tr>
<td></td>
<td>Morrow 1999114,115</td>
<td></td>
</tr>
<tr>
<td>Safe sex/drug use</td>
<td>Dickson-Gomez 200391,92</td>
<td>HIV infection prevention</td>
</tr>
<tr>
<td>Uptake of/up-to-date screening</td>
<td>Andersen 200093–95</td>
<td>Screening uptake</td>
</tr>
<tr>
<td></td>
<td>Bird 199894–97</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Earp 200294–97,99</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Paskett 2006116,117</td>
<td></td>
</tr>
</tbody>
</table>

### TABLE 20 Measurement of health-care beliefs and knowledge

<table>
<thead>
<tr>
<th>Measure</th>
<th>Studies</th>
<th>Intervention focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-efficacy</td>
<td>Barlow 200093</td>
<td>Chronic care</td>
</tr>
<tr>
<td></td>
<td>Griffiths 2005101,102</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kennedy 2007104–107</td>
<td></td>
</tr>
<tr>
<td>Knowledge</td>
<td>Resnicow 2004118</td>
<td>Diet/physical activity</td>
</tr>
<tr>
<td></td>
<td>Lujan 2007112</td>
<td>Chronic care</td>
</tr>
<tr>
<td></td>
<td>Keyserling 2002108,109</td>
<td>Diet/physical activity</td>
</tr>
<tr>
<td></td>
<td>Bird 199894–97</td>
<td>Screening uptake</td>
</tr>
<tr>
<td></td>
<td>Paskett 2006116,117</td>
<td></td>
</tr>
<tr>
<td>Change in attitudes and beliefs</td>
<td>Lujan 2007112</td>
<td>Chronic care</td>
</tr>
<tr>
<td></td>
<td>Resnicow 2004118</td>
<td>Diet/physical activity</td>
</tr>
<tr>
<td></td>
<td>Paskett 2006116,117</td>
<td>Screening uptake</td>
</tr>
<tr>
<td>Communication with health-care providers</td>
<td>Griffiths 2005103,104</td>
<td>Chronic care</td>
</tr>
<tr>
<td></td>
<td>Kennedy 2007104–107</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lorig 2003111</td>
<td></td>
</tr>
</tbody>
</table>
Intervention acceptability

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

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

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

Young 2005 measured satisfaction with treatment and intervention acceptability and found a 50% support rate for this intervention format.

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

Keyserling 2002 measured programme acceptability. For the health advisor component, 85% of 59 respondents felt the number of telephone calls by the LA was appropriate, 86% felt the role of the advisors in the programme was important, and 83% strongly agreed that talking to someone else with diabetes was very helpful.
SECTION 3: ANALYSIS OF COST-EFFECTIVENESS

Introduction

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

Implementing health economic evaluations

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

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

Policy cost-effectiveness \(\Delta CE_p = \frac{\Delta C_p}{\Delta B_p}\)

\[\Delta CE_p = \left(\Delta c_i + \Delta C_i\right)/\Delta B_p\]

\[\Delta CE_p = (\Delta p_i \times \Delta c_i/\Delta b_i) + \Delta CE_i\]  

[Equation 1]
where:

- $\Delta CE_p$ is the cost-effectiveness of the programme
- $\Delta CE_t$ is the cost-effectiveness of the underlying behaviour change
- $\Delta C_p$ is the change in overall costs from the programme
- $\Delta B_p$ is the change in overall health benefits from the programme
- $\Delta C_t$ is cost of the health promotion programme
- $\Delta C_s$ is the change in costs from the underlying behaviour change
- $\Delta p$ is the proportional effect of the health promotion programme on the underlying health behaviour relative to the change required to achieve a gain of $\Delta b$
- $\Delta b$ is the health benefit from the change in the underlying health behaviour.

This formulation highlights the fact that health promotion programmes can never be more cost-effective than the cost-effectiveness of the underlying behaviour change. Promotion programmes are unlikely to be cost-effective if the health care promoted is marginally cost-effective. Despite its simplicity there are drawbacks to this approach. Lifestyle changes such as smoking cessation and increasing physical activity are unlikely to increase health-care resource utilisation; in fact they are likely to reduce it. The resulting negative cost-effectiveness ratios $\Delta CE_t$ are rarely reported.

Data from medical trials require careful scrutiny, as calculated cost-effectiveness ratios may include health-care resource utilisation not relevant to a public health intervention. Care is also required in the consideration of relapse rates.

**Cost-effectiveness estimates in this chapter**

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

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

**Cost estimates**

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

Expert Patients Programmes

Introduction
Three of the five studies reviewed are UK based, and Kennedy 2007104–107 evaluates the Expert Patients Programme, which has been implemented across the UK. Griffiths 2005101,102 and Kennedy 2007104–107 provide costs and all three UK studies provide outcomes measured with EQ-5D. In addition, a sister publication to Kennedy 2007104–107 provides a robust cost-effectiveness analysis.

Assessing evidence of effectiveness
All of the studies provide evidence of significant improvements in patient self-efficacy and self-care behaviour. In addition, there is evidence of an impact of the intervention on participants’ perceptions of their conditions. Griffiths 2005101,102 and Barlow 200093 demonstrate improvements in anxiety and depression using HADS, although these changes were not statistically significant in Griffiths 2005101,102. Kennedy 2007104–107 and Lorig 2003111 find significant improvements in psychological well-being and health distress attributable to the intervention. The evidence of an impact on physical health is mixed. All three UK studies applied the EQ-5D, although in Barlow 200093 this was limited to a subset of the participants. Only Kennedy 2007104–107 observed a difference that was statistically significant, after allowing for baseline characteristics, in favour of the intervention. Only Lorig 2003111 finds a significant reduction in pain.

Evidence is limited on whether health improvements are maintained following the intervention. Barlow 200093 and Lorig 2003111 applied outcome measurements after the control group received the intervention, and Lorig 2003111 demonstrates that improvements in the intervention group are maintained. Barlow 200093 presents plots of several outcome measures for the intervention group at 4 and 12 months, and for the control group at 4 months. Results at 12 months suggest a slight deterioration in the improvements observed 8 months after the intervention. The controls in this study showed improvements in the outcomes measured at 4 months, albeit not as great as in the intervention arm, and may have continued to improve at 12 months without the intervention. Hence it is possible that the additional benefits from the intervention are short term. The intervention may have accelerated the acquisition of long-term disease management skills that would have been acquired through experience over time.

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

Hence findings that the Expert Patients Programme improves self-efficacy and symptom management appear uncontroversial. The evidence for an improvement in HRQoL is weak. The findings by Kennedy 2007104–107 were not replicated in Griffiths 2005101,102 or Barlow 200093 and are not supported by the literature. It is possible that Expert Patients Programmes provide a very small improvement in HRQoL.

Evidence from the studies of a reduction in health-care utilisation is inconsistent. Kennedy 2007104–107 examined a comprehensive range of health-care utilisation and reports reductions in both primary and secondary care. Analysed by category, none of the differences are statistically significant, but the reduction in inpatient days in the intervention arm is sufficient to offset the cost of the programme. Griffiths 2005101,102 and Barlow 200093 examined only primary care
contact, and found no evidence of a reduction in health-care utilisation attributable to the intervention. Lorig 1999\textsuperscript{110} found a reduction in hospital stay but no reduction in primary care. Lorig 2003\textsuperscript{111} found a reduction in physician and emergency room visits attributable to the intervention, but no change in hospital stay. These results may reflect the diverse morbidities of participants in these studies, with considerable heterogeneity in resource use.

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

**Estimating the cost-effectiveness**

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

**Discussion**

Expert Patients Programmes offer the possibility of combining patient empowerment with long-term savings for the NHS. Per-patient costs are fairly small; Kennedy 2007\textsuperscript{104-107} uses estimates from the Department of Health of £250 per patient. While direct evidence of cost savings is mixed there is evidence that patient self-management courses can lead to measurable improvements in clinical indicators of disease control for diabetes\textsuperscript{229} and CVD.\textsuperscript{223} The potential for cost savings from improved disease control in these two areas is likely to be considerable.\textsuperscript{230,231} In areas such as arthritis management the scope for savings may be small. While it is tempting to conclude that, overall, these programmes lead to small reductions in resource use that offset their cost, there is insufficient evidence to conclude that the costs of the Expert Patients Programme are offset by savings across all major chronic disease areas.

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

Introduction
All three interventions use lay-led counselling to improve lifestyle and disease management in poor, urban populations with type 2 diabetes. The impact of each intervention is measured by assessing the level of the glycated haemoglobin marker HbA1c, a well-recognised marker of diabetes control. Although the population in Young 2005121–123 is a little older than that of the American studies, baseline HbA1c levels are similar in each study (7.9%–8.6%). For the purposes of the economic analysis we assume that the target populations are the same. The three interventions report different methods of delivering lay-led lifestyle and disease management advice to disadvantaged patients with diabetes. The telephone-led intervention described by Young 2005121–123 appears to be less resource intensive than the face-to-face interventions. An economic analysis of the intervention in Young 2005121–123 has been published123 and provides data on costs. The economic analysis presented here will consider all three interventions as alternative programmes to promote diabetes disease management in marginalised urban populations.

Assessing evidence of effectiveness
Effect sizes based on differences between intervention and control arms will be applied for the modelling of interventions based on Gary 200398–100 and Young 2005121–123 As noted earlier, regression to the mean may have exaggerated the upwards trend observed in the control arm in Lujan 2007112 Regression to the mean would act to exaggerate the treatment effect in the intervention arm, but this might be offset by an expected rise of 0.1% in HbA1c level over 6 months. Hence, the effect size for the intervention was taken as the absolute fall observed in the treatment arm over the 6-month period.

Estimating the health gain from changes in effectiveness
Two large trials in the UK235 and USA236 have examined the long-term impact of control of HbA1c level. The United Kingdom Prospective Diabetes Study (UKPDS) ran from 1977 to 1991 and examined the benefits of intensive blood glucose control in patients with type 2 diabetes. It also contained a nested trial examining the impact of lower blood pressure. Intensive drug treatment initiated a rapid fall in HbA1c level of 0.9%. This difference between intervention and control was maintained over the 10-year observation period, although HbA1c level steadily increased in both arms with time. The trial reported a 25% risk reduction in microvascular complications and a 16% (non-significant) reduction in coronary heart disease (CHD) events in the intervention arm.

A number of models of diabetes have been published, many utilising the UKPDS data. The Centers for Disease Control and Prevention (CDC) model241 examined the cost-effectiveness of intensive drug treatment in a typical cohort of newly diagnosed type 2 diabetes patients. In the base-case analysis, a reduction in HbA1c level from 7.9% to 7.0% yielded a lifetime QALY gain of 0.192 (discounted at 3%). The base case ignored any impact of lowered HbA1c level on CHD. Including CHD events increased the QALY gain to 0.333. Based on typical US practice, intensive drug treatment to reduce HbA1c level increased overall costs by US$7927 (‘1997 US$). However, under UK management style, costs were US$1309 lower in the intervention arm. The UKPDS Outcomes Model242 examined the same data and predicted a lifetime gain of 0.27 QALYs for a 0.9% reduction in HbA1c level. Bagust et al.237,238 sought to examine the impact of improved HbA1c level control for health providers and their cost estimate (£2026 increase) explicitly includes the indirect medical costs arising from prolonged longevity.

Two groups have modelled the impact of lowering HbA1c levels. The CORE240 model (Table 21) uses data from the National Health and Nutrition Examination Survey (NHANES)245 and the INITIATE246 study. The ‘typical’ patient in the model is 59 years old and has had diabetes for 12 years; hence the model simulates the effects of an intervention to reduce HbA1c levels in the existing diabetes population rather than from diagnosis. Costs and outcomes for three scenarios
are reported: lowering HbA1c level from 9.5% to 8.0%, from 8.0% to 7.0% and from 7.0% to 6.5%. A similar modelling exercise using the DiabForecaster model219 (Table 22) provides health outcomes and costs from a UK perspective for 1% reductions in HbA1c level over the range 6%–11%. The results are tabulated below.

Hence, estimates of the health gain of a reduction in HbA1c level from 8% to 7% from the CDC, UKPDS, CORE and DiabForecaster models fall in the range of 0.3–0.4 QALYs. The health gain from the CORE model (0.38 QALYs), which is slightly lower than that from DiabForecaster, will be assumed for a 1% reduction in HbA1c level. The DiabForecaster model estimates of cost, which exclude specific drug treatment costs and indirect medical care costs, will be applied. The study suggests a £600 saving for a fall from 8% to 7% in HbA1c level. The cost year is unclear in the report but appears to be 2004, hence this value was inflated to pounds sterling in 2008 (£686).

### Costing the interventions

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

Cost data from Gary 200398–100 and Lujan 2007112 are limited. The intervention in Gary 200398–100 appears to have employed a full-time nurse and a CHW for the 2-year duration of the intervention, with the CHW spending half of his/her time with the participants in the CHW arm. A yearly cost of £31,043 was assumed for the CHW based on the cost of a social work assistant,219 giving a per-participant cost of £757. Lujan 2007112 reports that two *promotores* provided the

### TABLE 21 The CORE model predictions for HbA1c level change

<table>
<thead>
<tr>
<th>HbA1c change (%)</th>
<th>Change in life expectancya</th>
<th>Change in QALYsb</th>
<th>Change in costs (US$)c</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.5–8.0</td>
<td>1.11</td>
<td>0.58</td>
<td>−5209</td>
</tr>
<tr>
<td>8.0–7.0</td>
<td>0.72</td>
<td>0.38</td>
<td>−3099</td>
</tr>
<tr>
<td>7.0–6.5</td>
<td>0.33</td>
<td>0.18</td>
<td>−1637</td>
</tr>
</tbody>
</table>

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

### TABLE 22 The DiabForecaster predictions for HbA1c level change

<table>
<thead>
<tr>
<th>HbA1c change (%)</th>
<th>Change in QALYsa</th>
<th>Change in costs (£)b</th>
</tr>
</thead>
<tbody>
<tr>
<td>11–10</td>
<td>0.6</td>
<td>−2900</td>
</tr>
<tr>
<td>10–9</td>
<td>0.6</td>
<td>−1600</td>
</tr>
<tr>
<td>9–8</td>
<td>0.4</td>
<td>−1200</td>
</tr>
<tr>
<td>8–7</td>
<td>0.4</td>
<td>−600</td>
</tr>
<tr>
<td>7–6</td>
<td>0.2</td>
<td>−400</td>
</tr>
</tbody>
</table>

a  Discounted at 1.5%.
b  Discounted at 6%.
Results of the review

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

Consideration of relapse rates

The three studies report HbA1c levels over different time periods. The long-term effectiveness of the interventions in sustaining reduced HbA1c levels is unclear. The economic analysis in Mason et al. applied best- and worst-case scenarios and a 'best guess'. The best-case scenario assumes that the intervention effects last for the life of the participants. The worst-case scenario assumes that they last for only the duration of the intervention. The 'best-guess' scenario assumed that maintaining reduced levels of HbA1c required 50% of the intervention costs in each subsequent year. The model based estimates assume that the changes in physiology are maintained for the patient's life.

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

Estimating the cost-effectiveness

Cost-effectiveness estimates for each intervention are presented in Table 23. Costs are calculated assuming that the intervention is repeated at year 3, 6 and 10 (discounted at 3.5%). The assumption that 50% of participants relapse was implemented by halving the estimated benefit (0.38 QALYs) and costs avoided (£686) for the reported changes in HbA1c level. The benefits and costs of lowering HbA1c level were assumed to vary linearly with the magnitude of the change.

In the base-case analysis the telephone-based counselling intervention, Young 2005 is cost-effective if decision-makers apply a threshold of £30,000 per QALY. The CHW intervention in Gary 2003 is more expensive per participant than the telephone counselling intervention, and less effective in reducing HbA1c level. It is dominated, and consequently not effective. The ICER for the promotora intervention suggests that it is highly unlikely to be cost-effective at a threshold of £30,000. These conclusions are robust to the sensitivity analysis applied here. Assuming that only 25% of participants subsequently relapse and return to previous HbA1c levels, or halving the estimated costs for the promotora intervention, fails to bring the ICER for Gary 2003 below £30,000. If 75% of participants relapse (i.e. only 25% of participants benefit from the programme) the ICER for the telephone intervention is just below £30,000.

Costs saved by the intervention have little impact on the overall costs; hence, conclusions on cost-effectiveness rest on the estimates of the health gain from the interventions. The benefit estimate we used is likely to be conservative as it is estimated purely on the change in HbA1c levels. In reality, lifestyle improvements by the participants may have resulted in falls in blood pressure and cholesterol levels, too. Nevertheless, it is prudent to consider how the results change when the
estimate of the health gain from reducing HbA\(_1c\) level is varied. The base-case analysis assumes that only 50% of participants benefit. This is equivalent to assuming that 100% of the participants gain half of the estimated health gain (0.19 QALYs). The sensitivity analysis varies the number of patients who relapse (and gain no health improvement) between 25% and 75%. Assuming that 75% of participants relapse reduces the benefit gained from the intervention by 50% compared with the base case. Assuming that 25% of participants relapse increases the benefit gained from the intervention by 50%. Hence the sensitivity analysis where the relapse rate is varied between 25% and 75% is equivalent to varying the benefit of HbA\(_1c\) level control by ±50% (0.19–0.57 QALYs).

**Economic analysis in Mason et al.\(^{123}\)**  
Mason et al.\(^{123}\) provided an evaluation of the intervention in Young 2005\(^{121–123}\) using the framework elaborated in the introduction (\textit{Equation 1}). Estimates of the underlying cost-effectiveness of reducing HbA\(_1c\) (\(\Delta CE\), US$7927/0.1915 QALYs = US$41,400) and the health gain (\(\Delta b\), 0.1915 QALYs) were taken from the CDC model.\(^{241}\) Mason et al.\(^{123}\) converted the ICER to UK pounds sterling (£26,900 per QALY) to estimate \(\Delta CE\). The programme costs \(\Delta c_i\) were calculated under the assumption that 50% of the costs were required on an ongoing basis per participant to maintain adherence and discounted at 5%. The resulting ‘loading factor’ for the programme of £16,500 per QALY was added to \(\Delta CE\) (£26,900) to generate an ICER for the telemedicine programme of £43,400 per QALY. The authors conclude that the programme is unlikely to be cost-effective.

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

<p>| TABLE 23 Cost-effectiveness calculations for the Chronic Care diabetes interventions |
|----------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|</p>
<table>
<thead>
<tr>
<th>Intervention</th>
<th>Cost (£)</th>
<th>Mean percentage fall in HbA(_1c) level</th>
<th>QALYs gained</th>
<th>Costs averted (£)</th>
<th>Overall cost (£)</th>
<th>Incremental cost (£)</th>
<th>Incremental benefit</th>
<th>ICER</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Base case</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young 2005(^{121–123})</td>
<td>905</td>
<td>0.31</td>
<td>0.0589</td>
<td>106</td>
<td>799</td>
<td>799</td>
<td>0.0589</td>
<td>13,565</td>
</tr>
<tr>
<td>Lujan 2007(^{112})</td>
<td>3467</td>
<td>0.45</td>
<td>0.0855</td>
<td>154</td>
<td>3313</td>
<td>2514</td>
<td>0.0266</td>
<td>94,511</td>
</tr>
<tr>
<td>Gary 2003(^{98–100})</td>
<td>2656</td>
<td>0.30</td>
<td>0.057</td>
<td>103</td>
<td>2553</td>
<td></td>
<td></td>
<td>Dominated</td>
</tr>
<tr>
<td><strong>Sensitivity analysis assuming 75% patients relapse to old lifestyle</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young 2005(^{121–123})</td>
<td>905</td>
<td>0.31</td>
<td>0.0295</td>
<td>53</td>
<td>852</td>
<td>852</td>
<td>0.0295</td>
<td>28,881</td>
</tr>
<tr>
<td>Lujan 2007(^{112})</td>
<td>3467</td>
<td>0.45</td>
<td>0.0428</td>
<td>77</td>
<td>3390</td>
<td>2538</td>
<td>0.0133</td>
<td>190,827</td>
</tr>
<tr>
<td>Gary 2003(^{98–100})</td>
<td>2656</td>
<td>0.30</td>
<td>0.0285</td>
<td>52</td>
<td>2604</td>
<td></td>
<td></td>
<td>Dominated</td>
</tr>
<tr>
<td><strong>Sensitivity analysis assuming 25% patients relapse to old lifestyle</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young 2005(^{121–123})</td>
<td>905</td>
<td>0.31</td>
<td>0.0884</td>
<td>159</td>
<td>746</td>
<td>746</td>
<td>0.0884</td>
<td>8439</td>
</tr>
<tr>
<td>Lujan 2007(^{112})</td>
<td>3467</td>
<td>0.45</td>
<td>0.1283</td>
<td>231</td>
<td>3236</td>
<td>2490</td>
<td>0.0399</td>
<td>62,406</td>
</tr>
<tr>
<td>Gary 2003(^{98–100})</td>
<td>2656</td>
<td>0.30</td>
<td>0.0855</td>
<td>155</td>
<td>2501</td>
<td></td>
<td></td>
<td>Dominated</td>
</tr>
<tr>
<td><strong>Sensitivity analysis assuming lower running costs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young 2005(^{121–123})</td>
<td>663</td>
<td>0.31</td>
<td>0.0589</td>
<td>106</td>
<td>557</td>
<td>557</td>
<td>0.0589</td>
<td>9457</td>
</tr>
<tr>
<td>Lujan 2007(^{112})</td>
<td>1734</td>
<td>0.45</td>
<td>0.0855</td>
<td>154</td>
<td>1580</td>
<td>1023</td>
<td>0.0266</td>
<td>38,459</td>
</tr>
<tr>
<td>Gary 2003(^{98–100})</td>
<td>1328</td>
<td>0.30</td>
<td>0.057</td>
<td>103</td>
<td>1225</td>
<td></td>
<td></td>
<td>Dominated</td>
</tr>
</tbody>
</table>
the cost-effectiveness of the telemedicine intervention is simply the loading factor £16,500 (as estimated in Mason et al.\textsuperscript{122}). This would indicate that the intervention in Young 2005\textsuperscript{121–123} is cost-effective in a UK setting, although this rests on a series of assumptions about the long-term cost and effectiveness of the programme required to calculate the loading factor. An ICER of £16,500 is close to our calculation.

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

Introduction

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

Estimating the health gain from changes in effectiveness

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

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

Estimating overall costs

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

There is considerable debate over the long-term cost savings from quitting smoking. Direct health-care costs saved have been calculated by a number of authors and are considerable. The impact on indirect health-care costs is less well established but it seems likely that these will rise. Some studies have suggested that these costs outweigh the direct cost savings but this...
Results of the review

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

\textbf{Estimating the cost-effectiveness}

To fully evaluate the cost-effectiveness of this intervention we need to compare it with the reasonable alternatives that might be provided. Around one-third of smokers attempt to quit each year, mostly without help,\textsuperscript{265} with 1% succeeding,\textsuperscript{250} suggesting that around 3% of motivated quitters succeed unaided. Estimates of the effectiveness of brief advice vary, with American estimates being higher than those in the UK.\textsuperscript{249,250,254,266,267} We apply an annual quit rate of 4% as assumed in the 2002 HTA assessment of the effectiveness of NRT and bupropion\textsuperscript{248} and a cost of £47 based on data from Stapleton \textit{et al.} (£33 in ‘1998’ GBP).\textsuperscript{250} Pharmacy services also provide smoking cessation services; we apply the data collected by Boyd and Briggs\textsuperscript{269} in a recent evaluation. We assume annual effectiveness rate of 10\% for smokers’ clinics in line with published evidence.\textsuperscript{249,270,271} Estimated costs of these clinics vary. Godfrey \textit{et al.}\textsuperscript{271} estimated an average cost per user of £161, Boyd and Briggs\textsuperscript{269} report the costs of a smokers’ clinic in Glasgow at £350 per user, and data on smokers’ clinics in Health Action Zones\textsuperscript{272} suggest that the average cost per user is £450 (all figures inflated to ‘2008’ GBP). We apply the figure reported by Boyd and Briggs.\textsuperscript{269}

Cost-effectiveness calculations are presented in Table 24.

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

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

\textbf{TABLE 24} Cost-effectiveness calculations for smoking cessation services

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

ED, extendedly dominated.
Discussion

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

Introduction

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

Assessing evidence of effectiveness

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

Estimating the health gain from changes in effectiveness

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

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

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

Estimating the cost-effectiveness

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

The results of the analysis are summarised in Table 25. Each pound spent on the breastfeeding support programme would increase cognitive ability by 0.0232 for males and 0.0328 for females. In the notional population the £30,000 expenditure would result in increases of 420 in the total PPVTR scores across the population of 500 males and 500 females. Each pound spent would also result in a 0.0112% reduction in the risk of being obese for one adolescent, or the notional
£30,000 expenditure would yield a 3.3% reduction among the population of 1000. Combining the estimates of the link between diabetes and insulin-dependent diabetes with the efficacy of the support programme gives a cost-effectiveness ratio of 0.00216 for reducing the risk of type 1 diabetes, each pound spent ‘buying’ a reduction in risk of 0.00216% in one child. The hypothetical £30,000 spent would almost halve the risk of diabetes in 60 of the 1000 children.

**Discussion**

The results of the Canadian study\(^2^7\) were not replicated in a study in a deprived area of the UK; McInnes *et al*.\(^2^7\) found that increases in breastfeeding at birth were not maintained at 6 weeks, despite peer support. The control arm in the Canadian study reported a rate of breastfeeding that is greater than the 2005 UK average. There is evidence to suggest that increases in breastfeeding, over time, are best maintained in areas with high initial rates of breastfeeding,\(^2^7\) unlike most of the UK areas where peer support programmes have been introduced. Potential differences in the socioeconomic backgrounds of the study participants and the general UK population also raise concerns. Research\(^2^7\) has shown that breastfeeding rates vary with socioeconomic and racial status. These factors are highly likely to be associated with any health outcomes associated with breastfeeding. The cost-effectiveness estimates presented here rely on epidemiological studies of the association between breastfeeding and outcomes in later life. In such studies it is very difficult to control for confounding sociodemographic characteristics (and others that may confound the estimates), and quite possible that these confounders are exaggerating the reported benefits of breastfeeding.

The current analysis did not consider potential savings resulting from breastfeeding. These could result either from a reduction in medical costs associated with ill health or from a reduced number of working days lost by working parents caring for their children. In his study of the economic benefits of breastfeeding, Weimar estimated cost savings of a minimum of US$500M (‘1998’ US$) in medical and other indirect costs (such as time off work) if breastfeeding rates at 6 months were raised from 29% to 50%.\(^2^8\)

Insufficient data exist to perform any meaningful sensitivity analysis because of the small number of studies and their differing choice of observation times. However, the Dennis 2002\(^2^8\) estimates should be viewed as the upper bound of potential effectiveness. Nevertheless, the comparative baselines in Dennis 2002\(^2^8\) and the UK in 2005 do suggest there is scope to increase the numbers of women breastfeeding their infant.

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**TABLE 25** Summary of the estimated effects of a breastfeeding programme

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive ability at 5 years</td>
<td>Increase in PPVTR of 0.0232 (0.0328) in one male (female) for every £1 spent</td>
</tr>
<tr>
<td>Obesity between 9 and 14 years</td>
<td>Each pound spent ‘buying’ a reduction in risk of 0.0112% in one child</td>
</tr>
<tr>
<td>Childhood type 1 diabetes</td>
<td>Each pound spent resulting in 0.00216% reduction in the risk of type 1 diabetes</td>
</tr>
</tbody>
</table>
Mental health – families of children with chronic diseases

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

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

Estimating the cost-effectiveness
With over 10 hours of contact time plus telephone support from the trained and paid peer advisors, in addition to support from a clinical specialist, costs of the intervention are likely to be significant. Whether these costs are justified depends on the value placed on the outcome – a mean improvement of 2.1 points on the PSI\(^2\) (range 0–100). It is possible that a less intensive and a cheaper intervention might also have lowered anxiety levels. Anxiety levels rose in the control arm but the offered support was not utilised, which may suggest that it was not the best comparator.

Discussion
Without any measure of benefit it is difficult to gauge whether the reduction in anxiety for participants justifies the required resources to support this programme. The use of utility measures in the field of mental health is limited, driven by concerns that they do not capture the benefits that interventions in this area provide.\(^2\) An alternative approach might be to measure the value families place on interventions such as this through contingent valuation methods.\(^2\)
Screening uptake

Introduction

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

Estimating the health gain from changes in effectiveness

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

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

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

Estimating the cost-effectiveness

The follow-up period in each of the studies is fairly short and it is far from certain that new users will remain mammography users in 5 or 10 years. Clearly, the effectiveness of these interventions hinges on whether the changed behaviour is maintained. We have assumed that the intervention needs to be repeated at years 3, 6 and 10 to ensure that relapse is restricted to 50% of participants. Sensitivity analysis examines the impact of assuming 50% relapse without reapplication of the programme and 0% relapse without reapplication of the programme. The data are presented in Table 27. In the base case, the ICER for the low-intensity intervention is over £250,000, and the
TABLE 26  Modelling studies examining the costs, benefits and cost-effectiveness of mammography

<table>
<thead>
<tr>
<th>Study</th>
<th>Year</th>
<th>Country</th>
<th>Ages (years)</th>
<th>Screen interval</th>
<th>Marginal cost</th>
<th>Currencya</th>
<th>Discount rate (%)</th>
<th>Life-years saved (LYS)</th>
<th>QALYs gained</th>
<th>ICERb</th>
<th>ICERb (QALY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forrest 1986b,c</td>
<td>1986</td>
<td>UK</td>
<td>50–65</td>
<td>Triennial</td>
<td>£23</td>
<td>1984 GBP</td>
<td>5</td>
<td>0.00755</td>
<td>£3000</td>
<td>£3300</td>
<td></td>
</tr>
<tr>
<td>Rosenquist 1994b,c</td>
<td>1994</td>
<td>USA</td>
<td>50–85</td>
<td>Annual</td>
<td>£619</td>
<td>1994 US$?</td>
<td>0</td>
<td>0.0088</td>
<td>£3825</td>
<td>US$16,800</td>
<td></td>
</tr>
<tr>
<td>Salzmann 1997f</td>
<td>1997</td>
<td>USA</td>
<td>50–69</td>
<td>Biennial</td>
<td>US$185</td>
<td>1991 US$</td>
<td>3</td>
<td>0.0329</td>
<td>0.0324</td>
<td>US$21,400</td>
<td>US$21,700</td>
</tr>
<tr>
<td>Boer 1998f</td>
<td>1998</td>
<td>UK</td>
<td>50–69</td>
<td>Triennial</td>
<td>£2132</td>
<td>1996 GBP</td>
<td>6</td>
<td>0.0088</td>
<td>£2522</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Norum 1999f,g</td>
<td>1999</td>
<td>Norway</td>
<td>50–69</td>
<td>Biennial</td>
<td>£75.4</td>
<td>1996 GBP?</td>
<td>5</td>
<td>0.0088</td>
<td>£3750</td>
<td>US$3750</td>
<td></td>
</tr>
<tr>
<td>Stout 2006f</td>
<td>2006</td>
<td>USA</td>
<td>40–79</td>
<td>Annual</td>
<td>£8713</td>
<td>2000 US$</td>
<td>3</td>
<td>0.0434</td>
<td>0.0386</td>
<td>€4405</td>
<td>€4933</td>
</tr>
<tr>
<td>Rojnik 2008f</td>
<td>2008</td>
<td>Slovenia</td>
<td>50–69</td>
<td>Triennial</td>
<td>€191.2</td>
<td>2004 €</td>
<td>3</td>
<td>0.0357</td>
<td>US$35,500</td>
<td>€11,512</td>
<td></td>
</tr>
<tr>
<td>de Gelder 2009f</td>
<td>2009</td>
<td>Switzerland</td>
<td>50–69</td>
<td>Biennial</td>
<td>€1300</td>
<td>2004 €</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ahern 2009f</td>
<td>2009</td>
<td>USA</td>
<td>40–79</td>
<td>Biennial</td>
<td>£1160</td>
<td>2004 US$</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

€, euros; GBP, pounds sterling; LYS, life-years saved; NZD, New Zealand dollars; US$, US dollars.
a Where the cost/year is not stated it has been estimated (indicated by '?').
b ICERs reported or calculated versus no screening, except de Gelder et al.,298 where the comparator is opportunistic screening.
c Cohort simulation modelling gains from screening the US population from 1990 to 2000.
d The biennial strategy modelled here includes clinical breast examination in the year in between mammography.
<table>
<thead>
<tr>
<th>Intensity</th>
<th>Programme cost (currency)</th>
<th>Costs converted to '2008' GBP</th>
<th>Total costs including repeats (£)</th>
<th>Effectiveness (%)</th>
<th>Additional QALYs</th>
<th>Total additional cost (£)</th>
<th>Incremental costs (£)</th>
<th>Incremental gain</th>
<th>ICER ('2008' GBP)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td><strong>Screening triennially from 50 to 70 (cohort of 1000 women) assuming replication of programme at years 3, 6 and 10 and 50% relapse rate</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low intensity</td>
<td>34,000 ('1995' US$)</td>
<td>34,000</td>
<td>119,313</td>
<td>1.25</td>
<td>0.4825</td>
<td>1850</td>
<td>121,163</td>
<td>121,163</td>
<td>0.4825</td>
</tr>
<tr>
<td>Higher intensity</td>
<td>730,000 ('2000' US$)</td>
<td>657,000</td>
<td>2,305,554</td>
<td>7.60</td>
<td>2.9336</td>
<td>11,248</td>
<td>2,316,802</td>
<td>2,195,639</td>
<td>2.4511</td>
</tr>
<tr>
<td><strong>Screening triennially from 50 to 70 (cohort of 1000 women) with no replication of programme and 50% relapse rate</strong></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low intensity</td>
<td>34,000 ('1995' US$)</td>
<td>34,000</td>
<td>34,000</td>
<td>1.25</td>
<td>0.4825</td>
<td>1850</td>
<td>35,850</td>
<td>35,850</td>
<td>0.4825</td>
</tr>
<tr>
<td>Higher intensity</td>
<td>730,000 ('2000' US$)</td>
<td>657,000</td>
<td>657,000</td>
<td>7.60</td>
<td>2.9336</td>
<td>11,248</td>
<td>668,248</td>
<td>632,398</td>
<td>2.4511</td>
</tr>
<tr>
<td><strong>Screening triennially from 50 to 70 (cohort of 1000 women) with no replication of programme and 0% relapse rate</strong></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Low intensity</td>
<td>34,000 ('1995' US$)</td>
<td>34,000</td>
<td>34,000</td>
<td>2.50</td>
<td>0.9650</td>
<td>3700</td>
<td>37,700</td>
<td>37,700</td>
<td>0.9650</td>
</tr>
<tr>
<td>Higher intensity</td>
<td>730,000 ('2000' US$)</td>
<td>657,000</td>
<td>657,000</td>
<td>15.20</td>
<td>5.8672</td>
<td>22,496</td>
<td>679,496</td>
<td>641,796</td>
<td>4.9022</td>
</tr>
</tbody>
</table>
higher intensity intervention ICER is much higher. Even at the extreme assumption of 0% relapse without reapplication of the programme, the interventions are not cost-effective at a threshold of £30,000 per QALY.

Andersen 2002 undertook a cost-effectiveness analysis of promotion of mammography using the cost and effect estimates from the CA arm of the trial. The trial data are modelled to calculate a cost per life-year saved of US$56,600 ('1995' US$) or £56,000 ('2008' GBP). The calculation appears to assume that all new users maintain mammography use for life. Details of the modelling are very brief. It is unclear what discount rate was used, or even if the promotion of mammography was considered as an alternative programme to the provision of mammography without promotion. Nevertheless, the figure supports the conclusion that the programme would not be considered cost-effective in the UK.

**Discussion**

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

Introduction

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

Assessing evidence of effectiveness

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

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

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

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

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

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

Estimating the number of HIV cases avoided

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

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

**US setting**

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

where:

- \(\pi\) = HIV prevalence = 0.2\(^{99,90}\)
- \(\alpha_d\) = risk of infection of needle used by seropositive user = 0.9\(^{107}\)
- \(\alpha_i\) = risk of infection from infected needle = 0.0067\(^{308}\)
- \(n\) = number of incidences of needle sharing.

Without the programme, \(n = 12\) and \(p = 0.0144\), but with the programme \(n = 9\) and \(p = 0.0108\). Hence the programme reduces the probability of infection by 0.0144 – 0.0108 = 0.0036. Application of the control programme would have averted 0.0036 \(\times 4 = 0.0144\) cases. The additional gain from the programme is an additional 0.0216 cases averted.

**UK setting**

The prevalence of HIV in the UK is much lower than in the USA (around 0.13\(^%\)\(^{109}\)). A prevalence of around 4.0\(^%\) is observed among injecting drug users in London, but outside London HIV prevalence among injection drug users in England is low (0.6\(^%\) in 2007). These values have a dramatic effect on the number of HIV cases averted by the programme (Table 28) and, consequently, its cost-effectiveness. Applying Equation 2 with the same parameter and programme estimates, but applying a background HIV rate (\(\pi\)) of 0.04 (London) and 0.006 (outside London), allows calculation of the potential HIV cases averted in a UK setting (Table 28).

**Estimating health gains**

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

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

Programme costs

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

Estimating the cost-effectiveness of the programme (London)

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

Compared with the control:
- costs saved = £143,000 × 0.00433 = £619
- QALYs gained = 5.37 × 0.00433 = 0.0233 QALYs.

Compared with no intervention:
- costs saved = £143,000 × 0.00722 = £1032
- QALYs gained = 5.37 × 0.00722 = 0.0388 QALYs
- marginal cost = £59,200 – £1032 = £58,168
- ICER = £58,168/0.0388 = £1,500,000.

Based on these estimates the programme is not cost-effective. However, the estimates of costs saved and QALYs gained are based only on the reduction in risky behaviour among LAs during the 6-month period of observation. While these very conservative assumptions are typically applied in the HIV infection prevention literature they are likely to underestimate the gains.
from such programmes. Clearly, LAs are likely to maintain reductions in risky behaviour for at least some time after the intervention, and at least some will undertake outreach work that leads to risk reductions in their community as well. We can accommodate the impact of extended behavioural changes and outreach in a crude fashion by multiplying the estimated number of cases averted with a scaling factor. Assuming that LAs maintain their behaviour change for 3 years would give a scaling factor of 6. (The estimation of HIV cases from the Bernoulli model does not scale linearly with time, but the difference is negligible. The calculated HIV cases averted over 3 years is 0.00428 – multiplying the 6-month estimate by 6 gives 0.00433.) Assuming that LAs achieve similar reductions in risk behaviour by two peers for 18 months would also require a further increase in the scaling factor by 6, giving a scale factor of 12. The impact of varying the scale factor is shown in Table 29.

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

Discussion

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

There is some evidence to suggest that programmes targeting risky behaviours in injecting drug users are cost-effective in their US setting, where the prevalence of HIV is high. The mean prevalence rates for HIV among injecting drug users in the USA was estimated at 16% in 2007.318 Cohen et al.’s analysis305 suggests that programmes that are highly cost-effective at this prevalence are unlikely to remain cost-effective at prevalences below 1%, as observed in injecting drug users in most parts of the UK.

Extremely generous assumptions of the effectiveness of the programme are required for it to be cost-effective in London for prevention of HIV. However, unhygienic needle practices are also likely to spread hepatitis C with long-term cost implications.319 Prevalences of hepatitis C of 60% among intravenous drug users in London and 35% outside London were reported in 2008.310 Without firm data on the likelihood of transmission of hepatitis C through shared needles, and

### Table 29: Impact of extrapolation of changes in risky behaviour in drug users and their peers

<table>
<thead>
<tr>
<th>Scaling factor</th>
<th>Cases averted</th>
<th>Costs saved (£)</th>
<th>Marginal cost (£)</th>
<th>QALYs gained</th>
<th>ICER (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0.02166</td>
<td>3097</td>
<td>56,103</td>
<td>0.116</td>
<td>484,000</td>
</tr>
<tr>
<td>6</td>
<td>0.04332</td>
<td>6194</td>
<td>53,006</td>
<td>0.233</td>
<td>227,000</td>
</tr>
<tr>
<td>12</td>
<td>0.08664</td>
<td>12,390</td>
<td>46,810</td>
<td>0.465</td>
<td>101,000</td>
</tr>
<tr>
<td>20</td>
<td>0.1444</td>
<td>20,649</td>
<td>38,551</td>
<td>0.775</td>
<td>50,000</td>
</tr>
<tr>
<td>27</td>
<td>0.1949</td>
<td>27,876</td>
<td>31,324</td>
<td>1.047</td>
<td>29,900</td>
</tr>
</tbody>
</table>
on the long-term costs and consequences of hepatitis C infection, it is impossible to estimate
the costs saved and health gains from hepatitis C infections averted through a programme such
as this. The conclusions on the cost-effectiveness of the programmes in the USA, where HIV
prevalence among injecting drug users is 16%, may apply equally well to a UK setting when the
impact on hepatitis C infections (35% prevalence among injection drug users) is considered.
Chapter 4

Discussion

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

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

Analysis of the robustness of the review (sensitivity analysis)

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

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

1. broader in focus (i.e. not limited to one health improvement issue)
2. possibly be more likely to reach disengaged populations (as, by nature, in research there is a process of consent to participate, which may alienate people)
3. possibly be more likely to link with other services (such as smoking cessation services, for example)
4. working on longer timescales, thus informally assessing knowledge acquisition and behaviour change
5. having a greater focus on barrier removal, which was addressed only in five of the studies included here
6. having more likely to engage in community development activities, which none of the studies included here did.

**Appropriateness of study design**
Some aspects of the study designs may have introduced bias. For example, some studies recruited participants from prior studies or from existing health-care services. Some trials were unblinded and combined this with self-report data, for example Earp and Paskett. This may be difficult to avoid for some of the interventions studied, but there were few efforts to acknowledge or mitigate the problem. Longer follow-up would help to determine the duration of effect. This might also allow for the LA role/HRLA intervention to develop and mould itself to community-specific needs.

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

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

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

The benefits of lifestyle interventions are typically accrued decades into the future for younger people, hence capturing long-term outcomes (such as a reduction in mortality from smoking cessation) simply is not feasible. As such, the surrogate short-term outcomes reported are...
appropriate. However, there are concerns that lifestyle changes may not be maintained, and in this respect the very short duration of many studies (few were over 1 year – Gary 2003\textsuperscript{98–100} are an example of this) raises concerns. There is also a lack of clarity as to whether maintenance requires continued input from LA – behavioural theory would suggest that a single input is unlikely to maintain behaviour change if the environment that the person is in does not also substantially change, for example drug users remaining in a drug-using community (unhelpful), smokers no longer being able to smoke in public venues (helpful).

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

**Statistical issues**

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

**Quality of reporting**

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

**Quality of intervention**

Assessing the quality of interventions may be problematic ‘where there is no preliminary research suggesting that an intervention should be administered in a particular way… it is important to establish to what extent these are standardised, as this will affect how the results should be interpreted’\textsuperscript{96} (p. 41). There is a methodological dilemma here, as high-quality research would require replicable interventions, and our synthesis shows that there was a tendency towards standardisation, but the nature of LA intervention may be more intuitive and resistant to the production of ‘one-size-fits-all’ model of delivery.
With respect to complex interventions typical of public health community-based programmes, the quality can be conceptualised as having two main aspects: (i) whether the intervention has been appropriately defined, (ii) whether it has been delivered as planned\(^\text{[1]}\) (p. 42). As discussed above, the studies included in this review often lacked a detailed description of their intervention mechanisms, as planned and as delivered. Dickson-Gomez 2006\(^\text{[2]}\)\(^\text{[3]}\) in adopting an ethnographic approach, is an exception to this. With this exception in mind, it is of note that this issue is linked to that of the quality of reporting, as detailed descriptive accounts of intervention components, while they would have been considered in a realist synthesis, could not be included in this review.

**Interdependency issues**

Some studies reported on interventions that would be difficult to implement or be too costly in real-life settings (Dickson-Gomez 2006\(^\text{[4]}\)\(^\text{[5]}\) provides an example, in that the LAs would require salary to work in the longer term, and in that the background rates of HIV infection in the UK would mean that this intervention would not be cost-effective in this setting). Interventions are inevitably interdependent on their context, an issue that the realist approach used here has started to tease out, but this is rarely acknowledged in the published literature.

**Generalisability**

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

While not always granted statistical significance, small effect sizes may be important in public health setting. Indeed, Sorensen et al.\(^\text{[6]}\) assert that ‘when risk is widely distributed in the population, small changes in behaviour observed across an entire population are likely to yield greater improvements on the population-attributable risk than larger changes among a smaller number of high-risk individuals’ (p. 380).

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

**Evaluation approaches and research designs**

All research was conducted by professionals/academics, with no peer involvement in the research process; so, for example, when observed by ethnographers\(^\text{[7]}\)\(^\text{[8]}\) the peers ‘led the ethnographers around’, showed them ‘relatively’ safe environments, and people, and probably showed only behaviours regarded as ‘positive’ by the researchers. There may be issues of concern regarding the ‘not stated’/’not seen’ behaviours. For example, Ungar et al.\(^\text{[9]}\) showed peers wanting to be ‘invisible’ to fulfil their roles more effectively.

**Evidence application and utilisation: processes and challenges**

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

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

**Contextual issues**

**Evidence**

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

**FIGURE 6** Lifecycle advisor intervention.
Policy priorities
Although most included studies stated that their target population was underprivileged and lacked access to services, none referred to tackling health inequalities as a study aim. Some, however, such as the screening interventions, tackled inequalities in that they made the screening more available to otherwise mostly disengaged populations. However, this was not an explicit aim of the study. Maybe more obviously, the HIV infection prevention studies (Dickson-Gomez 2006\textsuperscript{91,92} in particular) sought to engage drug users in the delivery of health care. As such, they fulfilled a dual purpose of (1) engaging these hard-to-reach groups and (2) making safe practice advice and materials more available to them, thus reducing barriers to health. The ethnographic design of the study also meant that the message delivered was not solely from on high, but also took local practices and microcultural dimensions into consideration. Dickson-Gomez 2006\textsuperscript{91,92} put a particular emphasis on highlighting the benefits of HRLA work on the LAs themselves and described how, for many of them, undertaking the LA role was the first step to employment and a possible end to homelessness and addiction.

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

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

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

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

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

Mechanisms

Intervention aim

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

Intervention delivery mode

This was particularly relevant to the included studies, in that by necessity of producing and recording evidence (often by means of activity logs), few studies reported on ad hoc informal, but yet informative, conversations. Dickson-Gomez 200691,92 was an exception to this, but used an ethnographic study design to observe interactions between drug users and trained LAs.

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

The CDSM and associated programmes deserve particular attention. They have been assessed in this review as potentially cost-effective and have been widely replicated throughout the world. In contrast with the acknowledgement in the Choosing health7 document that one size fits all might not be appropriate; Lorig 1999110 have developed a highly formulaic intervention, adaptable to a large number of disease groups. There are a few notable differences between this and other HRLA interventions. While groups are defined by behavioural characteristics in the case of interventions targeting healthy eating or screening, for example, they are defined by physiological or physical characteristics in the case of CDSM programmes. The aims of the interventions also differ, in that people with chronic conditions are helped to live with their condition; whereas in other areas, participants are not learning to live with lack of exercise or physical activity, but try to change – thus a change in engagement with risk is a key differential factor.

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

Intervention approach

Most studies included in this review focused on providing information by an alternative message giver (as was predominantly the case in the diet and physical activities study group, with the
exception of Anand 200780 and Elder 200695,96); seven studies used this approach only. The assumption is that the message is thus translated in a more acceptable and effective manner. Less than half of the studies described the creation of supportive social environment to help behaviour change. It thus appears that most interventions included here were in support of standard advice (chronic care, the buddy schemes in smoking cessation or breastfeeding, for example). In a few cases, as in the HIV infection prevention studies or in mental health, they were presented as an alternative and more effective approach to standard care. The screening studies focused on reaching out to populations to bring them to standard screening practices, so fulfilled more the role of a bridge between disengaged populations and standard models of care.

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

Training
The relationship of the amount and area of LA training to intervention effectiveness remains unclear. Equally, the effect of training on the lay and/or peer status of LAs remains unexplored. Earp 200216,63,93,94 presents the impact of training on intervention acceptability and credibility, as participants nominated the fact that LA had taken a course as one of the reasons why they would feel comfortable talking to them. Some studies followed a pseudoprofessional approach with respect to recruitment, training and remuneration, and the LAs were rarely selected by the community they were intended to serve.

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

Outcomes
Although papers included in the review often discuss the content of the intervention, what they do that leads to positive change is very rarely described. So, although it is possible to say that LAs are effective in improving health and well-being, the outcome–causality chain is not clear. Disappointingly, the situation reported by the WHO 20 years ago with respect to CHWs, i.e. a lack of understanding of how to realise the potential of the role12 continues to plague the LA role. The dominant mechanisms of action appears to balance on the assumption that a change in knowledge leads to change in beliefs, which leads to change in health behaviours, which leads to improvements in health, QoL, activity, participation, etc. Three key issues emerge for comment. First, the time scale of many of the reported studies is too short to allow demonstration of movement along a knowledge to improved health trajectory. The general assumption is that the movement is linear and not dependent on continued or evolving and cumulative interventions. Second, there is a clear need to identify and measure intermediate outcomes to demonstrate progress on such an outcomes continuum. Third, because of the contextual sterility of intervention descriptions, it remains unclear to what extent the LA intervention was a
contributor to other programmatic interventions, as is often the case with respect to public health practice. Thus the partnership or cumulative impact or potential is therefore not clear.

**Acceptability**

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

**Equitability**

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

**Cost-effectiveness**

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

A considerable amount of uncertainty pervades much of this analysis. Estimates of the health gains are likely to be robust in mammography and diabetes management, as they are based on extensive trial data modelled by experienced groups. Less attention has been paid to modelling the health gains from smoking cessation, but extensive epidemiological data suggest that the estimate used here is conservative. Consequently, the conclusions on smoking cessation in this study are likely to be robust, and they are similar to many published studies of cessation services. The analysis of mammography used generous estimates of the benefits of the programme and the results are likely to be robust, although other authors have come to different conclusions. The greatest uncertainty exists over the benefits of breastfeeding. Few would doubt that benefits exist, but the evidence of improvements in cognitive ability and reductions in obesity and type 1 diabetes is controversial given the inevitable environmental confounders. Without an estimate of the health gains from breastfeeding it is very difficult to judge whether promotion is cost-effective. It should be noted that the small number of studies reviewed in each area raises the possibility of publication bias, leading to an overestimate of the effectiveness of LA programmes.
The greatest uncertainty arises with respect to maintenance of behaviour changes. Data from the smoking literature are encouraging, in as much as they suggest that a proportion of quitters remain abstinent. Few data exist on whether changes in diet or physical activity are maintained but the evidence from the weight loss literature is not encouraging. It is quite possible that long-term abstinence from smoking is easier to maintain than dietary improvements and physical activity routines given the financial incentives to abstain. Data on long-term maintenance are essential if judgements on the viability of diet and physical activity promotion programmes are to be made.
Chapter 5
Conclusions

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

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

■ Lifestyle advisor interventions in chronic care are cost-effective. The effectiveness of the CDSM approach is linked to their largely engaged target group. Their aim varies from that of some of the other HRLA in that they help people live with a condition, rather than necessarily aiming at behaviour change. For people with chronic conditions, there is a pre-existing problematisation, which happened at the time of diagnosis, whereas this problematisation is introduced by some of the other HRLA interventions, which inevitably impacts on intervention acceptability and impact.

■ Lifestyle advisor interventions for smoking cessation are cost-effective, because of the important health gains that derive from cessation. The economic analysis excluded two studies because their effectiveness did not reach statistical significance. The buddy schemes explored in these studies present, however, a number of advantages: they are not costly to run and they adopt the kind of unstructured and informal intervention rarely described in the literature. Thus, as a practice model, they may offer potential.

■ From the evidence that could be accessed, the cost-effectiveness of LA interventions for breastfeeding is inconclusive. In these interventions, peers were selected for their common past experience in breastfeeding, and the target group was defined by their stage of life, rather than being classified ‘at risk’ or carrying an existing diagnosis. Thus, for these interventions the aim may be not so much behaviour change as behaviour enhancement, with a dual goal of promoting mother and baby health. These interventions focused on an optimal breastfeeding duration of 3–6 months and do not, therefore, present the same issues of longitudinality of effect as the other intervention types.

■ Included studies did not allow the production of conclusive cost-effectiveness estimates for LA interventions for mental health. As for the chronic care intervention model, the problematisation (being a mother of a child with a chronic condition) pre-dated the intervention. This intervention thus uses other HRLA intervention modes (pairing people with similar experiences, as in breastfeeding or smoking cessation) to a group that presents similar characteristics to the CDSM programme.

■ Lifestyle advisor interventions for screening uptake are not cost-effective. These interventions did reach, however, a large number of people, presented on the whole high degrees of
acceptability and targeted population groups that tended to be disengaged from mainstream service provision.

- Lifestyle advisor interventions for diet and physical activity are not cost-effective. Of note here is one of the studies, where the intervention target was the whole family, rather than solely the individual. In the context of this review, this is a unique approach that has potential – in particular, it focused on nurturing and barrier removal. While the approach seems to offer an alternative potential, intervention component description was too limited, unfortunately, to draw further lessons.

- Lifestyle advisor interventions for HIV infection prevention were cost-effective, but not in a UK context. They did, however, succeed in reaching hard-to-reach communities and building on social capital, two aims of the health trainer scheme in the UK. As far as research methodologies are concerned, the Dickson-Gomez et al. study offers a unique approach, combining ethnography as a means to understand local needs and cultures as well as quantitative description of intervention effect.

Recommendations for practice

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

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

Recommendations for a future programme of research

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

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

Target groups:

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

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

Intervention aim:

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

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

Outcome identification and measurement:

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

- Health-related lifestyle advice schemes would benefit from a development of current methodological advancements\(^3\) to help identify and assess short-, medium- and long-term intervention outcomes. In the long term, this would encourage the publication of promising outcomes and thus strengthen the HRLA evidence base.

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

Systematic reviewing in public health:

- A greater engagement with realistic review or synthesis principles would allow exposure of contexts and mechanism components that influence a range of outcomes in HRLA interventions. Indeed this review, in using realist principles in the synthesis of the data, has refined programme theories (theoretical underpinning, intervention aim, approach, intensity and delivery mode and role/training) so that they may now be reviewed individually.

- This review supports previously published commentaries\(^6\) on the necessity for the development of quality assessment tools that could allow increased methodological flexibility.
Acknowledgements

Contributions of authors

Susan M Carr  Project management, ethical approval processes, UCL audit review, health trainer lead interview protocol development, search protocol development, include/exclude reviewing, quality assessment, data analysis and interpretation, report writing.

Monique Lhussier  UCL audit review, quality assessment, data extraction database development, data extraction, data analysis and interpretation report writing.

Natalie Forster (September 2008–9)  Database searching, quality assessment, data extraction, data analysis and interpretation.

Lesley Geddes  Search protocol development, UCL audit review, health trainer lead interview protocol development, database searching, include/exclude reviewing, quality assessment, data analysis and interpretation.

Katherine Deane (Newcastle University November 2007–8; University of East Anglia 2008–9)  Systematic review methodology expertise, specific contributions to Chapter 3 (Section 1) and review of reviews.

Mark Pennington  Economic analysis and modelling.


Martin White  Expertise in conducting systematic reviews and the development and evaluation of complex public health interventions.

Susan Michie  Expertise in mechanism of behaviour change and national health trainer audit.

Cam Donaldson  Economic analysis expertise.

Anthony Hildreth  Statistical review.

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- Peter McMeekin, Newcastle University, Newcastle upon Tyne. Support for economic analysis.
- Rachel Baker, Newcastle University, Newcastle upon Tyne. Support for economic analysis.
References


Appendix 1

Review of reviews

Rationale for inclusion of reviews

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

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

Excluded studies

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

The remaining 15 reviews covered a wide variety of areas, some of which are not covered by the systematic reviews included below, but none of them made any claims to be systematic, and
in fact some of the excluded reviews were explicitly opinion pieces that presented a particular argument with no attempt at impartiality. Therefore we did not feel we could include their conclusions because of the significant risk of bias.

Lifestyle advisors engaged in general health improvement or health promotion

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

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

The poor quality of the RCTs’ methods meant that we excluded the majority (six of seven) of the studies included in the review of Dale et al. in our review (see Table 3 for review studies included or excluded from this review). Dale et al.’s review of telephone support concluded that, although their review of seven RCTs provided some evidence that peer support telephone calls can be effective for certain health-related concerns, few of the studies were of high quality and so results should be interpreted cautiously. There were many methodological limitations, thus limiting the generalisability of findings.

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

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

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

Rhodes et al.’s review included 37 studies of a variety of methodologies of which only two were included in our review. Rhodes et al. concluded that given the long history of using LAs
as an approach to health promotion and disease prevention, and the current emphasis of LA approaches as a potential solution to health disparities in general, and among Hispanics/Latinos in particular, few rigorous studies have been published that document the effectiveness of LAs on a variety of public health concerns.

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

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

**Lifestyle advisor engaged in improving diet**

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

**Lifestyle advisor engaged in improving maternal and infant health**

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

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

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

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

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

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

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

**LAs to support smoking cessation**

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

Only one study from each review was included in our final review. There was substantial overlap of studies between the two reviews, with them having six studies in common. Unsurprisingly, their conclusions were similar. Park et al. failed to detect an increase in quit rates after partner support interventions. Limited data from several of the trials suggest that these interventions did not increase partner support either. No conclusions can be made about the impact of partner support on smoking cessation. May and West concluded that the research...
methodology in many cases was poor. The evidence would suggest that in the context of a smokers’ clinic the use of buddies may be of some benefit. There is a lack of evidence regarding the efficacy of the use of buddies in community interventions. May and West’s\textsuperscript{160} greater optimism for buddy support may have been influenced by their involvement in the conduct of those studies.

LAs using specific models of intervention

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

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

Reviews’ research recommendations

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

Discussion

Overall, the reviews suggest that health-related LAs may be of use in improving access to health care, and may reduce health disparities – in part by acting as cultural leverage. The evidence is variable and can give only limited support to health-related LAs having a positive impact on health knowledge, health behaviours and health outcomes. It is likely that factors that are often poorly described in the original studies, such as the context (e.g. the character of the advisors and advisees and their communities), mechanism (e.g. proposed mechanism of action, detailed descriptions of the actual delivery of the interventions) and outcomes (e.g. justify the outcomes in terms of relevance to the participants, their community, their reliability, sensitivity, validity, and the minimum size of relevant change, and the costs in terms of time, impact on lifestyle, and monetary costs), are of importance in the development of successful interventions. Without the information on context, mechanism and outcomes, an understanding of which interventions mediated by health-related LAs are likely to succeed or fail will remain elusive.
### TABLE 30 Tables of included reviews

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<tr>
<td>Aim</td>
<td>To assess the effects of peer support telephone calls in terms of physical (e.g. blood pressure), psychological (e.g. depressive symptoms), and behavioural health outcomes (e.g. uptake of mammography) and other outcomes</td>
</tr>
<tr>
<td>Search strategy</td>
<td>The Cochrane Library databases [Cochrane Central Register of Controlled Trials (CENTRAL); DARE, CDSR (issue 4 2007); MEDLINE (Ovid) (January 1966 to December 2007); EMBASE (Ovid) (January 1985 to December 2007); CINAHL (Athens) (January 1966 to December 2007)], trials registers and reference lists of articles, with no language restrictions</td>
</tr>
<tr>
<td>Selection criteria</td>
<td>RCTs of peer support interventions delivered by telephone call</td>
</tr>
<tr>
<td>Character of peer</td>
<td>The peer is someone selected to provide support because they have similar or relevant health experience</td>
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<tr>
<td>Assessment of risk of bias</td>
<td>We assessed and reported on the risk of bias of included studies in accordance with the guidelines of the Cochrane Consumers and Communication Review Group and the Cochrane Handbook, which recommended the explicit reporting of the following individual quality elements for RCTs: sequence generation (including the method used); allocation concealment (including the method used); blinding (participants, providers, outcome assessors, data analysts); completeness of outcome data; and selective reporting. We incorporated the results of the assessment into the review through systematic narrative description and commentary about each of the these domains, leading to an overall assessment of the risk of bias of included studies and a judgement about the internal validity of the review’s results</td>
</tr>
<tr>
<td>Data collection and analysis</td>
<td>Two review authors independently extracted data. We present results narratively and in tabular format. Meta-analysis was not possible due to heterogeneity between studies</td>
</tr>
<tr>
<td>Results</td>
<td>We included seven studies involving 2492 participants. Peer support telephone calls were associated with an increase in mammography screening, with 49% of women in the intervention group and 34% of women in the control group receiving a mammogram since the start of the intervention (p &lt; 0.001). In another study, peer support telephone calls were found to maintain mammography screening uptake for baseline adherent women (p = 0.029). Peer support telephone calls for postmyocardial infarction patients were associated at 6 months with a change in diet in the intervention and usual care groups of 54% and 44%, respectively (p = 0.03). In another study of post myocardial infarction patients there were no significant differences between groups for self-efficacy, health status and mental health outcomes Peer support telephone calls were associated with greater continuation of breastfeeding in mothers at 3 months post partum (p = 0.01). Peer support telephone calls were associated with reduced depressive symptoms in mothers with postnatal depression (EPDS &gt; 12). The peer support intervention significantly decreased depressive symptomatology at the 4-week assessment (OR 0.23, 95% CI 1.15 to 33.77, p = 0.02)) and 8-week assessment (OR 0.23, 95% CI 1.14 to 27.84, p = 0.01). One study investigated the use of peer support for patients with poorly controlled diabetes. There were no significant differences between groups for self-efficacy, HbA1c, cholesterol level and BMI</td>
</tr>
<tr>
<td>Conclusions</td>
<td>While this review provides some evidence that peer support telephone calls can be effective for certain health-related concerns, few of the studies were of high quality and so results should be interpreted cautiously. There were many methodological limitations, thus limiting the generalisability of findings. Overall, there is a need for further well designed randomised controlled studies to clarify the cost-effectiveness and clinical effectiveness of peer support telephone calls for improvement in health and health-related behaviour</td>
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EPDS, Edinburgh Postnatal Depression Scale.
Study Lewin 2005


Aim To assess the effects of LHW interventions in primary and community health care on health-care behaviours, patients’ health and well-being, and patients’ satisfaction with care.

Search strategy We searched the Cochrane Effective Practice and Organisation of Care and Consumers and Communication specialised registers (to August 2001); CENTRAL (to August 2001); MEDLINE (1966 to August 2001); EMBASE (1966 to August 2001); Science Citations (to August 2001); CINAHL (1986 to June 2001); HealthSTAR (1975–2000); AMED (1966 to August 2001); the Leeds Health Education Effectiveness Database, and the reference lists of articles.

Selection criteria RCTs of any intervention delivered by LHWs (paid or voluntary) in primary or community health care which are intended to promote health, manage illness or provide support to patients. An LHW was defined as any health worker carrying out functions related to health-care delivery, trained in some way in the context of the intervention, and having no formal RCTs of any intervention delivered by LHWs (paid or voluntary) in primary or community health care and intended to promote health, manage illness or provide support to patients. An LHW was defined as any health worker carrying out functions related to health-care delivery, trained in some way in the context of the intervention, and having no formal professional or paraprofessional certificated or degreed tertiary education. There were no restrictions on the types of consumers, professional or paraprofessional, certificated or degreed tertiary education. There were no restrictions on the types of consumers.

Character of peer Any LHW (paid or voluntary) including community health workers, village health workers, cancer supporters, birth attendants, etc.

For the purposes of this review, a “LHW” was defined as any health worker:

- carrying out functions related to health-care delivery
- trained in some way in the context of the intervention
- having no formal professional or paraprofessional certificated or degreed tertiary education

Assessment of risk of bias Two reviewers independently assessed the quality of all eligible trials using the methodological quality criteria for RCTs listed in the Cochrane EPOC Review Group module. Studies were assessed as high quality if they reported allocation concealment, higher than 80% patient follow-up and intention-to-treat analysis. Studies were assessed as low quality if they did not meet these criteria or if they did not report the information necessary for assessment.

Data collection and analysis Two reviewers independently extracted data on to a standard form and assessed study quality. Studies that compared broadly similar types of interventions were grouped together. Where feasible, the results of included studies were combined and an estimate of effect obtained.

Results Forty-three studies met the inclusion criteria, involving more than 210,110 consumers. These showed considerable diversity in the targeted health issue and the aims, content and outcomes of interventions. Most were conducted in high-income countries (n=35), but nearly half of these focused on low-income and minority populations (n=15). Study diversity limited meta-analysis to outcomes for five subgroups (n=15 studies) ([LHW interventions to promote the uptake of breast cancer screening, immunisation and breastfeeding promotion ([before 2 weeks and between 2 weeks and 6 months post partum) and to improve diagnosis and treatment for selected infectious diseases]). Promising benefits in comparison with usual care were shown for LHW interventions to promote immunisation uptake in children and adults (RR = 1.30, 95% CI 1.14 to 1.48, p=0.0001) and LHW interventions to improve outcomes for selected infectious diseases (RR = 0.74, 95% CI 0.58 to 0.93, p=0.01). LHWs also appear promising for breastfeeding promotion. They appear to have a small effect in promoting breast cancer screening uptake when compared with usual care. For the remaining subgroups (n=29 studies), the outcomes were too diverse to allow statistical pooling. We can therefore draw no general conclusions on the effectiveness of these subgroups of interventions.

Conclusions LHWs show promising benefits in promoting immunisation uptake and improving outcomes for acute respiratory infections and malaria, when compared with usual care. For other health issues, evidence is insufficient to justify recommendations for policy and practice. There is also insufficient evidence to assess which LHW training or intervention strategies are likely to be most effective. Further research is needed in these areas.

AMED, Allied and Complementary Medicine Database; CENTRAL, the Cochrane Register of Controlled Trials; EPOC, Effective Practice and Organisation of Care Group; LHW, lay health worker; RR, rate ratio.
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<tr>
<td>Aim</td>
<td>Are CHWs effective in community health promotion and disease prevention efforts?</td>
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<tr>
<td>Selection criteria</td>
<td>(1) CHWs. (2) Location: only studies conducted in the USA were included in this review. (3) Types of studies: only studies that were listed in a database and that focused on outcomes or effectiveness of CHW work were included. All studies purporting to measure outcomes were included, because the literature on types of outcomes defined them broadly. (4) Health promotion and disease prevention: CHWs are described as functioning across a wide range of populations, diseases and conditions. Thus, any study with a health focus for the activities of the CHWs was included in this review. (5) Time period: from 1980 to present</td>
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<tr>
<td>Character of peer</td>
<td>Definition of CHW: For the studies reviewed here, the terms CHW, community health advocate, promotora de salud, community health promoter, lay health worker and community outreach worker were used interchangeably. Often in these articles the definitions are not given explicitly, and thus, the definition used by each researcher was allowed to stand, and each study was coded by the functions of the worker</td>
</tr>
<tr>
<td>Assessment of risk of bias</td>
<td>None described</td>
</tr>
<tr>
<td>Data collection and analysis</td>
<td>The studies identified from these databases were entered into a search chart by relevant characteristics. An initial reading of the studies, in conjunction with the research question, culminated in the development of a codebook to document all relevant variables. This codebook was used to review three studies; it was then revised based on these three reviews and used to review the remaining studies (Broome 1993343). Analysis: The author coded all data as described previously here, with results displayed in tabular form and examined for frequencies, common themes, weaknesses, gaps, and the need for future studies</td>
</tr>
<tr>
<td>Results</td>
<td>Overall, CHWs were found to result in some positive outcomes in 79% (n = 15) of the reviewed studies. Eleven of the 15 studies (73%) documented at least partial effectiveness of the CHWs in changing access to health-care services in the target population. There is limited evidence from two studies of the CHW effectiveness with knowledge improvement outcomes. However, several other studies documented behaviour change and health-outcome changes from CHW health education interventions. Three of the four studies documented a positive change in health status indicators. Five of the six studies documented positive results in behaviour change on the part of the target population. Two studies measured the costs of care but found they did not differ between the groups</td>
</tr>
<tr>
<td>Conclusions</td>
<td>This article reviews the data-based literature on CHW effectiveness, which indicates preliminary support for CHWs in increasing access to care, particularly in underserved populations. There are a smaller number of studies documenting outcomes in the areas of increased health knowledge, improved health status outcomes, and behavioural changes, with inconclusive results. Although CHWs show some promise as an intervention, the role can be doomed by overly high expectations, lack of a clear focus and lack of documentation. Further research is required with an emphasis on stronger study design, documentation of CHW activities, and carefully defined target populations</td>
</tr>
</tbody>
</table>

**EBM**, evidence-based medicine; **NCBI**, National Center for Biotechnology Information.
Andrews 2004

---|---
Aim | To explore roles and effectiveness of CHWs in research with ethnic minority women in the USA
Search strategy | MEDLINE (1966–2002) and CINAHL (1982–2002) databases were used to locate published research studies on the use of CHWs with ethnic minority women in the USA. Key words for searches were CHWs, community health aides, health promoters and community workers
Selection criteria | Selection criteria were that the studies be data based, with ethnic minority women as the targeted population, use CHWs and be conducted in the USA. Reasons for exclusion were programme description only and lack of data-based results; international focus; or ethnic minority women not included in at least 75% of the sample
Character of peer | All of the CHWs in these studies were women and were matched according to the ethnicity of the target population
Assessment of risk of bias | Methodological limitations were coded but not reported
Data collection and analysis | A codebook to document all relevant variables was designed for review of these studies, in consideration with the research questions. The variables used in this analysis included the role of CHWs, targeted health outcomes (i.e. access, behaviour, knowledge), design, sample size, theoretical framework, preparation and training of CHWs, perceived benefits of CHWs, and methodological limitations
Results | The CHW role varied according to the purpose, design and intervention protocols of each study. The roles were coded to one of the following four areas: educator, ‘outreacher’, case manager and data collector. CHWs’ training, payment, recruitment and supervision also varied in the included studies. Outcomes related to access to health services were evaluated in 16 studies; all 16 found improvements in access, specifically for ethnic minority women, to prenatal care, mammography screening, Pap testing, sick child visits, pre- and postnatal care, STD testing, smoking cessation programme, and maternal–child health visits. Five of the seven studies showed positive outcomes in knowledge of participants. Positive outcomes in behaviour change were reported in five of the six studies. CHWs promoted social support, cultural competence and other intangible resources among community members. These outcomes were not quantitatively measured in these studies, but they were described in process evaluation and qualitative data. Conceptually, the use of CHWs in research is often considered cost-effective. Two of the studies in this review showed improved outcomes and reduced costs related to the use of CHWs. In comparison with other health-care providers, CHWs are relatively inexpensive to train, hire and supervise
Conclusions | An integrative analysis of 24 studies showed that despite varying roles and functions, evidence indicates that CHWs are effective in increasing access to health services, increasing knowledge, and promoting behaviour change among ethnic minority women. Other advantages of using CHWs are to provide social support and culturally competent, cost-effective care. Recommendations for future directions of research with CHWs and ethnic minority women include improved conceptualisation of the CHW role, theoretical frameworks for research designs, enhanced methods for evaluating effectiveness and increased community involvement
**Fischer 2007**

**Study**  

**Aim**  
This particular review examined a broad range of interventions that used cultural aspects of race to: (1) modify the health behaviours of individuals within communities; (2) increase access from communities to the existing health-care system; and (3) amend or transform the health-care system to better serve patients of colour and their communities.

**Search strategy**  
The reviewers searched MEDLINE, CENTRAL, and a cross-referenced engine, Web of Knowledge. In addition, we searched the grey literature using The New York Academy of Medicine Grey Literature Report. To augment this search strategy, we reviewed the reference lists of key reviews, websites, reference articles, systematic reviews and books.

**Selection criteria**  
We reviewed all non-white racial and ethnic categories, including African-American, Hispanic, American Indian/Alaska Native, and Asian/Pacific Islander. We included interventions that encompassed cultural constructs related to race, such as language, religion, diet, sexuality, family structure, neighbourhood, class and gender. We excluded articles published before 1985. We also excluded articles that did not describe interventions arising from health-care organisations or connecting communities or patients of colour to health-care organisations, those that did not include evaluations of interventions, those that did not focus on populations of at least 50% people of colour, and those describing interventions that took place outside the USA. Beyond these exclusion criteria, we chose to include a wide range of study designs. There are very few RCTs comparing interventions with and without cultural leverage, and to limit this review to those studies would have left out many innovative studies in the field. Similarly, there are very few intervention studies designed to examine an outcome such as the level of health disparities between white patients and coloured people. As such, we chose to also include studies that focused on the health of racial and ethnic minorities.

**Character of peer**  
Not specified

**Assessment of risk of bias**  
Articles included in the final analysis were reviewed for quality using multiple criteria, because of the difficulty in comparing and contrasting heterogeneous study approaches. To capture the value of studies that ranged from descriptive to controlled trials, we started with a descriptive discussion of their strengths and weaknesses. We then applied Downs and Black’s criteria for assessing methodological quality, using the first 26 items in the scoring system, which had a possible total score of 27.

**Data collection and analysis**  
The first author identified relevant abstracts through review of citations obtained from this search strategy. Each abstract was assigned to a team member for independent review to confirm relevance to the research question. We developed a standardised form to facilitate the review of abstracts and articles to determine relevance to the study question, document study characteristics, extract data, and assess the quality of evidence. Full articles were obtained for those abstracts appearing eligible and in cases in which determinations could not be made from the abstracts alone. Three team members (TLF, DLB and KAC) reviewed articles independently and then compared findings; each article was reviewed by at least two reviewers, and differences were adjudicated by team consensus.

**Results**  
Thirty-eight interventions of three types were identified: interventions that modified the health behaviours of individual patients of colour, that increased the access of communities of colour to the existing health-care system, and that modified the health-care system to better serve patients of colour and their communities. Individual-level interventions typically tapped community members’ expertise to shape programmes. Access interventions largely involved screening programmes, incorporating patient navigators and lay educators. Health-care interventions focused on the roles of nurses, counsellors, and CHWs to deliver culturally tailored health information. These interventions increased patients’ knowledge for self-care, decreased barriers to access, and improved providers’ cultural competence.

**Conclusions**  
The delivery of processes of care or intermediate health outcomes was significantly improved in 23 interventions. Interventions using cultural leverage show tremendous promise in reducing health disparities, but more research is needed to understand their health effects in combination with other interventions.

CENTRAL, the Cochrane Register of Controlled Trials.
Rhodes 2007

| Aim | The primary goal of this systematic review was to explore how LHA approaches have been used and evaluated within Hispanic/Latino communities in the USA |
| Search strategy | Ten literature databases were used: AgeLine, CINAHL, EBSCO Academic Search Elite and Premier, Education Resources Information Center (ERIC), Health Source Consumer and Nursing and Nursing/Academic Editions, pre-CINAHL, PsycINFO and PubMed. Each database was searched from its inception through to July 2006. Terms for the search included keywords as defined by the Medical Subject Headings (MeSH). Keywords used in a Boolean search included: Hispanic or Latino and village health worker, natural helper, promoter, promotora, partera, volunteer health worker, allied health personnel, LHA, lay health, community outreach worker, community health service volunteer, public health aide, peer health promoter, community health representative, community health advocate, or health advisor. In addition, citations from the bibliographies of identified papers were analysed and relevant citations were selected for review. |
| Selection criteria | This review consisted of human studies (which included adult Hispanics or Latinos of either gender), conducted in the USA, that were published in English-language peer-reviewed journals, and contained enough abstractable information. Often, editorials, letters, book chapters, and commentaries have been excluded in systematic reviews; however, when appropriate, such articles were included to supplement data about studies that had been identified. These inclusion and exclusion criteria were selected to ensure that findings could best inform future LHA intervention research among Hispanic/Latino communities within the USA. Because some studies included non-Hispanics and non-Latinos, these studies were included if at least half of the LHAs were Hispanic/Latino. Furthermore, because studies may have had multiple articles published, this analysis explored LHA approaches by study. |
| Character of peer | All studies indicated that the LHAs matched the target population in their communities in terms of countries of origin and current geographic location. |
| Assessment of risk of bias | Not described. |
| Data collection and analysis | Data abstraction was completed independently by three data abstractors using a standardised abstraction form that collected intervention characteristics and study results. A total of 172 studies were identified and 37 met the selection criteria. Of these, 28 included female LHAs exclusively and five included a small number of male as well as female LHAs. Training for LHAs ranged from 6 to 160 hours. Primary roles of LHAs included: supporting participant recruitment and data collection, serving as health advisors and referral sources, distributing materials, being role models, and advocating on behalf of community members. Fourteen studies found evidence of effectiveness. |
| Conclusions | Given the long history of using LHAs as an approach to health promotion and disease prevention, and the current emphasis of LHA approaches as a potential solution to health disparities in general, and among Hispanics/Latinos in particular, few rigorous studies have been published that document the effectiveness of LHAs on a variety of public health concerns. A stronger empirical evidence base is clearly needed. |
Pérez-Escamilla 2008


Aim This systematic review assesses the impact of peer education/counseling on nutrition and health outcomes among Latinos and identifies future research needs.

Search strategy A systematic literature search was conducted by: (1) searching internet databases (PubMed); (2) conducting backward searches from reference lists of articles of interest; (3) manually reviewing the archives of the Center for Eliminating Health Disparities among Latinos; (4) searching the *J Nutr Educ Behav*; and (5) directly contacting researchers in the field. The PubMed search was conducted using the following keywords and combinations: Latino(s), Hispanic(s), CHW(s), peer(s), educator(s), peer education, promotora(s), promoter(s), diabetes, nutrition, la cocina saludable, salud para su corazón, su corazón su vida, your health your life, partner(s) in health, compañeros en salud, EFNEP, FSNE and breastfeeding.

Selection criteria Nutrition education is defined as ‘any set of learning experiences designed to facilitate the voluntary adoption of eating and other nutrition-related behaviours conducive to health and well-being’. Thirteen nutrition education impact studies were included if they met the following criteria: (1) experimental or quasiexperimental design; (2) include Latino-specific results or a predominantly Latino study population (> 60%); (3) use of reliable and valid scales; (4) nutrition education intervention(s) clearly described; (5) published since 1994; and (6) conducted in the USA.

Character of peer Community members who work almost exclusively in community settings and serve as connectors between health-care consumers and providers to promote health among groups that have traditionally lacked access to adequate care.

Assessment of risk of bias The only bias assessed was those associated with the use of reliable and valid scales: a Cronbach $\alpha$ of at least 0.85 was established a priori as a criterion for assessing internal validity of scales. Reliability was assessed based on intracorrelation coefficients of repeated scale applications using preset criteria of an $r$-value of at least 0.35 and a $p$-value < 0.05.

Data collection and analysis All abstracts of articles generated from the database searches were reviewed by community nutrition academic and agency experts (i.e. the authors of this paper) to identify those that met the selection criteria. Each article was assessed for the internal and external validity of the study as well as for the behavioural theory base (or lack thereof) of the intervention. Internal and external validity were assessed following the guidelines recommended by Jekel et al.345

The collective interpretation of study findings was the product of a consensus process involving all authors.

Results Peer nutrition education has a positive influence on diabetes self-management and breastfeeding outcomes, as well as on general nutrition knowledge and dietary intake behaviours among Latinos.

Conclusions There is a need for longitudinal randomised trials testing the impact of peer nutrition education interventions grounded on goal-setting and culturally appropriate behavioural change theories. Inclusion of reliable scales and the construct of acculturation are needed to further advance knowledge in this promising field. Operational research is also needed to identify the optimal peer educator characteristics, the type of training that they should receive, the client loads and dosage (i.e. frequency and amount of contact needed between peer educator and client), and the best educational approaches and delivery settings.

EFNEP, Expanded Food and Nutrition Program; FSNE, Food Stamp Nutrition Education Program.
ANC, antenatal care; TBA, trained birth attendant.

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Hodnett 2003

**Study**

**Aim**
The objective of this review was to assess the effects of programmes offering additional social support for pregnant women who are believed to be at risk for giving birth to preterm or low-birthweight babies.

**Search strategy**
We searched the Cochrane Pregnancy and Childbirth Group’s Trials Register (March 2009).

**Selection criteria**
Randomised trials of additional support during at-risk pregnancy by either a professional (social worker, midwife or nurse) or specially trained layperson, compared with routine care. Additional support was defined as some form of emotional support (e.g. counseling, reassurance, sympathetic listening) and information or advice or both, either in home visits or during clinic appointments, and could include tangible assistance (e.g. transportation to clinic appointments, assistance with the care of other children at home).

**Character of peer**
Laywomen

**Assessment of risk of bias**
Both review authors independently assessed risk of bias for each study using the criteria outlined in the *Cochrane Handbook for Systematic Reviews of Interventions*. Any disagreements were resolved by discussion or by involving a third assessor.

**Data collection and analysis**
We independently assessed trial quality and extracted data. Double data entry was performed. We contacted study authors to request additional information.

**Results**
Eighteen trials, involving 12,658 women, were included. The trials were generally of good to excellent quality, although three used an allocation method likely to introduce bias. Programmes offering additional social support for at-risk pregnant women were not associated with improvements in any perinatal outcomes, but there was a reduction in the likelihood of caesarean birth and an increased likelihood of elective termination of pregnancy. Some improvements in immediate maternal psychosocial outcomes were found in individual trials.

Because there was only one trial in which the support was provided by laywomen, and in another trial the support was provided by a multidisciplinary team that included laywomen, the planned subgroup analysis was not performed. However, the results of these two trials were remarkably consistent with those of the other trials.

**Conclusions**
Pregnant women need the support of caring family members, friends and health professionals. While programmes that offer additional support during pregnancy are unlikely to prevent the pregnancy from resulting in a low-birthweight or preterm baby, they may be helpful in reducing the likelihood of caesarean birth.
**Aim**
To determine the effects of home visits during pregnancy and/or after birth for pregnant women with a drug or alcohol problem.

**Search strategy**
We searched the Cochrane Pregnancy and Childbirth Trials Register (30 April 2004), CENTRAL, MEDLINE (1966 to April 2004), EMBASE (1980 to week 16, 2004), CINAHL (1982 to April 2004), PsycINFO (1974 to April 2004), citations from previous reviews and trials, and contacted expert informants.

**Selection criteria**
Studies using random or quasi-random allocation of pregnant or post partum women with a drug or alcohol problem to home visits. Trials enrolling high-risk women of whom more than 50% were reported to use drugs or alcohol problem home visits. Trials enrolling high-risk women of whom more than 50% were reported to use drugs or alcohol were also eligible.

**Character of peer**
Trained laypeople (not the sole focus of the review).

**Assessment of risk of bias**
We assessed the methodological quality of included trials according to the criteria in the Cochrane Reviewers’ Handbook, with a grade allocated to each trial on the basis of allocation concealment: A (adequate), B (unclear), and C (clearly inadequate). Details regarding randomisation method, completeness of follow-up, and blinding of outcome measurement were documented for all trials. Cluster randomised and quasi-randomised designs, such as alternate allocation and use of record numbers, were included if found. Differences of opinion regarding trials for inclusion were resolved by consensus.

**Data collection and analysis**
Assessments of trials were performed independently by all review authors. Statistical analyses were performed using fixed and random effects models where appropriate.

**Results**
Six studies (709 women) compared home visits after birth with no home visits. None provided a significant antenatal component of home visits. The visitors included community health nurses, paediatric nurses, trained counsellors, paraprofessional advocates, midwives and lay African-American women. Most studies had methodological limitations, particularly large losses to follow-up. There were no significant differences in continued illicit drug use (two studies, 248 women: RR 0.95, 95% CI 0.75 to 1.20), continued alcohol use (RR 1.08, 95% CI 0.83 to 1.41), failure to enrol in a drug treatment programme (two studies, 211 women: RR 0.45, 95% CI 0.10 to 1.94). There was no significant difference in the Bayley MDI (three studies, 199 infants: WMD 2.89, 95% CI –1.17 to 6.95) or PDI (WMD 3.14, 95% CI –0.03 to 6.32). Other outcomes reported by one study only included breastfeeding at 6 months (RR 1.00, 95% CI 0.81 to 1.23), incomplete 6-month infant vaccination schedule (RR 1.07, 95% CI 0.58 to 1.96), non-accidental injury and non-voluntary foster care (RR 0.16, 95% CI 0.02 to 1.23), failure to use post partum contraception (RR 0.41, 95% CI 0.20 to 0.82), child behavioural problems (RR 0.46, 95% CI 0.21 to 1.01) and involvement with child protective services (RR 0.38, 95% CI 0.20 to 0.74).

Two studies reported home visits by trained layworkers. Schuler 2000 reported no significant difference for continued illicit drug use (RR 1.20, 95% CI 0.79 to 1.85), continued alcohol use (RR 1.01, 95% CI 0.75 to 1.35) or failure to enrol in a drug treatment programme (RR 0.84, 95% CI 0.63 to 1.12). Grant 1996 reported, at 3 years, no significant difference in incidence of cognitive delay using the Bayley MDI (RR 1.36, 95% CI 0.41 to 4.45) and an increase in incidence of psychomotor delay using the Bayley PDI of borderline statistical significance (RR 3.26, 95% CI 1.00 to 10.59; RR 0.27, 95% CI 0.03 to 0.51). Meta-analysis of two studies found no significant differences in cognitive development (Bayley MDI: FE WMD 3.92, 95% CI –0.56 to 8.41) or psychomotor development (Bayley PDI: FE WMD 3.22, 95% CI –0.01 to 6.44). Schuler 2000 reported a significant reduction in child protection services (RR 0.38, 95% CI 0.20 to 0.74).

**Conclusions**
There is insufficient evidence to recommend the routine use of home visits for women with a drug or alcohol problem. Further large, high-quality trials are needed, and women’s views on home visiting need to be assessed.

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

|---|---|---|

### Aim

To assess the effectiveness of support for breastfeeding mothers

### Search strategy


### Selection criteria

**Types of studies** – All RCTs or quasi-RCTs, with or without blinding, and with a minimum of 75% follow-up

**Types of participants** – Participants were pregnant women intending to breastfeed, post partum women intending to breastfeed and women breastfeeding their babies

**Types of interventions** – Contact with an individual or individuals (either professional or volunteer) offering support which is supplementary to standard care (in the form of, for example, appropriate guidance and encouragement), with the purpose of facilitating continued breastfeeding. Studies were included if the intervention occurred in the postnatal period alone or also included an antenatal component. Interventions taking place in the antenatal period alone were excluded from this review, as were interventions described as solely educational in nature

### Character of peer

Nine studies used laypeople for support

### Assessment of risk of bias

We assessed the method of allocation concealment used in each study using criteria outlined in the Cochrane Handbook for Systematic Reviews of Interventions. We categorised studies according to whether the method of allocation concealment reported was judged to have been adequate (A), unclear (B) or inadequate (C) or if allocation was not concealed (D). We also checked study reports for clear descriptions of inclusion and exclusion criteria; randomisation methods; withdrawals and dropouts; statistical analysis used; blinding of outcome assessment; and intention-to-treat analysis. Included trials had a minimum of 75% initial follow-up. When included, trials reported data at more than one time point and follow-up rates fell, we included only data from time points at which follow-up rates were at least 75% in the analysis

### Data collection and analysis

Two authors independently assessed trial quality and extracted data

### Results

We have included 34 trials (29,385 mother–infant pairs) from 14 countries. All forms of extra support analysed together showed an increase in duration of ‘any breastfeeding’ (includes partial and exclusive breastfeeding) (RR for stopping any breastfeeding before 6 months 0.91, 95% CI 0.86 to 0.96). All forms of extra support together had a larger effect on duration of exclusive breastfeeding than on any breastfeeding (RR 0.81, 95% CI 0.74 to 0.89). Lay and professional support together extended duration of any breastfeeding significantly (RR before 4–6 weeks 0.65, 95% CI 0.51 to 0.82; RR before 2 months 0.74, 95% CI 0.66 to 0.83). Exclusive breastfeeding was significantly prolonged with use of WHO/UNICEF training (RR 0.69, 95% CI 0.52 to 0.91). Maternal satisfaction was poorly reported

Nine studies included used laypeople for support. Trials that used laypeople to deliver the intervention demonstrated a significant reduction in breastfeeding cessation at the time of the last study assessment (RR 0.86, 95% CI 0.76 to 0.98). Significant heterogeneity was present among these studies (I² = 75.6%). Further subgroup analysis did not reveal a statistically significant effect at any time point up to 4 months. However, in the studies of lay support that reported exclusive breastfeeding, there was a marked reduction in the cessation of exclusive breastfeeding before the last study assessment (RR 0.72, 95% CI 0.57 to 0.90). There was heterogeneity among these studies (I² = 96.3%). Further subgroup analysis indicated that this effect was significant within the first 3 months (RR before 4–6 six weeks 0.66, 95% CI 0.46 to 0.96; RR before 2 months 0.44, 95% CI 0.26 to 0.73; RR before 3 months 0.42, 95% CI 0.31 to 0.57)

### Conclusions

Additional professional support was effective in prolonging any breastfeeding, but its effects on exclusive breastfeeding were less clear. WHO/UNICEF training courses appeared to be effective for professional training. Additional lay support was effective in prolonging exclusive breastfeeding, while its effects on duration of any breastfeeding were uncertain. Effective support offered by professionals and laypeople together was specific to breastfeeding, and was offered to women who had decided to breastfeed. Further trials are required to assess the effectiveness (including cost-effectiveness) of both lay and professional support in different settings, particularly those with low rates of breastfeeding initiation, and for women who wish to breastfeed for longer than 3 months. Trials should consider timing and delivery of support interventions and relative effectiveness of intervention components, and should report women’s views. Research into appropriate training for supporters (whether lay or professional) of breastfeeding mothers is also needed

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

**Aim**
To evaluate the effectiveness of interventions which aim to encourage women to breastfeed in terms of changes in the number of women who start to breastfeed.

**Search strategy**
We searched the Cochrane Pregnancy and Childbirth Group's Trials Register (July 2007), handsearched the *Journal of Human Lactation*, *Health Promotion International* and *Health Education Quarterly* from inception to 15 August 2007, and scanned reference lists of all articles obtained.

**Selection criteria**
RCTs, with or without blinding, of any breastfeeding promotion intervention in any population group except women and infants with a specific health problem.

**Character of peer**
Not specified.

**Assessment of risk of bias**
We assessed the validity of each included study according to the criteria outlined in the *Cochrane Handbook*. We assessed selection bias on the basis of concealment of allocation: adequate or unclear or inadequate. We rated performance bias, attrition bias and detection bias as: adequate or unclear or partially adequate or inadequate.

**Data collection and analysis**
One review author independently extracted data and assessed trial quality, checked by a second author. We contacted investigators to obtain missing information.

**Results**
Eleven trials were included. Statistical analyses were conducted on data from eight trials (1553 women). Five studies (582 women) on low incomes in the USA, whose participants had typically low breastfeeding rates, showed that breastfeeding education had a significant effect on increasing initiation rates compared with standard care (RR 1.57, 95% CI 1.15 to 2.15, \(p = 0.005\)). Subgroup analyses showed that one-to-one, needs-based, informal repeat education sessions and generic, formal antenatal education sessions are effective in terms of an increase in breastfeeding rates among women on low incomes, regardless of ethnicity and feeding intention. Needs-based, informal peer support in the antenatal and postnatal periods was also shown to be effective in one study conducted among Latina women who were considering breastfeeding in the USA (RR 4.02, 95% CI 2.63 to 6.14, \(p < 0.00001\)).

A single study evaluating the effect of prenatal, perinatal and postnatal peer support services among a total of 165 participants was shown to be effective at increasing initiation rates among predominantly Latina women who were considering breastfeeding in the USA (RR 4.02, 95% CI 2.63 to 6.14, \(p < 0.00001\)). Authors describe many of the study population as feeling socially uncomfortable with breastfeeding in the USA. The personalised, problem-solving approach of the intervention had been developed for 10 years in collaboration with the study hospital. Peer counsellors were community women who have completed high school, breastfed for 6 months and received 30 hours of internationally recognised classroom training in breastfeeding management. Counsellors served as observers for 3–6 months with experienced peer counsellors, received a payment (US$12) and the potential for health benefits if working at least 20 hours per week. Counselling services included at least one prenatal home visit, daily postpartum visits during hospitalisation and at least three home visits following return from hospital. Routine care was patient led, comprising breastfeeding information in response to participants’ questions and written materials available at the prenatal clinic. Perinatal care included hands-on assistance and education from maternity ward nurses. Written breastfeeding materials and access to a lactation consultant for breastfeeding problems were also available if requested, as was a ‘warm line’, where nurses answered postpartum breastfeeding questions. A significant increase in duration rates of breastfeeding was not demonstrated at 1 or 3 months post partum. Failure to adhere to protocol, particularly the delivery of half of postnatal home visits in the first month, was a study limitation due to staffing problems.

**Conclusions**
This review showed that health education and peer support interventions can result in some improvements in the number of women beginning to breastfeed. Findings from these studies suggest that larger increases are likely to result from needs-based, informal repeat education sessions than more generic, formal antenatal sessions. These findings are based only on studies conducted in the USA, among women on low incomes with varied ethnicity and feeding intention, and this raises some questions regarding generalisability to other settings.

RR, rate ratio.
May 2000

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

Search strategy: The search was performed in: Cochrane Tobacco Addiction Group specialised register (October 2007), Cochrane Controlled Trials Register (October 2007), (1966 to October 2007), MEDLINE (1966 to October 2007), EMBASE (1974 to October 2007), PsycINFO (1861 to Oct 2007). The search terms used were ‘smoking’ (prevention, control, therapy), ‘smoking cessation’ and ‘support’ (family, marriage, spouse, partner, sexual partner, buddy, friend, cohabitees and coworker).

Selection criteria: RCTs of smoking cessation interventions that compared an intervention which included a partner support component with an otherwise identical intervention and reported follow-up of 6 months or longer.

Character of peer: Partners were defined as spouses, friends, coworkers, ‘buddies’ or other significant others who supported the smokers as a part of the cessation programme to which they were assigned.

Assessment of risk of bias: Not described.

Data collection and analysis: Two authors independently identified the included studies and extracted data using a structured form. A third author was consulted to aid in the resolution of discrepancies. Abstinence, biochemically validated if possible, was the primary outcome measure and was extracted at two post-treatment intervals: 6–9 months and > 12 months. The scores of PIQ were also analysed to assess partner support. A fixed-effect model was used to pool RRs from each study and estimate a summary effect.

Results: A total of 49 articles were identified for this review. Only 10 articles (11 studies, > 2000 participants) met the inclusion criteria. The definition of partner varied between studies. All studies gave self-reported smoking cessation rates, but there was limited biochemical validation of abstinence. The RR for self-reported abstinence at 6–9 months was 1.01 (95% CI, 0.86 to 1.18); at 12 months the RR post treatment was 1.04 (95% CI, 0.87 to 1.24). Of the six studies that measured partner support at follow-up, only two studies reported significant increase in partner support in the intervention groups.

Conclusions: In this review of RCTs of interventions designed to enhance partner support for smokers in cessation programmes, we failed to detect an increase in quit rates. Limited data from several of the trials suggest that these interventions did not increase partner support either. No conclusions can be made about the impact of partner support on smoking cessation. More systematic intervention to affect partnership significantly should be delivered if partner support were part of an existing cessation programme.

PIQ, partner interaction questionnaire; RR, rate ratio.
### Riemstra 2002

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Aim</td>
<td>To systematically assess the effectiveness of interventions using a stage-based approach in bringing about positive changes in health-related behaviour</td>
</tr>
<tr>
<td>Search strategy</td>
<td>A wide range of electronic databases were searched from inception to May 2000: AMED; ASSIA; BIOSIS; British Education Index; British Library Catalogue; British Nursing Index; CAB-Health; CINAHL; Cochrane Library CD-ROM; Conference Papers Index; DARE; DH Data; Dissertation Abstracts; EconLIT; EMBASE; EPPI-Centre Register of Reviews of Effectiveness; ERIC; HEBs; HealthPromis/Health Education Authority; Unicorn Database; HEED; HELMIS; HTA database; Index to Scientific and Technical Proceedings; International Bibliography of the Social Sciences; King’s Fund Database; MANTIS; MEDLINE; Mental Health Abstracts; NHS EED; NRR; PsyLIT; SCI; SIGLE; SSCI; and Sociological Abstracts. In addition, searches of the internet were carried out using a range of search engines. The bibliographies of retrieved references were scanned for further relevant publications. The authors of abstracts appearing in conferences proceedings identified by the literature search were contacted for further information about their research.</td>
</tr>
<tr>
<td>Selection criteria</td>
<td>RCTs evaluating interventions which aimed to influence individual health behaviour, used within a stages-of-change approach, were eligible for inclusion. Only studies that reported health-related behaviour change, such as smoking cessation, reduced alcohol consumption or dietary intake and stage movement, were included. The target population included individuals whose behaviour could be modified, primarily in order to prevent the onset, or progression, of disease. There was no limitation of study by country of origin, language or date.</td>
</tr>
<tr>
<td>Character of peer</td>
<td>Not relevant</td>
</tr>
<tr>
<td>Assessment of risk of bias</td>
<td>Each included trial was assessed against a comprehensive checklist for methodological quality and quality of the implementation of the intervention. Quality assessment was performed by one reviewer and checked by a second, with disagreements resolved by discussion.</td>
</tr>
<tr>
<td>Data collection and analysis</td>
<td>Assessment of titles and abstracts was performed independently by two reviewers. If either reviewer considered a reference to be relevant, the full paper was retrieved. Full papers were assessed against the review selection criteria by two independent reviewers, and disagreements were resolved through discussion. Data were extracted by one reviewer into structured summary tables and checked by a second reviewer. Health behaviour change was the primary outcome of interest. Secondary outcomes included assessment of stage movement, health-related outcomes, intermediate outcomes, any adverse effects resulting from the intervention, as well as cost-effectiveness data. Information about the implementation of each intervention and how the relevant professionals were trained was also recorded where given. Any disagreements about data extraction were resolved by discussion.</td>
</tr>
<tr>
<td>Results</td>
<td>Thirty-seven RCTs were included in the review. Three studies evaluated interventions aimed at prevention (two for alcohol consumption and one for cigarette smoking). In 13 trials the interventions were aimed at smoking cessation, seven studies evaluated interventions aimed at the promotion of physical activity, and five studies evaluated interventions aimed at dietary change. Six trials evaluated interventions aimed at multiple lifestyle changes. Two studies evaluated interventions aimed at the promotion of screening mammography, and one study evaluated an intervention aimed at the promotion of treatment adherence. Four of these studies also included an economic evaluation. The methodological quality of the trials was mixed, and ranged from 2 to 11 out of 13 quality items present. The main problems were lack of detail on the methods used to produce true randomisation (methods of randomisation and concealment of allocation); lack of blinding of participants (where appropriate), outcome assessors and care providers, and failure to use intention-to-treat analysis. The main issue with the quality of the implementation was lack of information on the validity of the instrument used to assess an individual’s stage of change.</td>
</tr>
</tbody>
</table>
In 1 of the 13 trials aimed at smoking cessation the results could not be compared to a non-stage-based intervention because only stage-based interventions were included. In 4 of the remaining 12 smoking cessation trials, significant differences favouring the intervention group for scores on quit rates were found; in three of these the comparator was a usual-care control group and in one a non-stage-based intervention. One study showed mixed outcomes. In the remaining seven smoking cessation trials no significant differences between groups in behavioural change outcomes were found. One of the seven trials aimed at the promotion of physical activity did not report any data on behaviour change. Three trials found no significant differences between groups in behavioural change outcomes. Two trials showed mixed effects, and one trial mainly showed significant effects in favour of the stage-based intervention. Two of the five trials aimed at dietary change reported significant effects in favour of the stage-based intervention; in one trial this was in comparison to a non-stage-based intervention and in the other to a usual-care control group. Two trials showed mixed effects, and in one trial no significant differences between groups in behavioural change outcomes were found. Three of the six studies aimed at multiple lifestyle changes showed no differences between groups for any outcomes included. Two studies showed mixed effects, and one study showed positive effects for all outcomes included: smoking cessation, fat intake and physical activity. One of the two trials aimed at the promotion of screening mammography found no significant differences between groups for nearly all outcomes. The other trial showed a significant difference in favour of the stage-based intervention. The trial aimed at the promotion of treatment adherence showed significant results in favour of the stage-based intervention. Two out of three trials aimed at prevention showed no significant differences between groups for any measure of behaviour change. The other trial showed mixed outcomes. Studies with low-income participants tended not to report effects favouring the stage-based intervention. Other study characteristics, such as number of respondents, age and gender of respondents, year of publication, setting and verification of outcome measures, seemed to have little relationship with the effectiveness of the stage-based intervention.

Conclusions

Overall, there appears to be little evidence to suggest that stage-based interventions are more effective than non-stage-based interventions. Similarly, there is little evidence that stage-based interventions are more effective than no intervention or usual care. Out of 37 trials, 17 showed no significant differences between groups, eight trials showed mixed effects, and 10 trials showed effects in favour of the stage-based intervention(s). One trial presented no data on behavioural outcomes, and another included stage-based interventions only. Twenty trials compared a stage-based intervention with a non-stage-based intervention, 10 trials reported no significant differences between groups, five reported mixed effects and five reported significant effects in favour of the stage-based intervention. There does not seem to be any relationship between the methodological quality of the study, the targeted behaviour or quality of the implementation (both in terms of exposure and in terms of full use of the model) and effectiveness of the stage-based intervention.

The methodological quality of studies was mixed, and few studies mentioned validation of the stages of change instrument. In addition, there was little consistency in the types of interventions used once participants were classified into stages, and little knowledge about the types of interventions needed once people were classified. It was unclear in a number of trials whether the intervention was properly stage based. Given the limited evidence for the effectiveness of interventions tailored to the stages-of-change approach practitioners and policy-makers need to recognise that this approach has a status that appears to be unwarranted when it is evaluated in a systematic way.

There is a need for well-designed and appropriately implemented RCTs that are characterised by tailored interventions derived from accurate stage measurement, and which involve frequent reassessment of readiness to change in order to permit evolving, stage-specific interventions.
### TABLE 31 Characteristics of included reviews

<table>
<thead>
<tr>
<th>Study</th>
<th>Date of last search of databases</th>
<th>No. of studies included</th>
<th>Study method</th>
<th>Type of health advisor</th>
<th>Type of participant</th>
<th>Type/mode of intervention</th>
<th>Area of health</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dale 2008</td>
<td>December 2007</td>
<td>Seven RCTs</td>
<td>RCTs</td>
<td>Peer with similar or relevant health experience</td>
<td>People living with acute or long-term illness, carers of people with acute or long-term illness, parents, people with psychological symptoms, and people requiring screening or who had any other health and well-being-related concerns</td>
<td>Telephone support</td>
<td>Any health concern</td>
</tr>
<tr>
<td>Lewin 2005</td>
<td>June–August 2001</td>
<td>43 studies</td>
<td>RCTs</td>
<td>Lay health workers (paid or voluntary) in primary or community health care</td>
<td>Any</td>
<td>Any</td>
<td>To promote health, manage illness or provide support to patients</td>
</tr>
<tr>
<td>Swider 2002</td>
<td>1999</td>
<td>19 studies</td>
<td>Focused on outcomes or effectiveness of CHW work</td>
<td>CHWs in USA</td>
<td>Any in USA</td>
<td>Any</td>
<td>Health promotion and disease prevention</td>
</tr>
<tr>
<td>Andrews 2004</td>
<td>2002</td>
<td>24 studies</td>
<td>Any studies on the use of CHWs in social sciences research</td>
<td>CHW</td>
<td>Ethnic minority women in USA</td>
<td>Any</td>
<td>Any; cervical cancer, maternal health, breast cancer, diabetes management, STD prevention, HIV infection risk reduction, weight loss, and physical activity</td>
</tr>
<tr>
<td>Rhodes 2007</td>
<td>July 2006</td>
<td>37 studies</td>
<td>Any</td>
<td>LHAs</td>
<td>Adult Hispanic/ Latinos living in the USA</td>
<td>Any interventions to promote health and prevent disease</td>
<td>Any</td>
</tr>
<tr>
<td>Fischer 2007</td>
<td>1985 to June 2006</td>
<td>38 studies</td>
<td>Any</td>
<td>Evaluation of strategies or interventions using cultural leverage to see if they are effective at decreasing health disparities for communities of colour</td>
<td>Populations of at least 50% people of colour in the USA</td>
<td>Any</td>
<td>Any; also process outcomes</td>
</tr>
<tr>
<td>Study</td>
<td>Date of last search of databases</td>
<td>No. of studies included</td>
<td>Study method</td>
<td>Type of health advisor</td>
<td>Type of participant</td>
<td>Type/mode of intervention</td>
<td>Area of health</td>
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<td>-------------------------------------</td>
</tr>
<tr>
<td>Pérez-Escamilla 2008</td>
<td>1994 to not stated</td>
<td>22 studies</td>
<td>Any</td>
<td>CHWs</td>
<td>Latino-specific results or a predominantly Latino study population (&gt;60%)</td>
<td>Nutrition education intervention</td>
<td>Diet</td>
</tr>
<tr>
<td>Sibley 2004</td>
<td>January 1970 to June 1999</td>
<td>15 studies</td>
<td>Experimental or quasi-experimental designs</td>
<td>Traditional birth attendant</td>
<td>Pregnant women</td>
<td>Any</td>
<td>Maternal health and baby health</td>
</tr>
<tr>
<td>Hodnett 2003</td>
<td>March 2009</td>
<td>18 studies (two with lay advisors)</td>
<td>Randomised trials</td>
<td>Specially trained layperson</td>
<td>Pregnant women who are believed to be at risk for giving birth to preterm or low-birthweight babies</td>
<td>Additional support was defined as some form of emotional support (e.g. counselling, reassurance, sympathetic listening) and information or advice or both, either in home visits or during clinic appointments, and could include tangible assistance (e.g. transportation to clinic appointments, assistance with the care of other children at home)</td>
<td>Maternal health and baby health</td>
</tr>
<tr>
<td>Doggett 2005</td>
<td>April 2004</td>
<td>Six studies (two with lay advisors)</td>
<td>Studies using random or quasi-random allocation</td>
<td>Trained lay advisors</td>
<td>Pregnant or post partum women with a drug or alcohol problem</td>
<td>Any</td>
<td>Any, reduction of drug and alcohol use</td>
</tr>
<tr>
<td>Britton 2007</td>
<td>September/November 2005 or January 2006</td>
<td>34 studies (nine with lay advisors)</td>
<td>RCTs or quasi-RCTs</td>
<td>LHAs</td>
<td>Any pregnant women intending to breastfeed, post partum women intending to breastfeed and women breastfeeding their babies</td>
<td>Any</td>
<td>Breastfeeding support</td>
</tr>
<tr>
<td>Dyson 2005</td>
<td>July to August 2007 (search updated no change in review)</td>
<td>11 studies (one with peer support)</td>
<td>RCTs</td>
<td>Peers</td>
<td>Any breastfeeding promotion intervention in any population group except women and infants with a specific health problem</td>
<td>Any</td>
<td>Breastfeeding support</td>
</tr>
</tbody>
</table>

continued
## Characteristics of included reviews (continued)

<table>
<thead>
<tr>
<th>Study</th>
<th>Date of last search of databases</th>
<th>No. of studies included</th>
<th>Study method</th>
<th>Type of health advisor</th>
<th>Type of participant</th>
<th>Type/mode of intervention</th>
<th>Area of health</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 2006[10,11]</td>
<td>1980 to date not stated</td>
<td>10 studies</td>
<td>RCTs</td>
<td>Smoking buddies</td>
<td>Smokers</td>
<td>Interventions aimed at supporting smoking cessation</td>
<td>Smoking cessation</td>
</tr>
<tr>
<td>Park 2004[43]</td>
<td>October 2007</td>
<td>10 studies</td>
<td>RCTs</td>
<td>Smoking buddies</td>
<td>Smokers</td>
<td>Interventions aimed at supporting smoking cessation</td>
<td>Smoking cessation</td>
</tr>
</tbody>
</table>
### TABLE 32 Table of excluded reviews

<table>
<thead>
<tr>
<th>Study</th>
<th>Reason for exclusion</th>
<th>Area reviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boer 2005</td>
<td>Did not search multiple databases</td>
<td>Training of paraprofessionals as behaviour modifiers</td>
</tr>
<tr>
<td>Battersby 2004</td>
<td>Did not search multiple databases</td>
<td>Breastfeeding peer support cost-effectiveness</td>
</tr>
<tr>
<td>Devilly 2005</td>
<td>Did not search multiple databases</td>
<td>Prison-based peer education</td>
</tr>
<tr>
<td>Durlak 1979</td>
<td>Did not search multiple databases</td>
<td>Forty-two studies comparing the effectiveness of professional and paraprofessional</td>
</tr>
<tr>
<td>Fogelholm 2002</td>
<td>Did not search multiple databases</td>
<td>Helpers – mental health therapy</td>
</tr>
<tr>
<td>Forster 2007</td>
<td>Primarily addressing self management of chronic disease – not lifestyle advice</td>
<td>Self-management of chronic conditions</td>
</tr>
<tr>
<td>Hill 1995</td>
<td>Did not search multiple databases</td>
<td>Nurses and health workers CVD</td>
</tr>
<tr>
<td>Hattie 1984</td>
<td>Search strategy not described</td>
<td>Professional and paraprofessional counsellors – meta-analysis</td>
</tr>
<tr>
<td>Logsdon 2004</td>
<td>Review only included studies with statistically significant results</td>
<td>Paraprofessional support for pregnant and parenting women</td>
</tr>
<tr>
<td>Nash 1978</td>
<td>Did not search multiple databases</td>
<td>Paraprofessionals and community mental health</td>
</tr>
<tr>
<td>Parkin 2000</td>
<td>Did not search multiple databases</td>
<td>History of peer education techniques and outlines some of the definitional diversity in attempts at characterising peer education projects</td>
</tr>
<tr>
<td>Persily 2003</td>
<td>The search for and identification of studies was not systematic</td>
<td>Pregnancy, breastfeeding</td>
</tr>
<tr>
<td>Ross 2002</td>
<td>Did not search multiple databases</td>
<td>Community HIV/STD prevention programmes</td>
</tr>
<tr>
<td>Rossmann 2007</td>
<td>Search strategy not described</td>
<td>Breastfeeding peer counsellors in the USA</td>
</tr>
<tr>
<td>Scott 1999</td>
<td>Did not search multiple databases</td>
<td>Continuous support from doula in childbirth</td>
</tr>
<tr>
<td>Torres 2002–3</td>
<td>Did not search multiple databases</td>
<td>Nineteen articles on sex education in Latino populations</td>
</tr>
<tr>
<td>Valente 2007</td>
<td>Although 191 studies were identified they were not cited so the association between the studies and the review’s conclusions could not be corroborated</td>
<td>Ten techniques used to identify opinion leaders to promote behaviour change</td>
</tr>
<tr>
<td>Walt 1988</td>
<td>Did not search multiple databases</td>
<td>Are national CHWs programmes in crisis</td>
</tr>
<tr>
<td>Wilson 2008</td>
<td>Did not search multiple databases</td>
<td>Expert Patients Programme</td>
</tr>
<tr>
<td>Wilson 2006</td>
<td>Did not search multiple databases</td>
<td>Expert Patients Programme</td>
</tr>
<tr>
<td>Study</td>
<td>Studies included in review and in our review</td>
<td>Studies included in review and excluded in our review by title</td>
</tr>
<tr>
<td>-------</td>
<td>--------------------------------------------</td>
<td>---------------------------------------------------------------</td>
</tr>
</tbody>
</table>
### Studies included in review and excluded in our review by title

<table>
<thead>
<tr>
<th>Study</th>
<th>Reason for Exclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bird 1996; 83-86</td>
<td>Poor methodological quality</td>
</tr>
<tr>
<td>Woodruff 2002</td>
<td>Poor methodological quality</td>
</tr>
<tr>
<td>Balcazar 2006; Balcazar 2005; Bray 1994; Conway 2004; Forst 2004; Kim 2005; May 1995; McElmurry 2003; McQuiston 2001b; Meister 1992; Sherrill 2005; Suarez 1993a; Tuefel-Shone 2005; Watkins 1994</td>
<td>Not in developed countries similar to the UK context</td>
</tr>
<tr>
<td>Artinian 2004; Carrillo 1986; Flaskerund 2000; Hansen 2005; Hanson 1998; Kim 2004; Martin 2005; Mayo 2003; McQuiston 2001a; McQuiston 2003; Ramos 2001; Rodriguez 1999; Warrick 1992; Whitehouse 1999</td>
<td>Unobtainable in the timescale</td>
</tr>
<tr>
<td>Elder 2006; 94,95</td>
<td>Poor methodological quality</td>
</tr>
<tr>
<td>Lujan 2007</td>
<td>Poor methodological quality</td>
</tr>
<tr>
<td>Pérez-Escamilla 2008</td>
<td>Poor methodological quality</td>
</tr>
</tbody>
</table>

### Studies included in review

<table>
<thead>
<tr>
<th>Study</th>
<th>Reason for Inclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block-Low 2006; Calcutta 2007; Dalalhe 2003; Gill 2007; Townsend 2006</td>
<td>Relevant to health-related lifestyle focus</td>
</tr>
</tbody>
</table>

### Continued

<table>
<thead>
<tr>
<th>Study</th>
<th>Reason for Inclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corkery 1997; Navarro 2000</td>
<td>Relevant to health-related lifestyle focus</td>
</tr>
<tr>
<td>Jubb 2007</td>
<td>Relevant to health-related lifestyle focus</td>
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</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Study</th>
<th>Studies included in review and in our review</th>
<th>Studies included in review and excluded in our review by title</th>
<th>Unobtainable in the timescale</th>
<th>Not in developed countries similar to the UK context</th>
<th>Descriptive material/insufficient reporting</th>
<th>Not solely health-related LAs</th>
<th>Not adult health-related lifestyle focused</th>
<th>Poor methodological quality</th>
</tr>
</thead>
</table>
### Studies included in review and excluded in our review by title

<table>
<thead>
<tr>
<th>Study</th>
<th>Studies included in review and excluded in our review by title</th>
<th>Unobtainable in the timescale</th>
<th>Not in developed countries similar to the UK context</th>
<th>Descriptive material/insufficient reporting</th>
<th>Not solely health-related LAs</th>
<th>Not adult health-related lifestyle focused</th>
<th>Poor methodological quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 2006112</td>
<td>West 1998120</td>
<td></td>
<td></td>
<td>Cohn 1998; de Weerdt 1991; Gilford 1998; Summers Holtrop 2002; Von Korff 1998</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Park 2004143</td>
<td>May 2006113</td>
<td></td>
<td></td>
<td>Buszewicz 2006</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Riemssma 2002145</td>
<td>Stertoe 1999; Werch 1999; Warch 1996</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>
Appendix 2

Original protocol

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

**Background – policy context and existing literature**

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

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

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

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

There are, therefore, large gaps in terms of the published evidence in this area from the UK and a predominance of formal literature from North America, where interventions delivered by lay or peer advisors tend to focus on specific health issues, such as cancer screening, cardiovascular health or sex education. The full range of existing HRLA formats is difficult to clearly capture and categorise, but previous attempts to model the health trainer intervention will be expanded upon further in the research proposed here. The search strategies we propose to use recognise that, although randomised controlled trials (RCTs) are widely accepted as the ‘gold standard’ of research evidence, a range of different study designs are considered appropriate for the evaluation of health promotion interventions. Although RCTs are questions of safety and effectiveness (does it work?), qualitative studies and surveys are best for questions of appropriateness, satisfaction and salience (does it matter?), and questions concerning acceptability and process
may be addressed by qualitative studies or quantitative studies using mediation analyses (*how does it work?*). Hence, the research we propose here will attempt to incorporate studies that have utilised various qualitative and quantitative methodologies. By reviewing the current diverse range of evidence, a set of criteria will be developed detailing the conditions and contexts in which different versions of the HRLA or trainer format are more or less effective and cost-effective than others. The importance of looking at the existing models broadly across different dimensions, including different health topic areas and communities, is to understand under which conditions, in which settings and in what ways different types of support are more effective, efficient, equitable and acceptable.

**Research aim and objectives**

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

**Phase I** Intervention modelling and problem definition:

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

**Phase II** Evidence synthesis:

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

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

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

**Research methods**

The difficulty of conducting systematic reviews of public health interventions directly reflects the complexity of the interventions reviewed and the subsequent determination of effectiveness. Some of the key challenges in this field include: the focus on populations rather than individuals, multicomponent interventions, the use of qualitative as well as quantitative approaches, an emphasis on processes of implementation, and the complexity and long-term nature of the
interventions and outcomes. The concept of HRLAs is multifaceted and as such represents a complex public health intervention. Hence, any assessment of the effectiveness and cost-effectiveness of the models identified needs to take into consideration the nature of this type of intervention and will require multiple methods of enquiry. This has implications for the research proposed here, which will be divided into the following three elements:

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

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

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

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

Our primary classification of intervention dimensions will aim to identify the smallest number of discrete intervention types that are distinctive, can be identified from searches in the subsequent systematic review and could be expected to be differentiated in terms of outcomes. Our experience is that the number will not exceed 30. We will then undertake semistructured telephone interviews with local project leads/coordinators (largely those with some involvement
in local health trainer projects in order to refine the classification. We will analyse the interviews in batches of 10 and cease interviewing when the analysis is saturated and no new categories are identified (we estimate that this will be 30–40 interviews). We will identify categories that are well populated by instances of interventions, develop specific questions regarding differences expected and interview several from each category. Our expectation is that the number will not exceed 30. We will develop an interview schedule, informed by Phase I of the MRC framework for evaluation of complex interventions, and the Advisory Group will be consulted on this via email. Interviews will be audio-recorded, with participants’ consent, and later transcribed verbatim. Analysis of transcripts will be undertaken using the framework analysis method to verify the classification and modify it according to the findings. The resulting classification will be mailed out to all health trainer leads and hub leads for them to provide instances where interventions do not fit on to the classification. The final classification will be will be emailed to the PAG for comment via email and teleconference.

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

**Phase II: evidence synthesis**

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

**Planned inclusion/exclusion criteria**

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

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

This review will exclude interventions delivered without the explicit aim of health improvement. For example, community-based secondary prevention for chronic disease will be included, but lifestyle advice or training delivered as part of treatment or care for acute illness will be excluded. Other exclusion criteria will include: interventions focusing solely on the delivery of training or advice to children or adolescents as intervention methods and factors determining effectiveness.
are likely to be very different from those in adults; and studies or reports detailing descriptive accounts of programmes, without any evaluation. Although this descriptive information will not be included in the review per se, it may be included in the intervention modelling phase (Phase I) as part of the process of problem definition.

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

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

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

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

1. Searches of electronic databases Searches will be made of relevant electronic databases using various combinations of search terms (Boxes 1 and 2). These initial search strategies have been developed from the scoping review but will be refined and expanded based on the results of Phase I.

2. Searches of the internet Searches will be made of the internet using the Google search engine (www.google.com) using the search strategies listed in Box 2. The first 100 results returned by each search strategy will be scanned for relevance and those judged to be potentially relevant followed up. If this strategy identifies HRLA or training programmes but no information on evaluation is available on the internet, attempts will be made to contact programme organisers directly by telephone or email in order to access the results of any evaluation that has been performed.

3. Suggestions from experts and those working in the field Requests for help with accessing relevant literature will be posted on the NHS Health Trainers’ Network discussion forum (www.networks.nhs.uk/forums/showthread.php?p=11#post11) and sent to relevant mailbases (listed in Box 3). ‘Experts’ – identified as such either by responses to postings, frequent publication in the area or through personal contacts of the research team – will also be contacted directly and asked for help with identifying relevant literature or providing further contacts.
4. **Searches of specific websites** A number of specific websites of organisations that sponsor and/or conduct relevant research will be searched to identify publications of interest (listed in Box 4). Searches will also be made of various trial and research registers for completed and ongoing research of relevance.

5. **Reference lists of relevant studies** The reference lists of all studies assessed to be relevant will be hand searched to identify additional studies that may be of relevance. Reference lists of previous reviews will also be searched to ensure thoroughness.

6. **Searches of the Science Citation Index (SCI) and Social Sciences Citation Index (SSCI)** Citation searches of the SCI and SSCI will be made in order to identify all citations of studies identified as relevant, and therefore identify any further possible relevant studies.

7. **Hand searches of relevant journals** The contents pages of journals considered to be highly relevant (i.e. found to contain a significant number of relevant articles using the above methods) will be scanned to identify additional relevant publications.

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

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

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

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

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

We will use the *Quality assessment tool for quantitative studies* developed by the Effective Public Health Practice Project, Canada. The tool assesses the following quality criteria: selection bias, study design, confounders, blinding, data collection methods, withdrawals and dropouts, intervention integrity, and statistical analyses. It is suitable to be used in systematic reviews of effectiveness, and can be used for RCTs, quasi-experimental studies and uncontrolled studies. Content and construct validity have also been established. As few studies in this area are likely to be RCTs, we may not be able to use a formal scoring framework to determine the quality of each study. In such cases, we will collect information on various aspects of methodology – as shown in the data abstraction sheet – and report this in a descriptive analysis. In addition, we will report our results in categories based on the strength of the study designs used to obtain data (e.g. RCTs, non-RCTs, uncontrolled before and after studies, etc.) in order to make clear the methodological strength of the evidence available.

Statistical procedures

Where baseline data are available from quantitative studies, pre- and post-interventions, means will be reported for both intervention and control groups, and the absolute change from baseline will be calculated, together with 95% CIs. When baseline data are not available, results will be expressed as the relative percentage change. For dichotomous outcomes, we will present the RR of the outcome compared with the control group. We will also calculate the risk difference, which is the absolute difference in the proportions of each treatment group. The number needed to treat will also be calculated.

As the scoping review identified few occasions where the effect of lifestyle advice on health behaviour and health or well-being outcomes was investigated using quantitative methods, it is unlikely that we will collect much data that will be susceptible to combination and formal meta-analysis. Nevertheless, we will perform meta-analyses where possible, using a random effects model where there is statistical heterogeneity and a fixed effects model where there is no significant statistical heterogeneity. We will use funnel plots to examine publication bias, and use sensitivity studies to examine the effects of heterogeneity and study quality on the results. Sensitivity analyses will address: effectiveness of specific programmes, study quality, differential dropout and intention-to-treat. If a sufficient number of studies is identified, we will perform subgroup analyses for the following: gender, age groups, intervention type, socioeconomic status, ethnicity, and the various dimensions described in Table 1.

Treatment of qualitative data

Quality appraisal is a much-discussed issue in relation to the role of qualitative research in systematic reviews. We will utilise the Critical Appraisal Skills Programme (CASP) checklist for qualitative research, which is a tool for reviewers recommended by the Cochrane Qualitative Research Methods Group. The checklist comprises 10 questions designed to help the reviewer to appraise the report of qualitative research by thinking systematically about the key issues of rigour, credibility and relevance. As with the quantitative evaluative work, few qualitative studies or components of studies, identified in the scoping review for this proposal appeared to meet some of the standards for high-quality qualitative research that have been proposed. Whilst we will include all qualitative research identified as relevant in a narrative analysis, we may not be able to apply any formal framework for determining quality. In these cases, information on various aspects of methodology will be recorded and reported descriptively.

Expected output of the review

We will prepare tables of included and excluded studies. Within each of these sets of tables, interventions will be further grouped according to type of study, type of intervention, HRLA
and participant characteristics. Interventions will be classified as: effective, potentially effective, ineffective or uncertain in improving behaviours related to health and well-being.

**Economic modelling**

We will attempt to combine data on the economic impacts of HRLA or training in order to determine the cost-effectiveness of the various advisor formats. The economic models constructed will be based on care pathways and on a detailed analysis of previously conducted economic evaluations retrieved in the systematic review. Given the challenges in evaluating such complex interventions, in particular the likely lack of RCTs, lack of direct evidence of the effect on long-term outcomes such as QoL and uncertainty in appropriate measures of benefit, the initial phase of structuring the model will therefore draw on Phase I data relating to relevant measures of benefit.

When assessing efficiency, by whatever economic evaluation method, data are required on the costs and outcomes of different interventions and procedures. By deriving and linking estimates of relative costs and effectiveness for the alternative advisor formats under consideration, it should be possible to determine whether one format is:

- less costly and at least as effective as its comparator, in which case it would be judged, unequivocally, to be a better use of health-care resources; or
- more costly, and more effective, than its comparator, in which case a judgement would have to be made about whether the extra cost is worth the gains in health achieved.

The basic approach we will use to classify interventions in this way comprises three main stages:

**Structuring of the model**  The decision models constructed will have the following main features:

- They will be used to estimate final outcomes, for example probability (for a given time horizon) of developing a given disease condition, given participation in a HRLA/training intervention, by estimating the intermediate relationships of probability of intermediate outcome given intervention and probability of final given intermediate.
- The choice of outcomes will be determined by consultation with key stakeholders.
- Expected cost will be the sum of the costs associated with each outcome, weighted by their probabilities, and including the cost of the intervention itself. If QALYs were deemed an appropriate measure, and health–state utility data are available for each of the relevant states, then QALYs will be similarly estimated.
- Subgroup analysis will be used if relevant and in order to provide evidence of any inequalities, for example by socioeconomic status (where the data can be extracted in the review).
- We will seek to include the full range of intervention dimensions as considered in the systematic review of effectiveness.
- A time horizon will be chosen in consultation with the key stakeholders.

**Populating the model**  The models will be populated by the following data:

- Estimates of effects (probabilities) derived from the systematic review of effectiveness.
- Utility values (if deemed appropriate and available). Here, we will use literature-based values for corresponding outcomes. Some adjustment will have to be made to estimate the utility given multiple outcomes, for example stroke plus diabetes, if no literature estimates were available.
- Estimated unit costs and resource quantities derived from the systematic review, and nationally or locally available data, modified by an appropriate discount rate.
For the above three bullets, consideration will be given to using all sources regardless of quality, weighting the estimates according to quality using the shape of the second-order probability distribution (on the parameter estimates). We will use the most cost-effective method of locating estimates, such as from routinely collected data, industry or expert opinion. If only expert opinion is available we will use appropriate methods (e.g. consensus development), but which permit the estimation of uncertainty.

**Estimating uncertainty**  Inevitably, there will be considerable uncertainty in estimates of cost and effectiveness, and our strategy for dealing with this will be to:

- estimate appropriate probability distributions [surrounding the parameter (e.g. probability, cost and any utility) estimates] based on plausibility and the sampling distribution, using sample statistics
- estimate the expected cost and benefit, given the prior distributions
- summarise by subgroup in terms of:
  - incremental net benefit for plausible levels of a threshold (incremental cost per QALY) to inform the recommending of interventions (i.e. which are cost-effective).
  - cost-effectiveness acceptability curve (CEAC) for illustrative purposes.
- conduct non-probabilistic sensitivity analysis (e.g. one-way) as considered appropriate, such as to take into variation in unit costs.

All the new modelling processes in this research will follow guidelines on economic evaluation, such as those by Drummond *et al.* (1997), guidelines on technology appraisal, such as by the National Institute of Clinical Excellence (2004); and guidelines on decision modelling, such as by Phillips *et al.* (2004).

**Phase III: development of proposals for definitive research and dissemination of findings**

The findings of the previous two phases will be used to identify the main evaluation question(s) to be considered by the HTA for future research in examining the effectiveness, cost-effectiveness, equity and acceptability of the health-related LA role. Assessing the applicability of the findings and the feasibility of replicating the interventions included in the review to other settings will form a key part of the process of summarising evidence. The Cochrane Review guidelines contain a detailed framework that will be used by the reviewers in determining applicability. This framework is based on the RE-AIM model for conceptualising the public health impact of an intervention.

**Dissemination**

Papers will be produced for publication in journals indexed in major databases such as MEDLINE, as well as for presentation at relevant local, national and international conferences. Summary articles will be produced for publication in both professional and academic journals, such as the *Health Service Journal*, *Nursing Times* and *Quality in Health Care*. Specialist health publications and relevant consumer magazines will also be targeted. A summary of the research will be published electronically and be made available to download freely through Northumbria University’s web pages, and we will also ask for it to be assessed for inclusion in DARE, an electronic database of published reviews. Key contacts identified through the research and the PAG will be asked to distribute the review to all interested parties. Dissemination will also take place via workshops targeted at the DoH, Strategic Health Authorities, Primary Care Trusts and health trainer leads. We will offer to run workshops for other organisations, such as professional and public bodies, if funded by these organisations.
Research governance

The review of published and publicly available literature will not require ethical approval. However, any stakeholder events and telephone interviews conducted as part of Phase I will require submission of all project documentation to the relevant NHS Research Ethics Committee and Trust Research & Governance Department. Northumbria University, as the employing organisation of the Principal Investigator, will act as sponsor for the research.

Expertise

We have convened a collaborative, multidisciplinary team of highly skilled individuals who will make a significant contribution to the research by offering their expertise in public health, social sciences, health psychology, epidemiology, health economics, medicine and nursing. Particular skills in the team include experience of conducting quantitative and qualitative systematic reviews and economic modelling. The systematic review will be undertaken by two researchers at Northumbria University. They will draw on the expertise of Dr Katherine Deane, a Research Fellow at Northumbria University, who has undertaken numerous Cochrane reviews, and who will provide guidance with respect to quantitative systematic reviewing and with any meta-analyses required. Economic modelling expertise will be provided by the Health Economics team within the Institute of Health and Society at Newcastle University.

Dr Susan Carr, Reader in Public Health in the Health Improvement Research Programme (HIRP), at Northumbria University, is the Principal Investigator. Experience of concurrent management of multiple projects will provide a template for leadership, management and probity of the overlapping phases of this project. She will draw on HIRP research foci of enhancement of understanding of population need, service innovation and evaluation and output and outcome evaluation to contribute to this project. Professor Cam Donaldson, Director of the Institute of Health and Society at Newcastle University, has expertise in measuring and valuing the benefits of health care and the economic evaluation of health-care interventions. Professor Susan Michie of the Centre for Outcomes Research and Effectiveness (CORE) at UCL will take responsibility for an analysis of the possible mechanisms of change underlying any effects found. This will include appropriate coding of the interventions and linking this with theoretical principles of behaviour change. Professor Martin White, Director of the Public Health Research Programme at Newcastle University, will offer his expertise in conducting systematic reviews and the development and evaluation of complex public health interventions. He will contribute to all phases of the research, in particular providing advice on analysis of differential intervention effects within the systematic review and on development of future research questions, intervention strategies and evaluation designs.

An Advisory Group (n = 8) representing a range of key stakeholders and expertise has been recruited from different geographical locations, service, user and academic backgrounds and disciplines. The group will provide guidance to the review team to ensure appropriate inclusion and exclusion criteria; discuss and define the range of intervention dimensions following the survey analysis; contribute to decisions about the scope of the review; assisting the reviewers in prioritising outcomes and interpreting the findings of the review; and disseminating the review to relevant groups, ensuring that it is readable and understandable from a range of perspectives. This group will meet a minimum of four times over the duration of the project, at approximately the following times:

- October 2007 commence project, finalise roles and timetable, undertake initial consultation
- April 2008 completion of Phase I, preparation for Phase II and production of interim report
- October 2008 review of economic modelling and data abstraction, interim report preparation
February 2009 research question formulation, preparation of final report and framework paper for publication.

**Justification of support required**

In accordance with standard practice to ensure rigour, two reviewers will be used to avoid bias. This means that the equivalent of one part-time Research Associate (RA) and one part-time Senior Research Assistant (SRA) at Northumbria University will be required for 18 months, with input from Dr Deane for the equivalent of 10 days, and one part-time RA/economic modeller at Newcastle University for 18 months. Overall supervision and leadership will be provided by Dr Carr at Northumbria University, with Professors Donaldson, Michie and White providing expertise and specific leadership at appropriate points during the project. Progress review meetings will be conducted with Dr Carr and the research team on a monthly basis, and the core team will convene every 3 months, with regular email and telephone communication as and when required. The PAG will attend four steering group meetings over the course of the 18 months, with reimbursement of travel and subsistence costs.

**Flow diagram**

![Flow diagram](image)

**Project timetable**

We estimate that the project will take approximately 18 months to complete, starting in November 2007 and completing in May 2009. The relevant milestones will be as follows:
<table>
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<tr>
<th>Phase I: Problem definition and intervention modelling phasea</th>
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<tr>
<td>AGM – finalise roles, timetable and initial consultation</td>
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<tr>
<td>Systematic review protocol developmentb</td>
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<td>Interviews with key stakeholders</td>
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<th>Phase II: Evidence synthesis</th>
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<td>Economic model structure building, parameterisation and analysisb</td>
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<tr>
<td>Searching and assessment of relevance of studies</td>
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<tr>
<td>AGM – interim report preparation</td>
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<td>Data abstraction</td>
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<td>Data cleaning and analysis</td>
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<td>AGM – interim report preparation</td>
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<th>Phase III: Development of definitive evaluation research proposals</th>
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<tr>
<td>Draft report and paper for publication produced</td>
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<td>AGM – research question formulation; final report and preparation</td>
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<tr>
<td>Reporting and development of further work</td>
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AGM, Advisory Group Meeting.

a Including establishment of pathways and setting measures of benefit.
b Including searches to locate the association between intermediate and final outcomes.
c Including locating cost and utility estimates as required.
Progress reports will be submitted at 6-monthly intervals during the project, detailing progress towards or against the above milestones. A final report will be produced and submitted to Health Technology Assessment (HTA) by May 2009, along with at least one paper for publication in a relevant peer-reviewed journal.

Should we become aware of any further studies performed after the review has been completed, we will append these to the review as necessary. If a number of studies that challenge the conclusions of the review become available, and the original conclusions become untenable, we will repeat the review if we have the resources available to do so.

References


33. Popay J, Rogers A, Williams G. Rationale and standards for the systematic review of qualitative literature in health services research. *Qualitative Health Research* 1998;8:341–51.


TABLE 1 The multi-dimensional nature of the HRLA format\(^a\)

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<tr>
<th>Dimension</th>
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<th>Top down, mandated</th>
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<tbody>
<tr>
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<td>Origins</td>
<td>Formal</td>
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<tr>
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<td>Level of formality</td>
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<tr>
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<td>Topic focus</td>
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<tr>
<td>Community outreach</td>
<td>Population focus</td>
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</tr>
<tr>
<td>One-off contact</td>
<td>Referral</td>
<td>Professionally driven</td>
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<td>Peer or lay led</td>
<td>Frequency</td>
<td>Qualified, highly skilled</td>
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<tr>
<td>Unqualified, low/no skill</td>
<td>Practitioner type</td>
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<td>Full-time advisors/trainers</td>
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<td>Part-time/sessional workers</td>
<td>Nature of role</td>
<td>One-to-one intervention</td>
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<td>Information giving and signposting</td>
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<td>Mode of delivery</td>
<td>Health behaviour change within individual clients</td>
</tr>
<tr>
<td>Enhanced capacity and social capital within communities</td>
<td>Nature of role</td>
<td>Key outcomes</td>
</tr>
</tbody>
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\(^a\) Interventions and programmes for the delivery of HRLA can be loosely classified along the dimensions detailed above. However, none of these is mutually exclusive and there is inevitably a high degree of overlap and blurring of the boundaries between the categories. For example, initiatives described as taking a one-to-one approach may occasionally involve some group work, and those that focus on a particular issue often deal with wider health concerns by signposting clients to other services.

BOX 1 Electronic databases that will be searched

- ASSIA
- Article 1st
- British Humanities Index
- CINAHL
- EMBASE
- FRANCIS
- NHS Economic Evaluation Database (NHS EED)
- IBSS
- MDX Health
- MEDLINE
- PAIS
- PsycINFO
- Science Citation Index (SCI)
- SIRS Researcher
- Social Sciences Citation Index (SSCI)
- Social Services Abstracts
- Sociological Abstracts
- Web of Knowledge
- WorldCat
- Zetoc
BOX 2  Strategy for searching electronic databases

(Health trainer OR lifestyle adviser OR lay health worker/adviser OR peer educator/counselor/support OR health activist/activist OR health advocate OR link worker OR community champion OR community health educator OR outreach worker) AND (evaluation OR effectiveness OR cost-effectiveness OR equity OR acceptability OR behaviour change OR health promotion/improvement OR disease prevention)

AND/OR searches for specific health-related behaviours: (smoking OR physical activity OR diet OR overweight/obesity OR alcohol OR breastfeeding OR sexual health)

BOX 3  Mailbases and ListSrvs that requests for information will be posted on

HEALTH-EQUITY-NETWORK@JISCMAIL.AC.UK
COMMUNITY-HEALTH@JISCMAIL.AC.UK
GP-UK@JISCMAIL.AC.UK
GPRD-RESEARCH@JISCMAIL.AC.UK
HEALTH-FOR-ALL@JISCMAIL.AC.UK
HEALTH-PROMOTION@JISCMAIL.AC.UK
HEALTH-SERVICES-RESEARCH@JISCMAIL.AC.UK
PUBLIC-HEALTH@JISCMAIL.AC.UK
PUBLIC-HEALTH-IN-TRUSTS@JISCMAIL.AC.UK
SOCIALWORK-HEALTHINEQUALITIES@JISCMAIL.AC.UK
EVIDENCE-BASED-HEALTH@JISCMAIL.AC.UK
HEALTH-SECTOR-DEVELOPMENT@JISCMAIL.AC.UK
HEALTHFUTURESUK@JISCMAIL.AC.UK
APIG@JISCMAIL.AC.UK
LEEDSPEERSUPERVISION@JISCMAIL.AC.UK
primarycarenursingresearchnetwork@yahoo.groups.com
evidencenetwork.com
click4HP@yorku.ca
address_healthcare_disparities@list.ahrq.gov
health-disparities@lis.ahrq.gov
public-health@latrobe.edu.au
SDOH@yorku.ca
BOX 4  Websites to be hand searched for relevant publications

The National Audit Office: www.nao.org.uk
The Home Office: www.homeoffice.gov.uk
The Joseph Rowntree Foundation: www.jrf.org.uk
The Office of the Deputy Prime Minister: www.odpm.gov.uk
ISRCTN Register: www.controlled-trials.com/isrctn
The Department of Health: www.dh.gov.uk
The American Institutes for Research: www.air.org
The Office of Policy: www.ssa.gov/policy
The Medical Research Council: www.mrc.ac.uk
The Urban Institute: www.urban.org
Wellcome Trust: www.wellcome.ac.uk
National Institute of Health: www.nice.org.uk/
The Society of Behavioural Medicine: www.sbm.org/

TABLE 2  Data abstraction sheet

<table>
<thead>
<tr>
<th>Authors</th>
<th>Reviewer</th>
<th>Review date</th>
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<td>Journal and reference</td>
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<td>Entered on Access</td>
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</tbody>
</table>

Screening

Does this study describe an intervention involving some form of HRLA or trainer?
If not, this study should not be included in the review – may need to discuss with team

Description of intervention

What was the referral system?
When was the intervention delivered – timing or stage?
What were the aims of the intervention?
Who was eligible for the intervention?
Who delivered the intervention?
Where was the intervention delivered?
What was the content of the intervention (specific technique/s)?
Theoretical basis of the intervention?
What was the intensity of the intervention?
How as the intervention delivered?
What was the cost of the intervention?

Evaluation

Type of evaluation performed
Quantitative
Qualitative
Economic
### Quantitative evaluation

<table>
<thead>
<tr>
<th>Type of quantitative evaluation</th>
<th>Uncontrolled before and after Controlled/comparison group</th>
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</thead>
</table>

#### Uncontrolled before-and-after studies

- **Size**, e.g., number seen by advisor(s)
- **Timescale** that those included in evaluation seen

<table>
<thead>
<tr>
<th>Health outcomes</th>
<th>Measurement instrument 1</th>
<th>Data collection method</th>
<th>Baseline mean &amp; SD</th>
<th>FU mean &amp; SD</th>
<th>Stats performed?</th>
<th>Measurement instrument 2</th>
<th>Data collection method</th>
<th>Baseline mean &amp; SD</th>
<th>FU mean &amp; SD</th>
<th>Stats performed?</th>
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<tr>
<td>Other outcomes</td>
<td>Measurement instrument 1</td>
<td>Data collection method</td>
<td>Baseline mean &amp; SD</td>
<td>FU mean &amp; SD</td>
<td>Stats performed?</td>
<td>Measurement instrument 2</td>
<td>Data collection method</td>
<td>Baseline mean &amp; SD</td>
<td>FU mean &amp; SD</td>
<td>Stats performed?</td>
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</tbody>
</table>

#### Controlled studies/studies with comparison groups

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<th>Size</th>
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<th>No. in intervention/effect group at follow-up</th>
<th>No. in control/comparison group at baseline</th>
<th>No. in control/comparison group at follow-up</th>
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</thead>
<tbody>
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<td>Random assignment to control/intervention group?</td>
<td>Researchers blind to control/intervention group status?</td>
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</table>

| Health outcomes | Measurement instrument 1 | effect grp score at baseline | comp grp score at baseline | effect grp score at FU | comp grp score at FU | stats performed? | results of stats | Measurement instrument 2 | effect grp score at baseline | comp grp score at baseline | effect grp score at FU | comp grp score at FU | stats performed? | results of stats |

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**TABLE 2 Data abstraction sheet (continued)**
TABLE 2 Data abstraction sheet (continued)

<table>
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<td>control grp score at FU</td>
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<td>int grp score at FU</td>
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<td>control group score at FU</td>
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**Qualitative evaluation**

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<td>Composition</td>
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<td>How chosen</td>
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</table>

**Data collection method**

**Analytical method**

**Main themes identified**

**Economic evaluation**

<table>
<thead>
<tr>
<th>Size</th>
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</thead>
<tbody>
<tr>
<td>Timescale that those included in evaluation seen</td>
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**Economic outcomes**

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<th>Measurement instrument 1</th>
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<tbody>
<tr>
<td>Measurement instrument 2</td>
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Appendix 3

Multidimensional nature of the HRLA format

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<thead>
<tr>
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<tbody>
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Appendix 4

Project Advisory Group

Rachel Baker, Lecturer, Newcastle University

Sharon Bartram, Health Trainer Manager, Hartlepool Primary Care Trust

Dr Susan Carr, Reader in Public Health & Primary Care, Northumbria University

Professor Cam Donaldson, Director of the Institute of Health and Society, Newcastle University

Dr Katherine Deane, Senior Lecturer, Newcastle University (2008–9), University of East Anglia (2009)

Professor Chris Drinkwater, Emeritus Chair of Primary Care Development, Northumbria University

Gwen Ellison, Health Trainer Lead, North East Hub, Newcastle Primary Care Trust

Natalie Forster, Research Assistant, Northumbria University

Lesley Geddes, Principal Lecturer, Northumbria University

Philip Hodgson, Research Assistant/Administrator, Northumbria University

Diane Jones, Research Associate, Northumbria University (August–November 2009)

Farzana Latif, Public Health Practitioner, East Berkshire Primary Care Trust

Dr Monique Lhussier, Senior Lecturer, Northumbria University

Dr Marianne Morris, Principal Lecturer, University of West England

Professor Susan Michie, Professor of Health Psychology, University College London

Mark Pennington, Research Associate, Newcastle University

Jane South, Reader in Health Promotion, CoDirector of the Centre for Health Promotion Research, Leeds Metropolitan University

Professor Martin White, Professor of Public Health, Director of the Centre for Translational Research in Public Health, Newcastle University
Appendix 5

Interview schedule

Stakeholders’ perceptions of key issues surrounding the role of health-related LAs

1. Role definitions/descriptions
   i. What services/interventions do you provide that are delivered by a health-related LA?
   ii. Do you have one or multiple models/versions of the health-related LA role? What is their role title?
   iii. What is the skill level of those delivering the intervention?
   iv. Number of hours worked, for example full-time/part-time/sessional, etc.
   v. What are the origins/history of the service/intervention, i.e. was it previously undertaken by another post holder, is it delegated from another post holder?

2. Referral process
   i. Is a referral required for the service to be offered/delivered?
   ii. What type of referral, e.g. community outreach/biomedical referral?

3. Aims and objectives of the intervention delivered by the health-related LA
   i. What is the intervention intending to achieve, i.e. is it about primary or secondary prevention or positive health promotion?
   ii. Does it have a specific disease or health topic focus?
   iii. Does it focus on one particular health improvement issue (e.g. smoking cessation), more than one issue (e.g. smoking cessation, obesity and exercise) or general health and well-being (i.e. a generic focus)?
   iv. What are the key outcomes for the intervention?
   v. How do you define and measure success of the health-related LA role?

4. Eligibility for service
   i. Who are the target audience for the intervention?
   ii. What is the level of delivery, i.e. individual, group, community, local/regional/national population, etc.?
   iii. Is there any specific targeting of particular populations?

5. Setting
   i. Where is the intervention delivered?
   ii. What is the context in which the intervention is delivered?

6. Mode of delivery
   i. What are the main activities undertaken?
   ii. What is the approach of the intervention? Nurturing and supporting or signposting and giving information
   iii. How is the intervention delivered, e.g. face-to-face contact with individuals/groups versus telephone contact?
   iv. What is the method of the intervention, i.e. what are its component techniques?

7. Intensity
   i. What is the intensity of the intervention, i.e. frequency, duration, amount of specific components?
   ii. Theoretical basis
   iii. How does the intervention work?
   iv. Were any theories used to develop the intervention, e.g. stages of change?
8. Price
   i. Has any cost analysis of the intervention been carried out?
   ii. How much does the intervention cost? Overall cost/cost per contact?

9. Grey literature
   i. Any supporting documentation that could be used within the review?
Appendix 6

Search strategies for electronic databases

Database: Applied Social Sciences Index and Abstracts

Name of host: CSA Illumina

Years covered: 1960–present

Search strategy

List one:

1. kw= (health train*)
2. kw= (lifestyle within 1 (advi* or train* or coach*))
3. kw= (lay health within 1 (worker or advis?r or support*))
4. kw= (lay within 1 (practitioner or leader or midwi*))
5. kw= (peer within 1 (leader or educ* or counsel* or support* or mentor* or network* or assist*))
6. kw= (health within 1 (activ* or aide or advoc* or coach or promot*))
7. kw= ((patient or peer) within 1 navig*)
8. kw= ((community or health) within 1 champion)
9. kw= (community health within 1 (educ* or work* or advis* or activ* or representative))
10. kw= (community wellness advocate)
11. kw= (community within 1 (parent or mother))
12. kw= (outreach within 1 (worker or specialist))
13. kw= (expert patient) or kw= (natural help*)
14. kw= ((neighborhood or neighbourhood) within 1 (help* or leader or assistant))
15. kw= (family health advis*)
16. kw= (breastfeeding supporter)
17. kw= (lactation consultant)
18. kw= ((village or indigenous) within 1 health worker)
19. kw= (promotor*)
20. kw= (paraprofessional)
21. kw= (workplace health advi*)
22. kw= ((professional* or nurs* or physician* or clinician*) within 2 (delegat* or substitut*))
23. kw= (staff* within 1 model*)
24. kw= (nurs* within 2 (led or managed or directed or run))
25. kw= ((lay or voluntary or volunteer* or untrained or unlicensed or nonprofessional* or non professional* or paraprofessional* or paramedical) within 1 (worker* or staff))
26. kw= (community within 3 (volunteer* or aid* or support))
27. kw= ((birth or childbirth or child birth or labor or labour) within 1 (attendant* or assistant*))
28. kw= (douladural* or monitrice* or linkworker* or link worker* or barefoot doctor*)
29. kw= (home within 1 (aid or aides or health or nursing or support or intervention* or treatment* or visit*))
List two:

30. kw= (public health)
31. kw= ((behaviour or behavior or lifestyle or lifestyle) within 1 change)
32. kw= (health within 1 (promotion or education or improvement))
33. kw= ((disease or illness) within 1 prevention)
34. kw= (smoking)
35. kw= (tobacco use)
36. kw= (exercise)
37. kw= (diet)
38. kw= (nutrition)
39. kw= (overweight)
40. kw= (obesity)
41. kw= (alcohol)
42. kw= (substance misuse)
43. kw= (breastfeeding)
44. kw= (sexual health)
45. kw= (condom use)
46. kw= (HIV)
47. kw= (AIDS)
48. kw= (mental health)
49. kw= (wellbeing)

List three

50. kw= (evaluation)
51. kw= (randomised controlled trial)
52. kw= (RCT)
53. kw= (controlled clinical trial)
54. kw= ((questionnaire or survey or interview or focus group) within 5 method)
55. kw= (program evaluation)
56. kw= (multicenter study)
57. kw= (experiment*)
58. kw= (time within 1 series)
59. kw= (interrupted time series)
60. kw= (pre test or pretest or (post test or posttest))
61. kw= (impact)
62. kw= (intervention*)
63. kw= (chang*)
64. kw= (compar*)
65. kw= (random allocation)
66. kw= (double blind method)
67. kw= (single blind method)
68. kw= (clinical trial)
69. kw= (clin* within 5 trial*)
70. kw= ((singl* or doubl* or trebl* or tripl*) within 5 (blind* or mask*))
71. kw= (placebo*)
72. kw= (random*)
73. kw= (comparative study)
74. kw= (follow up studies)
75. kw= (prospective studies)
76. kw= (control* or prospective* or volunteer*)
77. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3
treatment within 1 (program* or strateg* or test* or questionnaire* or process* or procedure*
or method*))
78. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 1 care
within 1 (program* or strateg* or test* or questionnaire* or process* or procedure*
or method*))
79. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3
screening within 1 (program* or strateg* or test* or questionnaire* or process* or procedure*
or method*))
80. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3
intervention* within 1 (program* or strateg* or test* or questionnaire* or process* or procedure*
or method*))
81. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3
prevention* within 1 (program* or strateg* or test* or questionnaire* or process* or procedure*
or method*))
82. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3
(protocol* or guideline* or strateg* or audit* or method*))
83. kw= ((critical* within 3 apprais*) or evaluat*)

List four
84. kw= (econom*) or kw= (cost*) or kw= (pric*) or kw= (pharmacoecon*)
85. kw= (cost within 1 (effectiveness or utili* or benefit or minimi* or energy or oxygen or
metabolic)) or kw= (expenditure not energy)
86. kw= (value within 2 money) or kw= (budget*) or kw= (preference) or kw= (QALY) or kw=
(quality within 1 adjusted)
87. kw= (utility*)
88. kw= (financ* within 1 (management or support or organized)) or kw= (econom* or cost or
costs or costly or costing or price or prices or pricing or pharmacoeconomic*)
89. kw= (expenditure* not energy)
90. kw= (value within 1 money) or kw= (budget*)
91. List five
92. kw= (editorial)
93. kw= (letter)
94. kw= (comment)
95. kw= (animal)

**Database: Articles 1st**
Name of host: OCLC FirstSEARCH

Years covered: earliest to latest

**Search strategy**
((kw: Health w train*) or (kw: Lifestyle w advi*) or (kw: Lifestyle w train*) or (kw: Lifestyle w coach*) or (kw: Lay w health w worker) or (kw: Lay w health w advis#r) or (kw: Lay w health w support) or (kw: Lay w practitioner) or (kw: Lay w leader) or (kw: Lay w midwi*) or (kw: Peer w leader) or (kw: Peer w edu*) or (kw: Peer w counsel*) or (kw: Peer w support*) or (kw: Peer w mentor*) or (kw: Peer w network*) or (kw: Peer w assist*) or (kw: Health w activ*) or (kw: Health w aide) or (kw: Health w advoc*) or (kw: Health w coach) or (kw: Health w promot#r) or (kw: Patient w navig*) or (kw: Peer w navig*) or (kw: Community w health w promot#r) or (kw: Community w health w educ*) or (kw: Community w health w work*) or (kw: Community w health w advis*) or (kw: Community w health w activ*) or (kw: Community...
w health w representative) or (kw: Community w wellness w advocate) or (kw: Community w parent) or (kw: Community w mother) or (kw: Outreach w worker) or (kw: Outreach w specialist) or (kw: Expert w patient) or (kw: Natural w help*) or (kw: Neighborhood w help*) or (kw: Neighborhood w leader) or (kw: Neighborhood w assistant) or (kw: Neighborhood w help*) or (kw: Neighbourhood w leader) or (kw: Neighbourhood w assistant) or (kw: Family w health w advis*) or (kw: Breastfeeding w supporter) or (kw: Lactation w consultant) or (kw: Village w health w worker) or (kw: Indigenous w health w worker) or (kw: Promotor*) or (kw: Paraprofessional) or (kw: Workplace w health w advi*))

AND


AND

((kw: Evaluation) Or (kw: Randomi#ed w controlled w trial) Or (kw: RCT) Or (kw: Controlled w clinical w trail) Or (kw: controlled w before w after w 3 w study) Or (kw: cohort w 3 kw: study) Or (kw: case-control w 3 kw: study) Or (kw: longitudinal w 3 kw: study) Or (kw: observational w 3 kw: study) Or (kw: case w 3 kw: study) Or (kw: qualitative w 3 kw: study) Or (kw: quantitative w 3 kw: study) Or (kw: questionnaire w 25 kw: method) Or (kw: survey w 25 kw: method) Or (kw: interview w 25 kw: method) Or (kw: focus w group w 25 kw: method) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group) OR (kw: focus w group))

NOT

((kw: editorial) or (kw: letter) or (kw: comment) or (kw: animal))

**Database: British Humanities INDEX**

Name of host: CSA

Years covered: earliest to latest

**Search strategy**

List one:

1. kw= (health train*)
2. kw= (lifestyle within 1 (advi* or train* or coach*))
3. kw= (lay health within 1 (worker or advis?r or support*))
4. kw= (lay within 1 (practitioner or leader or midwi*))
5. kw= (peer within 1 (leader or educ* or counsel* or support* or mentor* or network* or assist*))
6. kw= (health within 1 (activ* or aide or advoc* or coach or promot*))
7. kw= ((patient or peer) within 1 navig*)
8. kw= ((community or health) within 1 champion)
9. kw= (community health within 1 (educ* or work* or advis* or activ* or representative))
10. kw= (community wellness advocate)
11. kw= (community within 1 (parent or mother))
12. kw= (outreach within 1 (worker or specialist))
13. kw= (expert patient) or kw= (natural help*)
14. kw= ((neighborhood or neighbourhood) within 1 (help* or leader or assistant))
15. kw= (family health advis*)
16. kw= (breastfeeding supporter)
17. kw= (lactation consultant)
18. kw= ((village or indigenous) within 1 health worker)
19. kw= (promotor*)
20. kw= (paraprofessional)
21. kw= (workplace health advi*)
22. kw= ((professional* or nurs* or physician* or clinician*) within 2 (delegat* or substitut*))
23. kw= (staff* within 1 model*)
24. kw= (nurs* within 2 (led or managed or directed or run))
25. kw= ((lay or voluntary or volunteer* or untrained or unlicensed or nonprofessional* or non professional* or paraprofessional* or paramedical) within 1 (worker* or staff))
26. kw= (community within 3 (volunteer* or aid* or support))
27. kw= ((birth or childbirth or child birth or labor or labour) within 1 (attendant* or assistant*))
28. kw= (doula* or douladural* or monitrice* or linkworker* or link worker* or barefoot doctor*)
29. kw= (home within 1 (aid or aides or health or nursing or support or intervention* or treatment* or visit*))

List two:

30. kw= (public health)
31. kw= ((behaviour or behavior or lifestyle or life style) within 1 change)
32. kw= (health within 1 (promotion or education or improvement))
33. kw= ((disease or illness) within 1 prevention)
34. kw= (smoking)
35. kw= (tobacco use)
36. kw= (exercise)
37. kw= (diet)
38. kw= (nutrition)
39. kw= (overweight)
40. kw= (obesity)
41. kw= (alcohol)
42. kw= (substance misuse)
43. kw= (breastfeeding)
44. kw= (sexual health)
45. kw= (condom use)
46. kw= (HIV)
47. kw= (AIDS)
48. kw= (mental health)
49. kw= (wellbeing)
List three:

50. kw= (evaluation)
51. kw= (randomized controlled trial)
52. kw= (RCT)
53. kw= (controlled clinical trial)
54. kw= ((questionnaire or survey or interview or focus group) within 5 method)
55. kw= (program evaluation)
56. kw= (multicenter study)
57. kw= (experiment*)
58. kw= (time within 1 series)
59. kw= (interrupted time series)
60. kw= (pre test or pretest or (post test or posttest))
61. kw= (impact)
62. kw= (intervention*)
63. kw= (chang*)
64. kw= (compar*)
65. kw= (random allocation)
66. kw= (double blind method)
67. kw= (single blind method)
68. kw= (clinical trial)
69. kw= (clin* within 5 trial*)
70. kw= (singl* or doubl* or trebl* or tripl*) within 5 (blind* or mask*)
71. kw= (placebo*)
72. kw= (random*)
73. kw= (comparative study)
74. kw= (follow up studies)
75. kw= (prospective studies)
76. kw= (control* or prospective* or volunteer*)
77. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3 treatment within 1 (program* or strateg* or test* or questionnaire* or process* or procedure* or method*))
78. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 1 care within 1 (program* or strateg* or test* or questionnaire* or process* or procedure* or method*))
79. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3 screening within 1 (program* or strateg* or test* or questionnaire* or process* or procedure* or method*))
80. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3 intervention* within 1 (program* or strateg* or test* or questionnaire* or process* or procedure* or method*))
81. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3 prevention* within 1 (program* or strateg* or test* or questionnaire* or process* or procedure* or method*))
82. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3 (protocol* or guideline* or strateg* or audit* or method*))
83. kw= ((critical* within 3 apprais*) or evaluat*)

List four:

84. kw= (econom*) or kw= (cost*) or kw= (pric*) or kw= (pharmacoecon*)
85. kw= (cost within 1 (effectiveness or utility or benefit or minimi* or energy or oxygen or metabolic)) or kw= (expenditure not energy)
86. kw= (value within 2 money) or kw= (budget*) or kw= (preference) or kw= (QALY) or kw= (quality within 1 adjusted)
87. kw= (utility*)
88. kw= (finance* within 1 (management or support or organized)) or kw= (econom* or cost or costs or costly or costing or price or prices or pricing or pharmacoeconomic*)
89. kw= (expenditure* not energy)
90. kw= (value within 1 money) or kw= (budget*)
91. List five
92. kw= (editorial)
93. kw= (letter)
94. kw= (comment)
95. kw= (animal)

Database: CINAHL

Name of host: Ovid

Years covered: 1982 to week 1 September, 2008

Search strategy
1. health train*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
2. (lifestyle adj (adv* or train* or coach*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
3. (lay health adj (worker or advis*r or support*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
4. (lay adj (practitioner or leader or midwi*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
5. (peer adj (leader or educ* or counsel* or support* or mentor* or network* or assist*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
6. (health adj (activ* or aide or advoc* or coach or promot*r)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
7. ((patient or peer) adj navig*).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
8. ((community or health) adj champion).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
9. (community health adj (educ* or work* or advis* or activ* or representative)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
10. community wellness advocate.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
11. (community adj (parent or mother)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
12. (outreach adj (worker or specialist)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
13. expert patient.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
14. natural help*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
15. ((neighborhood or neighbourhood) adj (help* or leader or assistant)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
16. family health advis*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
17. breastfeeding supporter.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
18. lactation consultant.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
19. ((village or indigenous) adj health worker).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
20. promotor*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
21. paraprofessional.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
22. workplace health advi*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
23. “delegation of authority”/
24. exp *voluntary workers/
25. (professional* or nurs* or physician* or clinician*) adj2 (delegat* or substitut*).tw
26. (staff* adj model*).tw
27. (nurs* adj2 (led or managed or directed or run)).tw
28. ((lay or voluntary or volunteer* or untrained or unlicensed or nonprofessional* or non professional* or paraprofessional* or paramedical) adj (worker* or staff)).tw
29. (community adj3 (volunteer* or aid* or support)).tw
30. ((birth or childbirth or child birth or labor or labour) adj (attendant* or assistant*)).tw
31. (doula* or doualadural* or monitrice* or linkworker* or link worker* or barefoot doctor*).tw
32. (home adj (aid or aides or health or nursing or support or intervention* or treatment* or visit*)).tw
33. health personnel, health educators.sh
34. or/1–33
35. public health.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
36. ((behaviour or behavior or lifestyle or life style) adj change).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
37. (health adj (promotion or education or improvement)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
38. ((disease or illness) adj prevention).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
39. smoking.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
40. “tobacco use”.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
41. physical activity.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
42. exercise.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
43. diet.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
44. nutrition.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
45. overweight.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
46. obesity.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
47. alcohol.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
48. substance misuse.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
49. breastfeeding.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
50. sexual health.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
51. "condom use".mp. [mp=title, original title, abstract, name of substance word, subject heading word]
52. HIV.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
53. AIDS.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
54. mental health.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
55. wellbeing.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
56. exp *community health services/
57. exp *public health/
58. "Tobacco Use Cessation"/
59. smoking/
60. patient compliance/
61. risk reduction behavior/
62. food habits/
63. or/35–62
64. evaluation.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
65. random?ed controlled trial.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
66. RCT.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
67. controlled clinical trial.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
68. (((controlled before and after) or cohort or case-control or longitudinal or observational or case or qualitative or quantitative) adj3 stud*).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
69. ((questionnaire or survey or interview or focus group) adj25 method).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
70. *program evaluation/
71. program evaluation.tw
72. exp *research/
73. multicenter studies/
74. experimental studies/
75. experiment*.tw
76. (time adj series).tw
77. time series/
78. (pre test or pretest or (post test or posttest)).tw
79. impact.tw
80. intervention*.tw
81. chang*.tw
82. compar*.tw
83. (controlled before and after stud*).mp
84. random assignment.sh
85. double – blind studies.sh
86. single -blind studies.sh
87. clinical trials.pt
88. exp Clinical Trial/
89. (clin* adj25 trial*).ti,ab
90. ((singl* or doubl* or trebl* or tripl*) adj25 (blind* or mask*)).ti,ab
91. placebo*.ti,ab
92. random*.ti,ab
93. comparative studies.sh
94. exp evaluation research/
95. follow up studies.sh
96. prospective studies.sh
97. (control* or prospective* or volunteer*).ti,ab
98. ((effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 treatment adj (program* or strateg* or test* or questionnaire* or process* or procedure* or method*)).tw
99. ((effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 care adj (program* or strateg* or test* or questionnaire* or process* or procedure* or method*)).tw
100. ((effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 screening adj (program* or strateg* or test* or questionnaire* or process* or procedure* or method*)).tw
101. ((effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 intervention* adj (program* or strateg* or test* or questionnaire* or process* or procedure* or method*)).tw
102. ((effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 prevention* adj (program* or strateg* or test* or questionnaire* or process* or procedure* or method*)).tw
103. ((effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 (protocol* or guideline* or strateg* or audit* or method*)).tw
104. ((critical* adj3 apprais*) or evaluat*).tw
105. *utilization review/
106. or/64–105
107. econom*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
108. cost*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
109. pric*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
110. pharmacoecon*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
111. (cost adj (effectiveness or utiliti* or benefit or minimi* or energy or oxygen or metabolic)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
112. (expenditure not energy).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
113. value NEAR2 money.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
114. budget*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
115. preference.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
116. QALY.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
117. (quality adj adjusted).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
118. utility*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
119. (finance* adj (management or support or organized)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
120. economics/
121. exp *costs/ and cost analysis/
122. economic value of life.sh
123. economics, dental/
124. exp "health care costs/"
125. economic aspects of illness/
126. nursing costs/
127. economics, pharmaceutical/
128. (econom* or cost or costs or costly or costing or price or prices or pricing or pharmacoeconomic*).tw
129. (expenditure* not energy).tw
130. (value adj1 money).tw
131. budget*.tw
132. or/107–131
133. editorial.pt
134. letter.pt
135. comment.pt
136. animals/
137. human/
138. or/133–135
139. 136 not 137
140. 138 or 139
141. 34 and 63
142. 106 or 132
143. 141 and 142
144. 143 not 140

**Database: EMBASE**
Name of host: Ovid

Years covered: 1980–2008 week 36

**Search strategy**

1. health train*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
2. (lifestyle adj (adv* or train* or coach*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
3. (lay health adj (worker or advis*r or support*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
4. (lay adj (practitioner or leader or midwi*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
5. (peer adj (leader or educ* or counsel* or support* or mentor* or network* or assist*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
6. (health adj (activ* or aide or advoc* or coach or promot?r)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
7. ((patient or peer) adj navig*).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
8. ((community or health) adj champion).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
9. (community health adj (educ* or work* or advis* or activ* or representative)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
10. community wellness advocate.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
11. (community adj (parent or mother)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
12. (outreach adj (worker or specialist)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
13. expert patient.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
14. natural help*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
15. ((neighborhood or neighbourhood) adj (help* or leader or assistant)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
16. family health advis*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
17. breastfeeding supporter.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
18. lactation consultant.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
19. ((village or indigenous) adj health worker).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
20. promotor*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
21. paraprofessional.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
22. workplace health advi*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
23. professional delegation/
24. voluntary worker/
25. ((professional* or nurs* or physician* or clinician*) adj2 (delegat* or substitut*)).tw
26. (staff* adj model*).tw
27. (nurs* adj2 (led or managed or directed or run)).tw
28. ((lay or voluntary or volunteer* or untrained or unlicensed or nonprofessional* or non professional* or paraprofessional* or paramedical) adj (worker* or staff)).tw
29. (community adj3 (volunteer* or aid* or support)).tw
30. ((birth or childbirth or child birth or labor or labour) adj (attendant* or assistant*)).tw
31. (doula* or douladural* or monitrice* or linkworker* or link worker* or barefoot doctor*).tw
32. (home adj (aid or aides or health or nursing or support or intervention* or treatment* or visit*)).tw
33. health care personnel, health education, healthy care delivery, health promotion, health program, health center, rural area.sh
34. or/1–33
35. public health.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
36. ((behaviour or behavior or lifestyle or life style) adj change).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
37. (health adj (promotion or education or improvement())).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
38. ((disease or illness) adj prevention).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
39. smoking.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
40. “tobacco use”.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
41. physical activity.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
42. exercise.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
43. diet.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
44. nutrition.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
45. overweight.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
46. obesity.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
47. alcohol.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
48. substance misuse.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
49. breastfeeding.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
50. sexual health.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
51. "condom use".mp. [mp=title, original title, abstract, name of substance word, subject heading word]
52. HIV.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
53. AIDS.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
54. mental health.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
55. wellbeing.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
56. exp *community health services/
57. exp *public health/
58. "'Tobacco Use Cessation'"/
59. smoking/
60. patient compliance/
61. risk reduction behavior/
62. food habits/
63. or/35–62
64. evaluation.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
65. randomi*ed controlled trial.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
66. RCT.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
67. controlled clinical trial.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
68. ((controlled before and after) or cohort or case-control or longitudinal or observational or case or qualitative or quantitative) adj3 stud*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
69. ((questionnaire or survey or interview or focus group) adj25 method).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
70. Health Care Quality/
71. program evaluation.tw
72. multicenter study.pt
73. intervention study/
74. experiment*.tw
75. (time adj series).tw
76. time series analysis.mp
77. (pre test or pretest or (post test or posttest)).tw
78. impact.tw
79. intervention*.tw
80. chang*.tw
81. compar*.tw
82. (controlled before and after stud*).mp
83. randomization.sh
84. double blind procedure/
85. single blind procedure/
86. clinical trial.pt
87. exp Clinical Trial/
88. (clin* adj25 trial*).ti,ab
89. ((singl* or doubl* or trebl* or tripl*) adj25 (blind* or mask*)).ti,ab
90. placebo*.ti,ab
91. random*.ti,ab
92. comparative study.sh
93. exp evaluation/
94. follow up.sh
95. prospective study.sh
96. (control* or prospective* or volunteer*).ti,ab
97. (effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 treatment adj (program* or strateg* or test* or questionnaire* or process* or procedure* or method*).tw
98. (effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 care adj (program* or strateg* or test* or questionnaire* or process* or procedure* or method*).tw
99. (effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 screening adj (program* or strateg* or test* or questionnaire* or process* or procedure* or method*).tw
100. (effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 intervention* adj (program* or strateg* or test* or questionnaire* or process* or procedure* or method*).tw
101. (effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 prevention* adj (program* or strateg* or test* or questionnaire* or process* or procedure* or method*).tw
102. (effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 (protocol* or guideline* or strateg* or audit* or method*).tw
103. ((critical* adj3 apprais*) or evaluat*).tw
104. *utilization review/
105. econom*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
106. cost*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
107. pric*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
108. pharmacoecon*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
109. (cost adj (effectiveness or utility or benefit or minimi* or energy or oxygen or metabolic)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
110. (expenditure not energy).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
111. value NEAR2 money.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
112. budget*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
113. preference.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
114. QALY.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
115. (quality adj adjusted).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
116. utility*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
117. (finance* adj (management or support or organized)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
118. economics, health economics, environmental economics/
119. exp *cost, cost benefit analysis/
120. socioeconomic.sh
121. pharmacoconomics/
122. (economics or cost or costs or costly or costing or price or prices or pricing or pharmacoeconomic*).tw
123. (expenditure* not energy).tw
124. (value adj1 money).tw
125. budget*.tw
126. or/64–125
127. Editorial/
128. Letter/
129. comment.pt
130. animal/
131. human/
132. or/127–129
133. 130 not 131
134. 132 or 133
135. 34 and 63
136. 135 and 126
137. 136 not 134

Database: FRANCIS
Name of host: OCLC FirstSEARCH

Years covered: earliest to latest

Search strategy
((kw: Health w train*) or (kw: Lifestyle w advis*) or (kw: Lifestyle w train*) or (kw: Lifestyle w coach*) or (kw: Lay w health w worker) or (kw: Lay w health w advis#r) or (kw: Lay w health w support) or (kw: Lay w practitioner) or (kw: Lay w leader) or (kw: Lay w midwi*) or (kw: Peer w leader) or (kw: Peer w edu*) or (kw: Peer w counsel*) or (kw: Peer w support*) or (kw: Peer w mentor*) or (kw: Peer w network*) or (kw: Peer w assist*) or (kw: Health w activ*) or (kw: Health w aide) or (kw: Health w advoc*) or (kw: Health w coach) or (kw: Health w promot#r) or (kw: Patient w navig*) or (kw: Peer w navig*) or (kw: Community w champion) or (kw: Health w champion) or (kw: Community w health w educ*) or (kw: Community w health w work*) or (kw: Community w health w advis*) or (kw: Community w health w activ*) or (kw: Community w health w representative) or (kw: Community w wellness w advocate) or (kw: Community w parent) or (kw: Community w mother) or (kw: Outreach w worker) or (kw: Outreach w specialist) or (kw: Expert w patient) or (kw: Natural w help*) or (kw: Neighborhood w help*) or (kw: Neighborhood w leader) or (kw: Neighborhood w assistant) or (kw: Neighbourhood w help*) or (kw: Neighbourhood w leader) or (kw: Neighbourhood w assistant) or (kw: Family w health w advis*) or (kw: Breastfeeding w supporter) or (kw: Lactation w consultant) or (kw: Village w health w worker) or (kw: Indigenous w health w worker) or (kw: Promotor*) or (kw: Paraprofessional) or (kw: Workplace w health w advis*))
AND


AND

((kw: Evaluation) Or (kw: Randomi#ed w controlled w trial) Or (kw: RCT) Or (kw: Controlled w clinical w trial) Or (kw: controlled w before w after w 3 w stud*) Or (kw: cohort w 3 kw: stud*) Or (kw: case-control w 3 kw: stud*) Or (kw: longitudinal w 3 kw: stud*) Or (kw: observational w 3 kw: stud*) Or (kw: case w 3 kw: stud*) Or (kw: qualitative w 3 kw: stud*) Or (kw: quantitative w 3 kw: stud*) Or (kw: questionnaire w 25 kw: method) Or (kw: survey w 25 kw: method) Or (kw: interview w 25 kw: method) Or (kw: focus w group w 25 kw: method) OR (kw: econom*) Or (kw: cost*) Or (kw: pric*) Or (kw: pharmacoecon*) Or (kw: cost w effectiveness) Or (kw: cost w utility*) Or (kw: cost w benefit) Or (kw: cost w minimi*) Or (kw: cost w energy) Or (kw: cost w oxygen) Or (kw: cost w metabolic) Or (kw: expenditure NOT kw: energy) Or (kw: value w 2 kw: money) Or (kw: budget*) Or (kw: preference) Or (kw: QALY) Or (kw: quality w adjusted) Or (kw: utility*) Or (kw: financ* w management) Or (kw: financ* w support) Or (kw: financ* w organized))

NOT

((kw: editorial) or (kw: letter) or (kw: comment) or (kw: animal))

**Database: NHS Economic Evaluation Database**

Name of host: OCLC First SEARCH

Years covered: earliest to latest

**Search strategy**

“health train*”

“lifestyle advi*”

“lifestyle train*”

“lifestyle coach*”

“lay health worker”

“lay health advis?r”

“lay health support*”

“lay practitioner”

“lay leader”
“lay midwi***

peer AND (leader OR educ* OR counsel* OR support* OR mentor* OR network* OR assist*)

“health activ***

“health aide"

“health advoc**

“health coach"

“health promot?r"

“(patient or peer) and navig***

“community champion”

“health champion’

“community health” AND (educ* OR work* OR advis* OR activ* OR representative)

“community wellness advocate”

“community mother”

“community parent”

“outreach worker”

“outreach specialist”

“expert patient”

“natural help***

“(neighborhood or neighbourhood) and (help or leader or assistant)**”

“family health advis***

“breastfeeding supporter”

“lactation consultant”

“indigenous health worker”

“village health worker”

promotor*

paraprofessional
“workplace health advi*”

community AND ( volunteer* OR aid* OR support)

(birth OR childbirth OR child OR birth OR labor OR labour) AND (attendant* OR assistant*)

"health educator*"

“rural health personnel”

“community health workers”

"lay midwifery”

“community role”

“peer counselling”

“public health”

(behaviour OR behavior OR lifestyle OR life OR style) AND change

“health and promotion”

“health and education”

“health and improvement”

“disease prevention”

“illness prevention”

smoking

tobacco use"

“physical activity”

exercise

diet

nutrition

overweight

obesity

alcohol

“substance misuse”
breastfeeding
“sexual health”
“condom use”
HIV
AIDS
“mental health”
wellbeing
“community health services”
“tobacco use cessation”
“patient compliance”
“risk reduction behavior”
“food habits”
“preventive health care”
wellness
“life style changes”
evaluation
“randomi?ed controlled trial”
RCT
“controlled clinical trial”
“controlled before and after stud*”
“cohort stud*”
“case-control stud*”
“longitudinal stud*”
“observational stud*”
“case stud*”
“qualitative stud*”
“quantitative stud*”

( questionnaire OR survey OR interview OR focus OR group) AND method

"program evaluation"

"multicenter study"

"intervention studies"

time AND series

"interrupted time series"

“pre test or pretest or (post test or posttest)”

“random allocation”

“double blind method”

“single blind method”

“clinical trial”

“comparative study”

“comparative study”

“follow up studies”

“prospective studies”

( effect* OR impact OR evaluat* OR introduc* OR compar* OR implement*) AND treatment
AND ( program* OR stratg* OR test* OR questionnaire* OR process* OR procedure* OR method*)

( effect* OR impact OR evaluat* OR introduc* OR compar* OR implement*) AND care
AND ( program* OR stratg* OR test* OR questionnaire* OR process* OR procedure* OR method*)

( effect* OR impact OR evaluat* OR introduc* OR compar* OR implement*) AND screening
AND ( program* OR stratg* OR test* OR questionnaire* OR process* OR procedure* OR method*)

( effect* OR impact OR evaluat* OR introduc* OR compar* OR implement*) AND intervention*
AND ( program* OR stratg* OR test* OR questionnaire* OR process* OR procedure* OR method*)

( effect* OR impact OR evaluat* OR introduc* OR compar* OR implement*) AND prevention*
AND ( program* OR stratg* OR test* OR questionnaire* OR process* OR procedure* OR method*)
(effect* OR impact OR evaluat* OR introduc* OR compar* OR implement*) AND (protocol* OR guideline* OR strateg* OR audit* OR method*)

"utilization review"
pharmacoecon*
"cost effectiveness"
"cost utili*"
"cost benefit"
"cost minimi*"

expenditure NOT energy
budget*
preference
QALY
"quality adjusted"
utility*
"financ management*"
"financ support*"
"financ organized*"

#1 or #2 or #5 or #10 or #11 or #14 or #20 or #24 or #26 or #31 or #34 or #35 or #38 or #39 or #41 or #43 or #44 or #46 or #47 or #48 or #49 or #50 or #51 or #52 or #53 or #54 or #55 or #56 or #57 or #58 or #59 or #60 or #61 or #62 or #63 or #64 or #65 or #66 or #67 or #68 or #69 or #70 or #71 or #72 or #73 or #74 or #75 or #76

#125 or #45

#79 or #80 or #81 or #82 or #83 or #84 or #85 or #86 or #87 or #88 or #89 or #90 or #91 or #92 or #93 or #94 or #95 or #96 or #97 or #98 or #99 or #100 or #101 or #102 or #103 or #110 or #111 or #112 or #113 or #114 or #115 or #116 or #117 or #118 or #119 or #120 or #121 or #122 or #123

#125 and #127

#126 and #127

#1 or #2 or #4 or #5 or #10 or #11 or #14 or #20 or #24 or #26 or #31 or #34 or #35 or #38 or #39 or #41 or #43 or #44 or #46 or #47 or #49 or #50 or #51 or #52 or #53 or #54 or #58 or #61 or #62 or #63 or #64 or #68 or #69 or #70 or #71 or #72 or #73 or #74 or #75 or #76
#130 and #127

**Database: International Bibliography of the Social Sciences**  
Name of host: EBSCO

Years covered: earliest to latest

**Search strategy**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>S16</td>
<td>(S14 and S10 and S6) not S15</td>
</tr>
<tr>
<td>S15</td>
<td>TX editorial or TX letter or TX comment or TX animal</td>
</tr>
<tr>
<td>S14</td>
<td>S13 or S12 or S11</td>
</tr>
<tr>
<td>S13</td>
<td>TX cost oxygen or TX cost metabolic or TX (expenditure NOT energy) or TX valu W 2 money or TX budget* or TX preference or TX QALY or TX quality adjusted or TX utility* or TX financ* management or TX financ* support or TX financ* organized</td>
</tr>
<tr>
<td>S12</td>
<td>TX survey W25 method or TX interview W25 method or TX focus group W25 method or TX econom* or TX cost* or TX pric* or TX pharmacoecon* or TX cost effectiveness or TX cost utili* or TX cost benefit or TX cost minimi* or TX cost energy</td>
</tr>
<tr>
<td>S11</td>
<td>TX evaluation or TX random?ed controlled trial or TX RCT or TX controlled clinical trial or TX cohort W3 stud* or TX case-control W3 stud* or TX longitudinal W3 stud* or TX observational W3 stud* or TX case W3 stud* or TX qualitative W3 stud* or TX quantitative W3 stud* or TX questionnaire W25 method</td>
</tr>
<tr>
<td>S10</td>
<td>S9 or S8 or S7</td>
</tr>
<tr>
<td>S9</td>
<td>S8 or S7</td>
</tr>
<tr>
<td>S8</td>
<td>TX physical activity or TX exercise or TX diet or TX nutrition or TX overweight or TX obesity or TX alcohol or TX substance misuse or TX breastfeeding or TX sexual health or TX condom use or TX HIV</td>
</tr>
<tr>
<td>S7</td>
<td>TX public health or TX behaviour change or TX behavior change or TX lifestyle change or TX life style change or TX health promotion or TX health education or TX health improvement or TX disease prevention or TX illness prevention or TX smoking or TX tobacco use</td>
</tr>
<tr>
<td>S6</td>
<td>S5 or S4 or S3 or S2 or S1</td>
</tr>
<tr>
<td>S5</td>
<td>TX indigenous health worker or TX promot* or TX paraprofessional or TX workplace health advi*</td>
</tr>
<tr>
<td>S4</td>
<td>TX expert patient or TX natural help* or TX neighborhood help* or TX neighborhood leader or TX neighborhood assistant or TX neighbourhood help* or TX neighbourhood leader or TX neighbourhood assistant or TX family health advi* or TX breastfeeding support* or TX lactation consultant or TX village health worker</td>
</tr>
<tr>
<td>S3</td>
<td>TX community champion or TX health champion or TX community health educ* or TX community health work* or TX community health advi* or TX community health activ* or TX community health representative or TX community wellness advocate or TX community parent or TX community mother or TX outreach worker or TX outreach specialist</td>
</tr>
<tr>
<td>S2</td>
<td>TX peer counsell* or TX peer support* or TX peer mentor* or TX peer network* or TX peer assist* or TX health advi* or TX health advi* or TX health coach or TX health promot* or TX patient navig* or TX peer navig*</td>
</tr>
<tr>
<td>S1</td>
<td>TX health train* or TX lifestyle adv* or TX lifestyle train* or TX lifestyle coach* or TX lay health worker or TX lay health advi* or TX lay health support* or TX lay practit* or TX lay leader or TX lay midwi* or TX peer leader or TX peer educ*</td>
</tr>
</tbody>
</table>

**Database: MEDLINE**  
Name of host: Ovid

Years covered: 1950 to week 4 May, 2008

**Search strategy**

1. `health train*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]`
2. `(lifestyle adj (advi* or train* or coach*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]`
3. `(lay health adj (worker or advis? or support*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]`
4. `(lay adj (practitioner or leader or midwi*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]`
5. (peer adj (leader or educ* or counsel* or support* or mentor* or network* or assist*)).mp.
   [mp=title, original title, abstract, name of substance word, subject heading word]
6. (health adj (activ* or aide or advoc* or coach or promotor)).mp. [mp=title, original title,
   abstract, name of substance word, subject heading word]
7. ((patient or peer) adj navig*).mp. [mp=title, original title, abstract, name of substance word,
   subject heading word]
8. ((community or health) adj champion).mp. [mp=title, original title, abstract, name of
   substance word, subject heading word]
9. (community health adj (educ* or work* or advis* or activ* or representative)).mp. [mp=title,
   original title, abstract, name of substance word, subject heading word]
10. community wellness advocate.mp. [mp=title, original title, abstract, name of substance word,
    subject heading word]
11. (community adj (parent or mother)).mp. [mp=title, original title, abstract, name of substance
    word, subject heading word]
12. (outreach adj (worker or specialist)).mp. [mp=title, original title, abstract, name of substance
    word, subject heading word]
13. expert patient.mp. [mp=title, original title, abstract, name of substance word, subject heading
    word]
14. natural help*.mp. [mp=title, original title, abstract, name of substance word, subject heading
    word]
15. ((neighborhood or neighbourhood) adj (help* or leader or assistant)).mp. [mp=title, original
    title, abstract, name of substance word, subject heading word]
16. family health advis*.mp. [mp=title, original title, abstract, name of substance word, subject
    heading word]
17. breastfeeding supporter.mp. [mp=title, original title, abstract, name of substance word, subject
    heading word]
18. lactation consultant.mp. [mp=title, original title, abstract, name of substance word, subject
    heading word]
19. ((village or indigenous) adj health worker).mp. [mp=title, original title, abstract, name of
    substance word, subject heading word]
20. promotor*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
21. paraprofessional.mp. [mp=title, original title, abstract, name of substance word, subject
    heading word]
22. workplace health advi*.mp. [mp=title, original title, abstract, name of substance word, subject
    heading word]
23. *delegation, professional/
24. exp *voluntary workers/
25. ((professional* or nurs* or physician* or clinician*) adj2 (delegat* or substitut*)).tw
26. (staff* adj model*).tw
27. (nurs* adj2 (led or managed or directed or run)).tw
28. ((lay or voluntary or volunteer* or untrained or unlicensed or nonprofessional* or non
    professional* or paraprofessional* or paramedical) adj (worker* or staff*)).tw
29. (community adj3 (volunteer* or aid* or support*)).tw
30. ((birth or childbirth or child birth or labor or labour) adj (attendant* or assistant*)).tw
31. (doula* or doula-dural* or monitrice* or linkworker* or link worker* or barefoot doctor*).tw
32. (home adj (aid or aides or health or nursing or support or intervention* or treatment* or
    visit*)).tw
33. health personnel, health educators.sh
34. or/1–33
35. public health.mp. [mp=title, original title, abstract, name of substance word, subject heading
    word]
36. ((behaviour or behavior or lifestyle or life style) adj change).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
37. (health adj (promotion or education or improvement)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
38. ((disease or illness) adj prevention).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
39. smoking.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
40. “tobacco use”.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
41. physical activity.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
42. exercise.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
43. diet.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
44. nutrition.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
45. overweight.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
46. obesity.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
47. alcohol.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
48. substance misuse.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
49. breastfeeding.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
50. sexual health.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
51. “condom use”.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
52. HIV.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
53. AIDS.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
54. mental health.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
55. wellbeing.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
56. exp *community health services/
57. exp *public health/
58. “Tobacco Use Cessation”/
59. smoking/
60. patient compliance/
61. risk reduction behavior/
62. food habits/
63. or/35–62
64. evaluation.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
65. randomi?ed controlled trial.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
66. RCT.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
67. controlled clinical trial.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
68. (((controlled before and after) or cohort or case-control or longitudinal or observational or case or qualitative or quantitative) adj3 stud*).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
69. ((questionnaire or survey or interview or focus group) adj25 method).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
70. "program evaluation/
71. program evaluation.tw
72. exp "health care evaluation mechanisms/
73. multicenter study.pt
74. intervention studies/
75. experiment*.tw
76. (time adj series).tw
77. interrupted time series.mp
78. (pre test or pretest or (post test or posttest)).tw
79. impact.tw
80. intervention*.tw
81. chang*.tw
82. compar*.tw
83. (controlled before and after stud*).mp
84. random allocation.sh
85. double blind method.sh
86. single blind method.sh
87. clinical trial.pt
88. exp Clinical Trial/
89. (clin* adj25 trial*).ti,ab
90. ((singl* or doubl* or trebl* or tripl*) adj25 (blind* or mask*)).ti,ab
91. placebo*.ti,ab
92. random*.ti,ab
93. comparative study.sh
94. exp evaluation studies/
95. follow up studies.sh
96. prospective studies.sh
97. (control* or prospective* or volunteer*).ti,ab
98. ((effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 treatment adj (program* or strateg* or test* or questionnaire* or process* or procedure* or method*)).tw
99. ((effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 care adj (program* or strateg* or test* or questionnaire* or process* or procedure* or method*)).tw
100. ((effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 screening adj (program* or strateg* or test* or questionnaire* or process* or procedure* or method*)).tw
101. ((effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 intervention* adj (program* or strateg* or test* or questionnaire* or process* or procedure* or method*)).tw
102. ((effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 prevention* adj (program* or strateg* or test* or questionnaire* or process* or procedure* or method*)).tw
103. ((effect* or impact or evaluat* or introduc* or compar* or implement*) adj3 (protocol* or guideline* or strateg* or audit* or method*)).tw
104. ((critical* adj3 apprais*) or evaluat*).tw
105. *utilization review/
106. or/64–105
107. econom*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
108. cost*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
109. pric*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
110. pharmacoecon*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
111. (cost adj (effectiveness or utili* or benefit or minimi* or energy or oxygen or metabolic)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
112. (expenditure not energy).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
113. value NEAR2 money.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
114. budget*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
115. preference.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
116. QALY.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
117. (quality adj adjusted).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
118. utility*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
119. (financ* adj (management or support or organized)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
120. economics/
121. exp *costs/ and cost analysis/
122. economic value of life.sh
123. economics, dental/
124. exp *economics, hospital/
125. economics, medical/
126. economics, nursing/
127. economics, pharmaceutical/
128. (econom* or cost or costs or costly or costing or price or prices or pricing or pharmacoeconomic*).tw
129. (expenditure* not energy).tw
130. (value adj1 money).tw
131. budget*.tw
132. or/107–131
133. editorial.pt
134. letter.pt
135. comment.pt
136. animal/
137. human/
138. or/133–135
139. 136 not 137
140. 138 or 139
141. 34 and 63
142. 106 or 132
143. 141 and 142
144. 143 not 140

Database: PsycINFO
Name of host: APA PsychNET
Years covered: earliest to latest
Search strategy

<table>
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<th>#14</th>
<th>#13 AND #9</th>
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<tr>
<td>#13</td>
<td>#12 OR #11 OR #10</td>
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<tr>
<td>#12</td>
<td>TS=(&quot;preference&quot;) OR TS=(&quot;QALY&quot;) OR TS=(&quot;quality adjusted&quot;) OR TS=(&quot;utility&quot;) OR TS=(&quot;financ&quot; support&quot;) OR TS=(&quot;financ&quot; organized&quot;) NOT TS=(&quot;editorial&quot;) NOT TS=(&quot;letter&quot;) NOT TS=(&quot;comment&quot;) NOT TS=(&quot;animal&quot;)</td>
</tr>
<tr>
<td>#11</td>
<td>TS=(&quot;focus group method&quot;) OR TS=(&quot;econom&quot;) OR TS=(&quot;cost&quot;) OR TS=(&quot;pric&quot;) OR TS=(&quot;pharmacoecon&quot;) OR TS=(&quot;cost effectiveness&quot;) OR TS=(&quot;cost utili&quot;) OR TS=(&quot;cost benefit&quot;) OR TS=(&quot;cost minimi&quot;) OR TS=(&quot;cost energy&quot;) OR TS=(&quot;cost oxygen&quot;) OR TS=(&quot;cost metabolic&quot;) OR TS=(&quot;expenditure NOT energy&quot;) OR TS=(&quot;value NEAR/2 money&quot;) OR TS=(&quot;budget&quot;)</td>
</tr>
<tr>
<td>#10</td>
<td>TS=(&quot;evaluation&quot;) OR TS=(&quot;random?ed controlled trial&quot;) OR TS=(&quot;RCT&quot;) OR TS=(&quot;controlled clinical trial&quot;) OR TS=(&quot;controlled before and after stud&quot;) OR TS=(&quot;cohort stud&quot;) OR TS=(&quot;case-control stud&quot;) OR TS=(&quot;longitudinal stud&quot;) OR TS=(&quot;observational stud&quot;) OR TS=(&quot;case stud&quot;) OR TS=(&quot;qualitative stud&quot;) OR TS=(&quot;quantitative stud&quot;) OR TS=(&quot;questionnaire method&quot;) OR TS=(&quot;survey method&quot;) OR TS=(&quot;interview method&quot;)</td>
</tr>
<tr>
<td>#9</td>
<td>#8 AND #5</td>
</tr>
<tr>
<td>#8</td>
<td>#7 OR #6</td>
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<tr>
<td>#7</td>
<td>TS=(&quot;nutrition&quot;) OR TS=(&quot;overweight&quot;) OR TS=(&quot;obesity&quot;) OR TS=(&quot;alcohol&quot;) OR TS=(&quot;substance misuse&quot;) OR TS=(&quot;breastfeeding&quot;) OR TS=(&quot;sexual health&quot;) OR TS=(&quot;condom use&quot;) OR TS=(&quot;HIV&quot;) OR TS=(&quot;AIDS&quot;) OR TS=(&quot;mental health&quot;) OR TS=(&quot;wellbeing&quot;)</td>
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</table>

Database: SCI (part of web of Science)

Name of host: APA PsychNET

Years covered: earliest to latest
#6 TS="(public health) OR TS=("behaviour change") OR TS=("behavior change") OR TS=("lifestyle change") OR TS=("life style change") OR TS=("health promotion") OR TS=("health education") OR TS=("health improvement") OR TS=("disease prevention") OR TS=("illness prevention") OR TS=("smoking") OR TS=("tobacco use") OR TS=("physical activity") OR TS=("exercise") OR TS=("diet")

#5 #4 OR #3 OR #2 OR #1

#4 TS="(family health advis*)" OR TS="(breastfeeding supporter)" OR TS="(lactation consultant)" OR TS="(village health worker)" OR TS="(indigenous health worker)" OR TS="(promotor*)" OR TS="(workplace health advi*)"

#3 TS="(community health representative)" OR TS="(community wellness advocate)" OR TS="(community parent)" OR TS="(community mother)" OR TS="(outreach specialist)" OR TS="(outreach worker)" OR TS="(expert patient)" OR TS="(natural help*)" OR TS="(neighborhood help*)" OR TS="(neighborhood leader)" OR TS="(neighborhood assistant)" OR TS="(neighborhood help*)" OR TS="(neighborhood leader)" OR TS="(neighborhood assistant)"

#2 TS="(peer network*)" OR TS="(peer assist*)" OR TS="(health activ*)" OR TS="(health aide)" OR TS="(health advoc*)" OR TS="(health coach*)" OR TS="(health promotr*)" OR TS="(patient navig*)" OR TS="(peer navig*)" OR TS="(community champion)" OR TS="(health champion)" OR TS="(community health educ*)" OR TS="(community health work*)" OR TS="(community health advis*)" OR TS="(community health activ*)"

#1 TS="(health train*)" OR TS="(lifestyle advi*)" OR TS="(lifestyle train*)" OR TS="(lifestyle coach*)" OR TS="(lay health worker)" OR TS="(lay health advis*)" OR TS="(lay health support)" OR TS="(lay practitioner)" OR TS="(lay leader)" OR TS="(lay midw*)" OR TS="(peer leader)" OR TS="(peer educ*)" OR TS="(peer counsel*)" OR TS="(peer support*)" OR TS="(peer mentor*)"

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**Database: SIRS Researcher**

Name of host: OCLC FirstSEARCH

Years covered: earliest to latest

Search strategy

((kw: Health w train*) or (kw: Lifestyle w advi*) or (kw: Lifestyle w train*) or (kw: Lifestyle w coach*) or (kw: Lay w health w worker) or (kw: Lay w health w advis#r) or (kw: Lay w health w support) or (kw: Lay w practitioner) or (kw: Lay w leader) or (kw: Lay w midwi*) or (kw: Peer w leader) or (kw: Peer w edu*) or (kw: Peer w counsel*) or (kw: Peer w support*) or (kw: Peer w mentor*) or (kw: Peer w network*) or (kw: Peer w assist*) or (kw: Health w activ*) or (kw: Health w aide) or (kw: Health w advoc*) or (kw: Health w coach) or (kw: Health w promot#r) or (kw: Patient w navig*) or (kw: Peer w navig*) or (kw: Community w champion) or (kw: Health w champion) or (kw: Community w health w educ*) or (kw: Community w health w work*) or (kw: Community w health w advis*) or (kw: Community w health w activ*) or (kw: Community w health w representative) or (kw: Community w wellness w advocate) or (kw: Community w parent) or (kw: Community w mother) or (kw: Outreach w worker) or (kw: Outreach w specialist) or (kw: Expert w patient) or (kw: Natural w help*) or (kw: Neighborhood w help*) or (kw: Neighborhood w leader) or (kw: Neighborhood w assistant) or (kw: Neighbourhood w leader) or (kw: Neighbourhood w assistant) or (kw: Family w health w advis*) or (kw: Breastfeeding w supporter) or (kw: Lactation w consultant) or (kw: Village w health w worker) or (kw: Indigenous w health w worker) or (kw: Promotor*) or (kw: Paraprofessional) or (kw: Workplace w health w advi*))

AND


AND
**Database: Social Services Abstracts**

Name of host: CSA

Years covered: earliest to latest

**Search strategy**

List one:

1. kw= (health train*)
2. kw= (lifestyle within 1 (advi* or train* or coach*))
3. kw= (lay health within 1 (worker or advis*r or support*))
4. kw= (lay within 1 (practitioner or leader or midwi*))
5. kw= (peer within 1 (leader or educ* or counsel* or support* or mentor* or network* or assist*))
6. kw= (health within 1 (activ* or aide or advoc* or coach or promot?r))
7. kw= ((patient or peer) within 1 navig*)
8. kw= ((community or health) within 1 champion)
9. kw= (community health within 1 (educ* or work* or advis* or activ* or representative))
10. kw= (community wellness advocate)
11. kw= (community within 1 (parent or mother))
12. kw= (outreach within 1 (worker or specialist))
13. kw= (expert patient) or kw= (natural help*)
14. kw= ((neighborhood or neighbourhood) within 1 (help* or leader or assistant))
15. kw= (family health advis*)
16. kw= (breastfeeding supporter)
17. kw= (lactation consultant)
18. kw= ((village or indigenous) within 1 health worker)
19. kw= (promotor*)
20. kw= (paraprofessional)
21. kw= (workplace health advi*)
22. kw= ((professional* or nurs* or physician* or clinician*) within 2 (delegat* or substitut*))
23. kw= (staff* within 1 model*)
24. kw= (nurs* within 2 (led or managed or directed or run))
25. kw= ((lay or voluntary or volunteer* or untrained or unlicensed or nonprofessional* or non professional* or paraprofessional* or paramedical) within 1 (worker* or staff))
26. kw= (community within 3 (volunteer* or aid* or support))
27. kw= ((birth or childbirth or child birth or labor or labour) within 1 (attendant* or assistant*))
28. kw= (doula* or douladural* or monitrice* or linkworker* or link worker* or barefoot doctor*)
29. kw= (home within 1 (aid or aides or health or nursing or support or intervention* or treatment* or visit*))

List two:

30. kw= (public health)
31. kw= ((behaviour or behavior or lifestyle or life style) within 1 change)
32. kw= (health within 1 (promotion or education or improvement))
33. kw= ((disease or illness) within 1 prevention)
34. kw= (smoking)
35. kw= (tobacco use)
36. kw= (exercise)
37. kw= (diet)
38. kw= (nutrition)
39. kw= (overweight)
40. kw= (obesity)
41. kw= (alcohol)
42. kw= (substance misuse)
43. kw= (breastfeeding)
44. kw= (sexual health)
45. kw= (condom use)
46. kw= (HIV)
47. kw= (AIDS)
48. kw= (mental health)
49. kw= (wellbeing)

List three:

50. kw= (evaluation)
51. kw= (randomised controlled trial)
52. kw= (RCT)
53. kw= (controlled clinical trial)
54. kw= ((questionnaire or survey or interview or focus group) within 5 method)
55. kw= (program evaluation)
56. kw= (multicenter study)
57. kw= (experiment*)
58. kw= (time within 1 series)
59. kw= (interrupted time series)
60. kw= (pre test or pretest or (post test or posttest))
61. kw= (impact)
62. kw= (intervention*)
63. kw= (chang*)
64. kw= (compar*)
65. kw= (random allocation)
66. kw= (double blind method)
67. kw= (single blind method)
68. kw= (clinical trial)
69. kw= (clin* within 5 trial*)
70. kw= ((singl* or doubl* or trebl* or tripl*) within 5 (blind* or mask*))
71. kw= (placebo*)
72. kw= (random*)
73. kw= (comparative study)
74. kw= (follow up studies)
75. kw= (prospective studies)
76. kw= (control* or prospective* or volunteer*)
77. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3
treatment within 1 (program* or strateg* or test* or questionnaire* or process* or procedure* or method*))
78. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 1 care
within 1 (program* or strateg* or test* or questionnaire* or process* or procedure* or method*))
79. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3
screening within 1 (program* or strateg* or test* or questionnaire* or process* or procedure* or method*))
80. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3 intervention* within 1 (program* or strateg* or test* or questionnaire* or process* or procedure* or method*))
81. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3 prevention* within 1 (program* or strateg* or test* or questionnaire* or process* or procedure* or method*))
82. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3 (protocol* or guideline* or strateg* or audit* or method*))
83. kw= ((critical* within 3 apprais*) or evaluat*)

List four:

84. kw= (econom*) or kw= (cost*) or kw= (pric*) or kw= (pharmacoecon*)
85. kw= (cost within 1 (effectiveness or utili* or benefit or minimi* or energy or oxygen or metabolic)) or kw= (expenditure not energy)
86. kw= (value within 2 money) or kw= (budget*) or kw= (preference) or kw= (QALY) or kw= (quality within 1 adjusted)
87. kw= (utility*)
88. kw= (financ* within 1 (management or support or organized)) or kw= (econom* or cost or costs or costly or costing or price or prices or pricing or pharmacoeconomic*)
89. kw= (expenditure* not energy)
90. kw= (value within 1 money) or kw= (budget*)
91. List five
92. kw= (editorial)
93. kw= (letter)
94. kw= (comment)
95. kw= (animal)

**Database: Sociological Abstracts**

Name of host: CSA

Years covered: all available

**Search strategy**

List one:

96. kw= (health train*)
97. kw= (lifestyle within 1 (advi* or train* or coach*))
98. kw= (lay health within 1 (worker or advis?r or support*))
99. kw= (lay within 1 (practitioner or leader or midwi*))
100. kw= (peer within 1 (leader or educ* or counsel* or support* or mentor* or network* or assist*))
101. kw= (health within 1 (activ* or aide or advoc* or coach or promot?r))
102. kw= ((patient or peer) within 1 navig*)
103. kw= ((community or health) within 1 champion)
104. kw= (community health within 1 (educ* or work* or advis* or activ* or representative))
105. kw= (community wellness advocate)
106. kw= (community within 1 (parent or mother))
107. kw= (outreach within 1 (worker or specialist))
108. kw= (expert patient) or kw= (natural help*)
109. kw= ((neighborhood or neighbourhood) within 1 (help* or leader or assistant))
110. kw= (family health advis*)
111. kw= (breastfeeding supporter)
112. kw= (lactation consultant)
113. kw= ((village or indigenous) within 1 health worker)
114. kw= (promotor*)
115. kw= (paraprofessional)
116. kw= (workplace health advi*)
117. kw= ((professional* or nurs* or physician* or clinician*) within 2 (delegat* or substitut*))
118. kw= (staff* within 1 model*)
119. kw= (nurs* within 2 (led or managed or directed or run))
120. kw= ((lay or voluntary or volunteer* or untrained or unlicensed or nonprofessional* or nonprofessional* or paraprofessional* or paramedical) within 1 (worker* or staff))
121. kw= (community within 3 (volunteer* or aid* or support))
122. kw= ((birth or childbirth or child birth or labor or labour) within 1 (attendant* or assistant*))
123. kw= (doula* or douladural* or monitrice* or linkworker* or link worker* or barefoot doctor*)
124. kw= (home within 1 (aid or aides or health or nursing or support or intervention* or treatment* or visit*))

List two:

125. kw= (public health)
126. kw= ((behaviour or behavior or lifestyle or life style) within 1 change)
127. kw= (health within 1 (promotion or education or improvement))
128. kw= ((disease or illness) within 1 prevention)
129. kw= (smoking)
130. kw= (tobacco use)
131. kw= (exercise)
132. kw= (diet)
133. kw= (nutrition)
134. kw= (overweight)
135. kw= (obesity)
136. kw= (alcohol)
137. kw= (substance misuse)
138. kw= (breastfeeding)
139. kw= (sexual health)
140. kw= (condom use)
141. kw= (HIV)
142. kw= (AIDS)
143. kw= (mental health)
144. kw= (wellbeing)

List three:

145. kw= (evaluation)
146. kw= (randomi?ed controlled trial)
147. kw= (RCT)
148. kw= (controlled clinical trial)
149. kw= ((questionnaire or survey or interview or focus group) within 5 method)
150. kw= (program evaluation)
151. kw= (multicenter study)
152. kw= (experiment*)
153. kw= (time within 1 series)
154. kw= (interrupted time series)
155. kw= (pre test or pretest or (post test or posttest))
156. kw= (impact)
157. kw= (intervention*)
158. kw= (chang*)
159. kw= (compar*)
160. kw= (random allocation)
161. kw= (double blind method)
162. kw= (single blind method)
163. kw= (clinical trial)
164. kw= (clin* within 5 trial*)
165. kw= (singl* or doubl* or trebl* or tripl*) within 5 (blind* or mask*)
166. kw= (placebo*)
167. kw= (random*)
168. kw= (comparative study)
169. kw= (follow up studies)
170. kw= (prospective studies)
171. kw= (control* or prospective* or volunteer*)
172. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3 treatment within 1 (program* or strateg* or test* or questionnaire* or process* or procedure* or method*))
173. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 1 care within 1 (program* or strateg* or test* or questionnaire* or process* or procedure* or method*))
174. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3 screening within 1 (program* or strateg* or test* or questionnaire* or process* or procedure* or method*))
175. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3 intervention* within 1 (program* or strateg* or test* or questionnaire* or process* or procedure* or method*))
176. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3 prevention* within 1 (program* or strateg* or test* or questionnaire* or process* or procedure* or method*))
177. kw= ((effect* or impact or evaluat* or introduc* or compar* or implement*) within 3 (protocol* or guideline* or strateg* or audit* or method*))
178. kw= ((critical* within 3 apprais*) or evaluat*)

List four:

179. kw= (econom*) or kw= (cost*) or kw= (pric*) or kw= (pharmacoecon*)
180. kw= (cost within 1 (effectiveness or utili* or benefit or minimi* or energy or oxygen or metabolic)) or kw= (expenditure not energy)
181. kw= (value within 2 money) or kw= (budget*) or kw= (preference) or kw= (QALY) or kw= (quality within 1 adjusted)
182. kw= (utility*)
183. kw= (financ* within 1 (management or support or organized)) or kw= (econom* or cost or costs or costly or costing or price or prices or pricing or pharmacoeconomic*)
184. kw= (expenditure* not energy)
185. kw= (value within 1 money) or kw= (budget*)
186. List five
187. kw= (editorial)
188. kw= (letter)
189. kw= (comment)
190. kw= (animal)

Database: Web of Knowledge
Name of host: ISI
Years covered: earliest to latest

Search strategy

#14 #13 AND #9
#13 #12 OR #11 OR #10
#12 Topic="(preference)" OR Topic="(DALY)" OR Topic="(quality adjusted)" OR Topic="(utility*)" OR Topic="(financ* management)" OR Topic="(financ* support)" OR Topic="(financ* organized) NOT Topic="(editorial)" NOT Topic="(letter)" NOT Topic="(comment)" NOT Topic="(animal)"
#11 Topic="(focus group method)" OR Topic="(econom**)" OR Topic="(cost*)" OR Topic="(pric*)" OR Topic="(pharmaecon**)" OR Topic="(cost effectiveness)" OR Topic="(cost util*)" OR Topic="(cost benefit)" OR Topic="(cost minimi*)" OR Topic="(cost energy)" OR Topic="(cost oxygen)" OR Topic="(cost metabolic)" OR Topic="(expenditure NOT energy)" OR Topic="(value NEAR2 money)" OR Topic="(budget*)"
#10 Topic="(evaluation)" OR Topic="(randomized controlled trial)" OR Topic="(RCT)" OR Topic="(controlled clinical trial)" OR Topic="(controlled before and after study*)" OR Topic="(cohort study*)" OR Topic="(case-control study)" OR Topic="(longitudinal study*)" OR Topic="(observational study*)" OR Topic="(case study)" OR Topic="(qualitative study*)" OR Topic="(quantitative study*)" OR Topic="(questionnaire method)" OR Topic="(survey method)" OR Topic="(interview method)"
#9 #8 AND #5
#8 #7 OR #6
#7 Topic="(nutrition)" OR Topic="(overweight)" OR Topic="(obesity)" OR Topic="(alcohol)" OR Topic="(substance misuse)" OR Topic="(breastfeeding)" OR Topic="(sexual health)" OR Topic="(condom use)" OR Topic="(HIV)" OR Topic="(AIDS)" OR Topic="(mental health)" OR Topic="(wellbeing)"
#6 Topic="(public health)" OR Topic="(behaviour change)" OR Topic="(behavior change)" OR Topic="(lifestyle change)" OR Topic="(life style change)" OR Topic="(health promotion)" OR Topic="(health education)" OR Topic="(health improvement)" OR Topic="(disease prevention)" OR Topic="(illness prevention)" OR Topic="(smoking)" OR Topic="(tobacco use)" OR Topic="(physical activity)" OR Topic="(exercise)" OR Topic="(diet)"
#5 #4 OR #3 OR #2 OR #1
#4 Topic="(family health adv*)" OR Topic="(breastfeeding supporter)" OR Topic="(lactation consultant)" OR Topic="(village health worker)" OR Topic="(indigenous health worker)" OR Topic="(promotor)" OR Topic="(paraprofessional)" OR Topic="(workplace health adv)"
#3 Topic="(community health representative)" OR Topic="(community wellness advocate)" OR Topic="(community parent)" OR Topic="(community mother)" OR Topic="(outreach specialist)" OR Topic="(outreach worker)" OR Topic="(outreach specialist)" OR Topic="(expert patient)" OR Topic="(natural help)" OR Topic="(neighborhood help)" OR Topic="(neighborhood leader)" OR Topic="(neighborhood assistant)" OR Topic="(neighborhood help)" OR Topic="(neighborhood leader)" OR Topic="(neighborhood assistant)"
#2 Topic="(peer network*)" OR Topic="(peer assist*)" OR Topic="(health adv*)" OR Topic="(health aide)" OR Topic="(health advoc*)" OR Topic="(health coach)" OR Topic="(health promotor?) OR Topic="(patient navig*)" OR Topic="(peer navig*)" OR Topic="(community champion)" OR Topic="(health champion)" OR Topic="(community health educ*)" OR Topic="(community health work*)" OR Topic="(community health adv*)" OR Topic="(community health activ*)"
#1 Topic="(health train*)" OR Topic="(lifestyle adv*)" OR Topic="(lifestyle train*)" OR Topic="(lifestyle coach*)" OR Topic="(lay health worker)" OR Topic="(lay health adv?)" OR Topic="(lay health support*)" OR Topic="(lay practitioner)" OR Topic="(lay leader)" OR Topic="(lay midwi*)" OR Topic="(peer leader)" OR Topic="(peer educ*)" OR Topic="(peer counsel*)" OR Topic="(peer support*)" OR Topic="(peer mentor*)"
**Database: WorldCat**

Name of host: OCLC FirstSEARCH

Years covered: earliest to latest

**Search strategy**

\[
\text{((kw: Health w train*) or (kw: Lifestyle w advi*) or (kw: Lifestyle w train*) or (kw: Lifestyle w coach*) or (kw: Lay w health w worker) or (kw: Lay w health w advis#r) or (kw: Lay w health w support) or (kw: Lay w practitioner) or (kw: Lay w leader) or (kw: Lay w midwi*) or (kw: Peer w leader) or (kw: Peer w edu*) or (kw: Peer w counsel*) or (kw: Peer w support*) or (kw: Peer w mentor*) or (kw: Peer w network*) or (kw: Peer w assist*) or (kw: Health w activ*) or (kw: Health w aide) or (kw: Health w advoc*) or (kw: Health w coach) or (kw: Health w promot#r) or (kw: Patient w navig*) or (kw: Peer w navig*) or (kw: Community w champion) or (kw: Health w champion) or (kw: Community w health w educ*) or (kw: Community w health w work*) or (kw: Community w health w advis*) or (kw: Community w health w activ*) or (kw: Community w health w representative) or (kw: Community w wellness w advocate) or (kw: Community w parent) or (kw: Community w mother) or (kw: Outreach w worker) or (kw: Outreach w specialist) or (kw: Expert w patient) or (kw: Natural w help*) or (kw: Neighborhood w help*) or (kw: Neighborhood w leader) or (kw: Neighborhood w assistant) or (kw: Neighbourhood w help*) or (kw: Neighbourhood w leader) or (kw: Neighbourhood w assistant) or (kw: Family w health w advis*) or (kw: Breastfeeding w supporter) or (kw: Lactation w consultant) or (kw: Village w health w worker) or (kw: Indigenous w health w worker) or (kw: Promotor*) or (kw: Paraprofessional) or (kw: Workplace w health w advi*))
\]

\[\text{AND}\]

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\[\text{AND}\]

\[
\text{((kw: Evaluation) Or (kw: Randomi#ed w controlled w trial) Or (kw: RCT) Or (kw: Controlled w clinical w trail) Or (kw: controlled w before w after w 3 w stud*) Or (kw: cohort w 3 kw: stud*) Or (kw: case-control w 3 kw: stud*) Or (kw: longitudinal w 3 kw: stud*) Or (kw: observational w 3 kw: stud*) Or (kw: case w 3 kw: stud*) Or (kw: qualitative w 3 kw: stud*) Or (kw: quantitative w 3 kw: stud*) Or (kw: questionnaire w 25 kw: method) Or (kw: survey w 25 kw: method) Or (kw: interview w 25 kw: method) Or (kw: focus w group w 25 kw: method) OR (kw: econom*) Or (kw: cost*) Or (kw: pric*) Or (kw: pharmacocon* Or (kw: cost w effectiveness) Or (kw: cost w utili*) Or (kw: cost w benefit) Or (kw: cost w minimi*) Or (kw: cost w energy) Or (kw: cost w oxygen) Or (kw: cost w metabolic) Or (kw: expenditure NOT kw: energy) Or (kw: value w 2 kw: money) Or (kw: budget*) Or (kw: preference) Or (kw: QALY) Or (kw: quality w adjusted) Or (kw: utility*) Or (kw: financ* w management) Or (kw: financ* w support) Or (kw: financ* w organized))}\]

\[\text{NOT}\]

\[
\text{((kw: editorial) or (kw: letter) or (kw: comment) or (kw: animal))}\]
**Database: Zetoc**

Name of host: Mimas

Years covered: earliest to latest

**Search strategy**

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

AND

Evaluation OR effectiveness OR cost-effectiveness OR equity OR acceptability OR behaviour change OR health promotion OR health improvement OR disease prevention
Appendix 7

Search strategy for Google

**List one (role)**

1. “health trainer”
2. “lifestyle adviser” OR “lifestyle advisor” OR “lifestyle trainer” OR “lifestyle coach”
3. “lay health worker” OR “lay health adviser” OR “lay health advisor” OR “lay health supporter”
4. “lay practitioner” OR “lay leader” OR “lay midwife”
5. health (“peer leader” OR “peer educator” OR “peer counsellor” OR “peer supporter” OR “peer mentor” OR “peer networker” OR “peer assistant”)
6. “health activist” OR “health aide” OR “health advocate” OR “health coach” OR “health promoter”
7. “patient navigator” OR “peer navigator”
8. “community champion” OR “health champion”
   i. a) “community health educator” OR “community health worker” OR “community health adviser” OR “community health advisor” OR “community health activist”
   ii. b) “community health representative”
9. “community wellness advocate”
10. “community parent” OR “community mother”
11. “outreach worker” OR “outreach specialist”
12. “expert patient”
13. “natural helper”
14. “neighborhood helper” OR “neighborhood leader” OR “neighborhood assistant” OR “neighbourhood helper” OR “neighbourhood leader” OR “neighbourhood assistant”
15. “family health adviser” OR “family health advisor”
16. “breastfeeding supporter”
17. “lactation consultant”
18. “village health worker” OR “indigenous health worker”
19. promotoras OR promotores
20. “workplace health adviser” OR “workplace health advisor”
21. “community volunteer” OR “community aide”
22. “birth attendant” OR “childbirth attendant” OR “child birth attendant” OR “labor attendant” OR “labour attendant”
23. “birth assistant” OR “childbirth assistant” OR “child birth assistant” OR “labor assistant” OR “labour assistant”
24. linkworker OR “link worker”
25. “lay staff” OR “untrained staff” OR “unlicensed staff” OR “nonprofessional staff” OR “nonprofessional staff” OR “paraprofessional staff” OR “paramedical staff”
26. “barefoot doctor”
27. “lay worker” OR “untrained worker” OR “unlicensed worker” OR “nonprofessional worker” OR “non professional worker” OR “paraprofessional worker” OR “paramedical worker”
28. doula OR douladural OR monitrice

**List two (method or general outcome)**

(evaluation OR trial OR RCT OR study OR questionnaire OR survey OR interview OR focus group OR observation OR economic OR effectiveness OR cost effectiveness OR equity OR acceptability)
## Appendix 8

### Results returned for each Google search string

<table>
<thead>
<tr>
<th>Search string</th>
<th>Number of results</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;lifestyle adviser&quot; OR &quot;lifestyle advisor&quot; OR &quot;lifestyle trainer&quot; OR &quot;lifestyle coach&quot;</td>
<td>744</td>
</tr>
<tr>
<td>&quot;lay practitioner&quot; OR &quot;lay leader&quot; OR &quot;lay midwife&quot;</td>
<td>15,200</td>
</tr>
<tr>
<td>&quot;health activist&quot; OR &quot;health aide&quot; OR &quot;health advocate&quot; OR &quot;health coach&quot; OR &quot;health promoter&quot;</td>
<td>191,000</td>
</tr>
<tr>
<td>&quot;community champion&quot; OR &quot;health champion&quot;</td>
<td>1210</td>
</tr>
<tr>
<td>&quot;community wellness advocate&quot;</td>
<td>19</td>
</tr>
<tr>
<td>&quot;outreach worker&quot; OR &quot;outreach specialist&quot;</td>
<td>83,900</td>
</tr>
<tr>
<td>health (&quot;natural helper&quot;)</td>
<td>377</td>
</tr>
<tr>
<td>&quot;family health adviser&quot; OR &quot;family health advisor&quot;</td>
<td>23</td>
</tr>
<tr>
<td>promotoras OR promotores</td>
<td>104,000</td>
</tr>
<tr>
<td>Health (&quot;community volunteer&quot; OR &quot;community aide&quot;)</td>
<td>11,200</td>
</tr>
<tr>
<td>&quot;lay staff&quot; OR &quot;untrained staff&quot; OR &quot;unlicensed staff&quot; OR &quot;nonprofessional staff&quot; OR &quot;non professional staff&quot; OR &quot;paraprofessional staff&quot; OR &quot;paramedical staff&quot;</td>
<td>112,000</td>
</tr>
<tr>
<td>&quot;lay worker&quot; OR &quot;untrained worker&quot; OR &quot;unlicensed worker&quot; OR &quot;nonprofessional worker&quot; OR &quot;non professional worker&quot; OR &quot;paraprofessional worker&quot; OR &quot;paramedical worker&quot;</td>
<td>728</td>
</tr>
<tr>
<td>&quot;breastfeeding supporter&quot;</td>
<td>26</td>
</tr>
<tr>
<td>&quot;village health worker&quot; OR &quot;indigenous health worker&quot;</td>
<td>15,300</td>
</tr>
<tr>
<td>&quot;birth attendant&quot; OR &quot;childbirth attendant&quot; OR &quot;child birth attendant&quot; OR &quot;labor attendant&quot; OR &quot;labour attendant&quot;</td>
<td>6010</td>
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<tr>
<td>health (linkworker OR &quot;link worker&quot;)</td>
<td>2110</td>
</tr>
<tr>
<td>&quot;barefoot doctor&quot;</td>
<td>898</td>
</tr>
<tr>
<td>&quot;doula&quot; OR &quot;douladural&quot; OR &quot;monitrice&quot;</td>
<td>55,700</td>
</tr>
<tr>
<td>&quot;health trainer&quot;</td>
<td>797</td>
</tr>
<tr>
<td>&quot;lay health worker&quot; OR &quot;lay health adviser&quot; OR &quot;lay health advisor&quot; OR &quot;lay health supporter&quot;</td>
<td>10,000</td>
</tr>
<tr>
<td>Health (&quot;peer leader&quot; OR &quot;peer educator&quot; OR &quot;peer counsellor&quot; OR &quot;peer supporter&quot; OR &quot;peer mentor&quot; OR &quot;peer networker&quot; OR &quot;peer assistant&quot;)</td>
<td>10,800</td>
</tr>
<tr>
<td>&quot;patient navigator&quot; OR &quot;peer navigator&quot;</td>
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</tr>
<tr>
<td>&quot;community health educator&quot; OR &quot;community health worker&quot; OR &quot;community health adviser&quot; OR &quot;community health advisor&quot; OR &quot;community health activist&quot;</td>
<td>57,700</td>
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<tr>
<td>&quot;community health representative&quot;</td>
<td>544</td>
</tr>
<tr>
<td>&quot;community parent&quot; OR &quot;community mother&quot;</td>
<td>18,800</td>
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<td>&quot;neighborhood helper&quot; OR &quot;neighborhood leader&quot; OR &quot;neighborhood assistant&quot; OR &quot;neighbourhood helper&quot; OR &quot;neighbourhood leader&quot; OR &quot;neighbourhood assistant&quot;</td>
<td>602</td>
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<tr>
<td>&quot;expert patient&quot;</td>
<td>6210</td>
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<tr>
<td>&quot;workplace health adviser&quot; OR &quot;workplace health advisor&quot;</td>
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### Appendix 9

#### Website search results

<table>
<thead>
<tr>
<th>Website</th>
<th>URL (number of results received)</th>
<th>Date searched</th>
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<tr>
<td>The National Audit Office</td>
<td><a href="http://www.nao.org.uk">www.nao.org.uk</a> (61)</td>
<td>16 October 2008</td>
</tr>
<tr>
<td>The Home Office</td>
<td><a href="http://www.homeoffice.gov.uk">www.homeoffice.gov.uk</a> (54)</td>
<td>16 October 2008</td>
</tr>
<tr>
<td>The Office of the Deputy Prime Minister (now Communities.gov)</td>
<td><a href="http://www.odpm.gov.uk">www.odpm.gov.uk</a> (191)</td>
<td>16 October 2008</td>
</tr>
<tr>
<td>ISRCTN Register</td>
<td><a href="http://www.controlled-trials.com/isrctn">www.controlled-trials.com/isrctn</a> (2)</td>
<td>16 October 2008</td>
</tr>
<tr>
<td>The Department of Health</td>
<td><a href="http://www.dh.gov.uk">www.dh.gov.uk</a> (251)</td>
<td>16 October 2008</td>
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<tr>
<td>The American Institutes for Research</td>
<td><a href="http://www.air.org">www.air.org</a> (2)</td>
<td>17 October 2008</td>
</tr>
<tr>
<td>The Office of Policy</td>
<td><a href="http://www.ssa.gov/policy">www.ssa.gov/policy</a> (12)</td>
<td>17 October 2008</td>
</tr>
<tr>
<td>The Medical Research Council</td>
<td><a href="http://www.mrc.ac.uk">www.mrc.ac.uk</a> (310)</td>
<td>17 October 2008</td>
</tr>
<tr>
<td>The Urban Institute</td>
<td><a href="http://www.urban.org">www.urban.org</a> (4)</td>
<td>17 October 2008</td>
</tr>
<tr>
<td>Wellcome Trust</td>
<td><a href="http://www.wellcome.ac.uk">www.wellcome.ac.uk</a> (26)</td>
<td>17 October 2008</td>
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Total search results = 5225
## Appendix 10

### Table of excluded studies

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<th>Reference(s)</th>
<th>Reason for exclusion</th>
<th>Design</th>
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<tbody>
<tr>
<td>Adair (1960)</td>
<td>Adair J. The Indian Health Worker in the Cornell-Navaho Project. <em>Hum Organ</em> 1960;19:59–63</td>
<td>Poor methodological quality</td>
<td>Qualitative</td>
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<tr>
<td>Burnhill et al. (1985)</td>
<td>Burnhill MS, King E, Kateen E. Impact of counselling on repeated unplanned pregnancy and contraceptive behavior in low SES abortion population. New Brunswick, NJ: Department of Obstetrics and Gynecology Rutgers Medical School; 1985</td>
<td>Poor methodological quality</td>
<td>Quantitative</td>
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<tr>
<td>Study</td>
<td>Reference(s)</td>
<td>Reason for exclusion</td>
<td>Design</td>
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<td>Reference(s)</td>
<td>Reason for exclusion</td>
<td>Design</td>
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<td>Reference(s)</td>
<td>Reason for exclusion</td>
<td>Design</td>
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<tr>
<td>Green</td>
<td>Green J. <em>One step closer to the real people: An evaluation of HealthWORKS’ Linkworker scheme</em>. Newcastle Upon Tyne: Northumbria University</td>
<td>Poor methodological quality</td>
<td>Quantitative</td>
</tr>
<tr>
<td>Study</td>
<td>Reference(s)</td>
<td>Reason for exclusion</td>
<td>Design</td>
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<td>Reference(s)</td>
<td>Reason for exclusion</td>
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<td>Reference(s)</td>
<td>Reason for exclusion</td>
<td>Design</td>
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<td>Reference(s)</td>
<td>Reason for exclusion</td>
<td>Design</td>
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<td>Reference(s)</td>
<td>Reason for exclusion</td>
<td>Design</td>
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<td>Reason for exclusion</td>
<td>Design</td>
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<td>Reference(s)</td>
<td>Reason for exclusion</td>
<td>Design</td>
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<tr>
<td>Sixta and Ostwald (2008)</td>
<td>Sixta CS, Ostwald S. Border intervention by Promotores for type 2 diabetes. Texas: University of Texas School of Nursing; 2007</td>
<td>Poor methodological quality</td>
<td>Quantitative</td>
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<tr>
<td>Study</td>
<td>Reference(s)</td>
<td>Reason for exclusion</td>
<td>Design</td>
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<td>Reason for exclusion</td>
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Appendix 11

Intervention intensity rating
<table>
<thead>
<tr>
<th>Study</th>
<th>Population level targeted (general population, groups, family, individual)</th>
<th>Nature of the contacts (groups session, telephone, face to face)</th>
<th>Other intervention components</th>
<th>No. of sessions</th>
<th>Duration/session</th>
<th>Intervention duration</th>
<th>Intensity score (minutes/week + other scores)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anand 2007</td>
<td>Family – 3</td>
<td>Home visits – 3</td>
<td>Provision of water cooler, recipes; food preparations classes; grocery store tours; activity programme for children – 1</td>
<td>3</td>
<td></td>
<td>6 months</td>
<td>Medium</td>
</tr>
<tr>
<td>Andersen 2000</td>
<td>Individual and community – 4</td>
<td>Telephone calls and group sessions – 2</td>
<td>CA, such as video showings or mammography-themed bingo nights – 1</td>
<td>2</td>
<td></td>
<td>3 years</td>
<td>Low (though women in the IG arm were telephoned once in 3 years, some in the CA arm may have had more exposure)</td>
</tr>
<tr>
<td>Barlow 2000</td>
<td>Groups of people with chronic conditions – 2</td>
<td>Group sessions – 1</td>
<td>Handbook – 1</td>
<td>1</td>
<td></td>
<td>6 weeks</td>
<td>124</td>
</tr>
<tr>
<td>Bird 1998</td>
<td>General population – 1</td>
<td>Small group sessions – 1</td>
<td>Distribution of health education materials and promotional events (health fairs) – 1</td>
<td>3</td>
<td>10–15 minutes plus discussion (25 minutes)</td>
<td>30 months</td>
<td>Not all participants got intervention exposure – low</td>
</tr>
<tr>
<td>Griffiths 1998</td>
<td>Groups of people with chronic conditions – 2</td>
<td>Small group sessions – 1</td>
<td>Video cassette – 1</td>
<td>1</td>
<td></td>
<td>6 weeks</td>
<td>184</td>
</tr>
<tr>
<td>Emmons 2005</td>
<td>Individual – 4</td>
<td>Telephone calls – 2</td>
<td>NRT made available; tailored written materials – 1</td>
<td>1</td>
<td></td>
<td>7 months</td>
<td>11</td>
</tr>
<tr>
<td>Dennis 2002</td>
<td>Individual – 4</td>
<td>Telephone calls – 2</td>
<td>Referrals to other professionals – 1</td>
<td>1</td>
<td></td>
<td>3 months</td>
<td>14</td>
</tr>
<tr>
<td>*Dickson-Gomez 2003</td>
<td>Individual – 4</td>
<td>Small group sessions – 1</td>
<td>?</td>
<td>10</td>
<td>90 minutes</td>
<td>6 months</td>
<td>43</td>
</tr>
<tr>
<td>Earp 2002</td>
<td>Individual and Community – 4</td>
<td>Face to face and presentations to local community groups – 3</td>
<td>Brochures, posters, holiday cards promoting mammography – 1</td>
<td>3</td>
<td></td>
<td>32 months</td>
<td>Not all participants got intervention exposure – low</td>
</tr>
<tr>
<td>Elder 2006</td>
<td>Individual – 4</td>
<td>Face to face or telephone – 3</td>
<td>Twelve tailored newsletters – 1</td>
<td>14</td>
<td></td>
<td>14 weeks</td>
<td>33</td>
</tr>
<tr>
<td>Study</td>
<td>Population level targeted (general population, groups, family, individual)</td>
<td>Nature of the contacts (groups session, telephone, face to face)</td>
<td>Other intervention components</td>
<td>No. of sessions</td>
<td>Duration/session</td>
<td>Intervention duration</td>
<td>Intensity score (minutes/week + other scores)</td>
</tr>
<tr>
<td>---------------------</td>
<td>--------------------------------------------------------------------------</td>
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<td>------------------------------</td>
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<td>----------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Gary 2003[96–100]</td>
<td>Individual – 4</td>
<td>Face to face or telephone – 3</td>
<td>0</td>
<td>Aimed for six visits (but fell short of that)</td>
<td>45–60 minutes</td>
<td>24 months</td>
<td>10</td>
</tr>
<tr>
<td>Ireys 2001[101]</td>
<td>Individual – 4</td>
<td>Face to face and telephone – 3</td>
<td>Bowling parties or small group lunches – 1</td>
<td>Seven visits, two weekly telephone calls and three community events</td>
<td>60–90 minutes face to face and at least five-minute telephone calls</td>
<td>15 months</td>
<td>22</td>
</tr>
<tr>
<td>Kennedy 2002</td>
<td>Group of people with chronic conditions – 2</td>
<td>Group sessions – 1</td>
<td>0</td>
<td>Six</td>
<td>2 hours 30 minutes</td>
<td>6 weeks</td>
<td>153</td>
</tr>
<tr>
<td>Keyserling 2002</td>
<td>Individual – 4</td>
<td>Telephone calls – 2</td>
<td>Inspirational faith-based postcards mailed twice a week for 16 weeks – 1</td>
<td>8 + 16 telephone calls</td>
<td>2 hours/group session</td>
<td>8 weeks</td>
<td>125</td>
</tr>
<tr>
<td>Lujan 2007[110]</td>
<td>Groups of people with diabetes – 2</td>
<td>Group sessions + telephone follow-up – 2</td>
<td>Inspirational faith-based postcards mailed twice a week for 16 weeks – 1</td>
<td>8 + 16 telephone calls</td>
<td>2 hours/group session</td>
<td>8 weeks</td>
<td>125</td>
</tr>
<tr>
<td>Lorig 1999[103]</td>
<td>Groups of people with chronic conditions – 2</td>
<td>Group sessions – 1</td>
<td>A textbook detailing the content of the course – 1</td>
<td>Seven weekly sessions</td>
<td>2.5 hours/group session</td>
<td>7 weeks</td>
<td>154</td>
</tr>
<tr>
<td>Lorig 2002[111]</td>
<td>Groups of people with chronic conditions – 2</td>
<td>Group sessions – 1</td>
<td>A book, an audio exercise tape, an illustrated booklet and an audio relaxation tape – 1</td>
<td>Six weekly sessions</td>
<td>2.5 hours/group session</td>
<td>6 weeks</td>
<td>154</td>
</tr>
<tr>
<td>May 2006[113]</td>
<td>Individual – 4</td>
<td>Telephone calls – 2</td>
<td>NRT or Zyban was provided to four of the buddy groups; smoking cessation group – 1</td>
<td>1.4 times (on average)</td>
<td></td>
<td>4 weeks</td>
<td></td>
</tr>
<tr>
<td>Morrow 1999[114,115]</td>
<td>Individual – 4</td>
<td>Face to face – 3</td>
<td>Additional support on demand – 1</td>
<td>Six</td>
<td>?</td>
<td>8 weeks</td>
<td>31</td>
</tr>
<tr>
<td>Paskett 2006[116,117]</td>
<td>Individual – 4</td>
<td>Face to face – 3</td>
<td>Educational material follow-up telephone calls and mailing after each visit – 1</td>
<td>Three</td>
<td>45 minutes</td>
<td>9–12 months</td>
<td>11</td>
</tr>
<tr>
<td>Study</td>
<td>Population level targeted (general population, groups, family, individual)</td>
<td>Nature of the contacts (groups session, telephone, face to face)</td>
<td>Other intervention components</td>
<td>No. of sessions</td>
<td>Duration/session</td>
<td>Intervention duration</td>
<td>Intensity score (minutes/week + other scores)</td>
</tr>
<tr>
<td>--------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------</td>
<td>-------------------------------</td>
<td>-----------------</td>
<td>-------------------</td>
<td>----------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Staten 2004&lt;sup&gt;119&lt;/sup&gt;</td>
<td>Individual – 4</td>
<td>Telephone calls – 2</td>
<td>Two HE classes + 12 newsletters + reminder telephone calls to women who had missed a session –1</td>
<td>24 (average)</td>
<td>?</td>
<td>12 months</td>
<td>17</td>
</tr>
<tr>
<td>West 1998&lt;sup&gt;30&lt;/sup&gt;</td>
<td>Individual – 4</td>
<td>Telephone calls – 2</td>
<td>One-to-one smoking cessation intervention – 1</td>
<td>1.5 times (on average)</td>
<td>?</td>
<td>4 weeks</td>
<td>14</td>
</tr>
<tr>
<td>Woodruff 2002&lt;sup&gt;25&lt;/sup&gt;</td>
<td>Individual – 4</td>
<td>Home visits and telephone calls – 3</td>
<td>Video, booklet, ‘quit kit’ – 1</td>
<td>Four face-to-face, three telephone calls</td>
<td>1–2 hours face to face, 15–30 minutes’ telephone call</td>
<td>3 months</td>
<td>43</td>
</tr>
<tr>
<td>Young 2005&lt;sup&gt;121,123&lt;/sup&gt;</td>
<td>Individual – 4</td>
<td>Telephone calls – 3</td>
<td>0</td>
<td>Tailored four to 12 (eight average)</td>
<td>20 minutes</td>
<td>12 months</td>
<td>10</td>
</tr>
</tbody>
</table>

HE, health education.

a Studies in which the population for which results reported focus on the LAs themselves.

Population targeted: general population – rating 1; small groups of people – 2; family – 3; and individual – 4. The intervention was considered as targeting the individual as long as one intervention component was doing so.

Nature of sessions: face to face – 3; telephone calls – 2; small groups – 1; general population – 0.

If the intervention comprised several components, either the component most used was rated, or the one associated with the greatest intensity was considered for calculations.

When the number of sessions varied between participants, numbers were averaged for calculations – the same thing applies to session duration.

Home visits were estimated to last 30 minutes on average.

Telephone calls were estimated to last 20 minutes on average.

Overall ratings were rounded to the nearest decimal.

Scores below 15 are considered as a low-intervention intensity, 16–69, medium-intervention intensity and > 70 high-intervention intensity.

For all dimensions, studies were rated according to the intervention component that would bring the highest rating, i.e. if a study described two intervention arms, one being face to face and the other involving small groups, only the face to face components would be taken into account in this rating.

Anand et al.<sup>29</sup> in which there was no description of number or duration of sessions, was rated as medium intensity intervention. For studies such as Bird et al.<sup>24,27</sup>, Earp et al.<sup>33,35</sup>, Earp and Flax,<sup>16</sup> Flax and Ear,<sup>69</sup> and McPhee et al.<sup>50,55</sup>, in which the general population was targeted, and in which not all surveyed participants were exposed to the intervention were rated as having a low intervention level.

In Elder et al.<sup>98,99</sup> the intervention was delivered by a mixture of face to face and telephone contacts – the average contact duration was estimated at 25 minutes.

In Anderson et al.<sup>42,81,82</sup> women in the individual counseling arm were telephoned once, but there is a lack of details about the intensity and duration of intervention in the community activity arm. Pre and post interviews took place 3 years apart.

In Batts et al.<sup>97</sup>, Gary<sup>98</sup> and Gary et al.<sup>100</sup> the authors expected that participants would complete six intervention visits before the 24 months follow-up, but the participation fell short of that because of insufficient staff support and participants non compliance. Home visits were an average of 45–60 minutes, but some of the contacts were by telephone. The overall intervention intensity has therefore been overestimated in our calculations, but it still places the study in a low intensity category.
Appendix 12

Studies success rating
<table>
<thead>
<tr>
<th>Study</th>
<th>Intervention focus</th>
<th>QoL/health status</th>
<th>Study's primary outcome</th>
<th>Effect size/context</th>
<th>Training intensity</th>
<th>Intervention intensity</th>
<th>Costs</th>
<th>Population accessibility</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barlow 2000&lt;sup&gt;13&lt;/sup&gt;</td>
<td>CC</td>
<td>Health – NS 1</td>
<td>Arthritis self-efficacy – sig 2</td>
<td>Not described: 0</td>
<td>High: 1</td>
<td>Not measured – 0</td>
<td>Easy – 0</td>
<td>Medium (4)</td>
<td></td>
</tr>
<tr>
<td>Griffiths 2005&lt;sup&gt;101,102&lt;/sup&gt;</td>
<td>QoL – NS 0</td>
<td>Self-efficacy – sig 2</td>
<td>After 4 months’ self-efficacy change did not impact on health/ QoL; 1</td>
<td>Intensive: 1</td>
<td>High: 1</td>
<td>£123/person (cost per change unknown) – 0</td>
<td>Easy – 0</td>
<td>Low (3)</td>
<td></td>
</tr>
<tr>
<td>Kennedy 2007&lt;sup&gt;104–105&lt;/sup&gt;</td>
<td>QoL – NS, health – NS 0</td>
<td>Self-efficacy – sig 2</td>
<td>After 6 months’ self-efficacy change did not impact on health/ QoL; 1</td>
<td>Intensive: 1</td>
<td>High: 1</td>
<td>£250/person (cost per change unknown) – 0</td>
<td>Easy – 0</td>
<td>Low (3)</td>
<td></td>
</tr>
<tr>
<td>Gary 2003&lt;sup&gt;98–100&lt;/sup&gt;</td>
<td>Not measured – 0</td>
<td>HbA&lt;sub&gt;1c&lt;/sub&gt; – NS 0</td>
<td>Not described: 0</td>
<td>Low: 3</td>
<td>Not measured – 0</td>
<td>Easy – 0</td>
<td>Low (3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young 2005&lt;sup&gt;51–123&lt;/sup&gt;</td>
<td>Not measured – 0</td>
<td>HbA&lt;sub&gt;1c&lt;/sub&gt; – sig 2</td>
<td>Limited relevance of size of effect: 1</td>
<td>Intensive: 1</td>
<td>Low: 3</td>
<td>Not measured – 0</td>
<td>Easy – 0</td>
<td>Medium (5)</td>
<td></td>
</tr>
<tr>
<td>Lujan 2007&lt;sup&gt;112&lt;/sup&gt;</td>
<td>Not measured – 0</td>
<td>HbA&lt;sub&gt;1c&lt;/sub&gt; – sig 2</td>
<td>Limited relevance of size of effect: 1</td>
<td>Intensive: 1</td>
<td>High: 1</td>
<td>Easy – 0</td>
<td>Low (3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lorig 1999&lt;sup&gt;110&lt;/sup&gt;</td>
<td>Health – sig 2</td>
<td>Health behaviours and health care use – sig 2</td>
<td>Intensive: 1</td>
<td>High: 1</td>
<td>US$70 per participant/ 6 months (cost per change unknown) – 0</td>
<td>Easy – 0</td>
<td>Medium (6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lorig 2003&lt;sup&gt;111&lt;/sup&gt;</td>
<td>Health – sig 2</td>
<td>Health behaviour, health-care use and self-efficacy – sig 2</td>
<td>Intensive: 1</td>
<td>High: 1</td>
<td>Not measured – 0</td>
<td>Easy – 0</td>
<td>High (7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td>Intervention focus</td>
<td>QoL/health status</td>
<td>Study’s primary outcome</td>
<td>Effect size/context</td>
<td>Training intensity</td>
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<td>Costs</td>
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<td>Rating</td>
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<tr>
<td>Dennis 2002&lt;sup&gt;216&lt;/sup&gt;</td>
<td>BF</td>
<td>Not measured – 0</td>
<td>BF rates – sig 2</td>
<td>BF rates included mixed or comfort feeding? Overestimation: 1</td>
<td>Moderate – 2</td>
<td>Low – 3</td>
<td>Not measured – 0</td>
<td>Easy – 0</td>
<td>Medium (6)</td>
</tr>
<tr>
<td>Morrow 1999&lt;sup&gt;14,115&lt;/sup&gt;</td>
<td>Not measured – 0</td>
<td>BF rates – sig 2</td>
<td>Calculated on exclusive breastfeeding only; reduction of childhood diarrhoea rates: 1</td>
<td>Intensive 1</td>
<td>Medium – 2</td>
<td>Not measured – 0</td>
<td>Easy – 0</td>
<td>Medium (6)</td>
<td></td>
</tr>
<tr>
<td>Earp 2002&lt;sup&gt;93,96&lt;/sup&gt;  Screening</td>
<td>Not measured – 0</td>
<td>Screening rates – sig 2</td>
<td>Relevant effect size: 1</td>
<td>Moderate – 2</td>
<td>Low – 3</td>
<td>COSTLY&lt;sup&gt;4&lt;/sup&gt; – 2</td>
<td>Medium – 1</td>
<td>High (7)</td>
<td></td>
</tr>
<tr>
<td>Paskett 2006&lt;sup&gt;116,117&lt;/sup&gt;</td>
<td>Not measured – 0</td>
<td>Screening rates – sig 2</td>
<td>Relevant effect size: 1</td>
<td>Intensive – 1</td>
<td>Low – 3</td>
<td>US$4986; extra mammogram – 2</td>
<td>Medium – 1</td>
<td>Medium (6)</td>
<td></td>
</tr>
<tr>
<td>Bird 1998&lt;sup&gt;94–97&lt;/sup&gt;</td>
<td>Not measured – 0</td>
<td>Screening rates – sig 2</td>
<td>Relevant effect size: 1</td>
<td>Moderate – 2</td>
<td>Low – 3</td>
<td>Not measured – 0</td>
<td>Medium – 1</td>
<td>High (9)</td>
<td></td>
</tr>
<tr>
<td>Andersen 2000&lt;sup&gt;2,81,82&lt;/sup&gt;</td>
<td>Not measured – 0</td>
<td>Low users screening rates – NS 0</td>
<td>Effect more relevant on prior mammography users: 1</td>
<td>Not described – 0</td>
<td>Low – 3</td>
<td>Not measured – 0</td>
<td>Easy – 0</td>
<td>Medium (4)</td>
<td></td>
</tr>
<tr>
<td>Woodruff 2002&lt;sup&gt;92&lt;/sup&gt;  Smoking</td>
<td>Not measured – 0</td>
<td>Smoking cessation rates – sig 2</td>
<td>Relevant effect size: 1</td>
<td>Intensive – 1</td>
<td>Medium – 2</td>
<td>Not measured – 0</td>
<td>Easy – 0</td>
<td>Medium (6)</td>
<td></td>
</tr>
<tr>
<td>West 1998&lt;sup&gt;12&lt;/sup&gt;</td>
<td>Not measured – 0</td>
<td>Ossesion rates – sig 2</td>
<td>Relevant effect size: 1</td>
<td>No training – 4</td>
<td>Low – 3</td>
<td>Not measured – 0</td>
<td>Easy – 0</td>
<td>High (10)</td>
<td></td>
</tr>
<tr>
<td>May 2006&lt;sup&gt;113&lt;/sup&gt;</td>
<td>Not measured – 0</td>
<td>Ossesion rates – NS 0</td>
<td>No significant changes, even at week: 1</td>
<td>No training – 4</td>
<td>Low – 3</td>
<td>Not measured – 0</td>
<td>Easy – 0</td>
<td>Medium (6)</td>
<td></td>
</tr>
<tr>
<td>Emmons 2005&lt;sup&gt;98,97&lt;/sup&gt;</td>
<td>Not measured – 0</td>
<td>Cessation rates – sig 2</td>
<td>Relevant effect size: 1</td>
<td>Not described – 0</td>
<td>Low – 3</td>
<td>US$298/person – US$5317 per additional quit – 2</td>
<td>Easy – 0</td>
<td>Medium (4)</td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td>Intervention focus</td>
<td>QoL/health status</td>
<td>Study's primary outcome</td>
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<td>Training intensity</td>
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<tr>
<td>Keyserling 2002&lt;sup&gt;108,109&lt;/sup&gt;</td>
<td>Diet and PA</td>
<td>Not measured – 0</td>
<td>PA – sig – kcal NS – 2</td>
<td>Limited relevance of size of effect – 1</td>
<td>Intensive – 1</td>
<td>Low – 3</td>
<td>Not measured – 0</td>
<td>Easy – 0</td>
<td>Medium (5)</td>
</tr>
<tr>
<td>Anand 2007&lt;sup&gt;110&lt;/sup&gt;</td>
<td></td>
<td>Not measured – 0</td>
<td>PA – NS, kcal NS; F&amp;V – NS – 0</td>
<td>Moderate – 2</td>
<td>Medium – 2</td>
<td>Not measured – 0</td>
<td>Medium – 1</td>
<td>Medium (5)</td>
<td></td>
</tr>
<tr>
<td>Staten 2004&lt;sup&gt;111&lt;/sup&gt;</td>
<td></td>
<td>Not measured – 0</td>
<td>PA – NS; F&amp;V – NS – 0</td>
<td>No training – 4</td>
<td>Medium – 2</td>
<td>Not measured – 0</td>
<td>Medium – 1</td>
<td>High (7)</td>
<td></td>
</tr>
<tr>
<td>Resnicow 2004&lt;sup&gt;112&lt;/sup&gt;</td>
<td></td>
<td>F&amp;V – sig 2</td>
<td>Relevant effect size: 1</td>
<td>Moderate – 2</td>
<td>Low – 3</td>
<td>Not measured – 0</td>
<td>Medium (9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elder 2006&lt;sup&gt;26,26&lt;/sup&gt;</td>
<td></td>
<td>Not measured – 0</td>
<td>kcal – sig 2</td>
<td>At 12 months, the effect of the promotores dissipated – 1</td>
<td>Not described – 0</td>
<td>Medium – 2</td>
<td>US$135/participant US$0.36 per reduced calorie: 1</td>
<td>Medium – 1</td>
<td>Medium (5)</td>
</tr>
<tr>
<td>Dickson-Gomez 2003&lt;sup&gt;93,93&lt;/sup&gt;</td>
<td>HIV infection prevention</td>
<td>Not measured – 0</td>
<td>Injection risk behaviour – sig 2</td>
<td>Good penetration into a hard-to-reach population: 1</td>
<td>Intensive – 1</td>
<td>Medium – 2</td>
<td>Not measured – 0</td>
<td>High – 2</td>
<td>High (8)</td>
</tr>
<tr>
<td>Dickson-Gomez 2006&lt;sup&gt;94,94&lt;/sup&gt;</td>
<td></td>
<td>N/A (qualitative study)</td>
<td>N/A (qualitative study)</td>
<td>Good penetration into a hard-to-reach population: 1</td>
<td>Intensive – 1</td>
<td>N/A</td>
<td>Not measured – 0</td>
<td>High – 2</td>
<td>Medium (4)</td>
</tr>
<tr>
<td>Ireys 2001&lt;sup&gt;113&lt;/sup&gt;</td>
<td>Mental health</td>
<td>Not measured – 0</td>
<td>Anxiety – sig 2, depression – NS – 0</td>
<td>Intervention not effective on one of the two primary outcomes – 1</td>
<td>Intensive – 1</td>
<td>Medium – 2</td>
<td>Not measured – 0</td>
<td>Easy – 0</td>
<td>Medium (4)</td>
</tr>
</tbody>
</table>

BF, breastfeeding; CC, chronic conditions; F&V, fruit and vegetables; N/A, not available; NS, not significant; PA, physical activity; sig, significant.

a) Costing details not reported, but the author qualify their intervention as ‘costly’.

QoL/health status – not measured 0; one or both measured but not significant 1; 1 or both measured and significant 2.

Study primary outcome; significant = 2; not significant = 0.

Effect size/context; limited relevance of effect size = –1; relevant effect size = 1; study primary outcome; supportive evidence 1 study primary outcome; non supportive evidence = –1.

Training intensity; professional 0; high intensity = 1; moderate = 2; low = 3; no training = 4.

Intervention intensity; intensive = 0; medium = 1; low = 3.

Cost; not measured or unknown cost per change = 0; low cost per change = 1; over $4000 per change = –2.

Population accessibility; easy; well known/already accessing or easily accessible population group = 0; medium; population generally disengaged with health care services = 1; high; population avoiding engagement with health care services = 2.

Overall rating; 0–3 low/limited success rating; 4–6 moderate success rating; > 6 high success rating.
Appendix 13
Use of ICERs in the analysis of cost-effectiveness

The analysis of cost-effectiveness considers the marginal benefit and marginal cost of the programme under consideration in comparison with appropriate alternatives. Where data are available, the unit of effectiveness considered is the QALY, a measure that captures the impact of the intervention on both longevity and HRQoL. The use of a consistent unit for each analysis facilitates comparisons across interventions. Calculation of ICERs is undertaken according to the principles outlined by Karlsson and Johannesson. Alternative programmes are ranked according to cost. Any programme that is less effective and more expensive than an alternative programme is considered to be dominated. Clearly, it is inferior to the alternative. Any programme that produces a smaller effect than some combination of two other programmes is considered to be extendedly dominated. It would be better to implement the partial combination of the two alternatives than to implement this programme. We exclude all dominated and extendedly dominated programmes and rank the remaining programmes according to cost. The marginal cost (effectiveness) of each programme is calculated by subtracting, from the costs (effects) of the programme, the costs (effects) of the next lower ranking programme. The cheapest and least effective programme forms the baseline comparison. The ICER for the next most expensive programme is calculated by dividing the marginal cost by the marginal effectiveness. An ICER can be calculated for each of the remaining programmes.

The ICER provides a measure of the additional cost of gaining each additional unit of effectiveness delivered by that programme, over and above the next best alternative. Presentation of ICERs in this manner helps to guide decision-making. If the maximum threshold or maximum willingness to pay for a unit of effectiveness is established then the programme that should be implemented is the most effective programme with an ICER below that threshold. ICERs below the threshold indicate programmes with additional health gains that justify the additional cost; ICERs above the threshold indicate programmes whose additional health gains do not justify the additional resources required to implement them. Decision-making by NICE is not based on an arbitrary threshold, but interventions with an ICER > £25,000–35,000 per QALY require exceptional justifications to be considered good value for money.
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Chair – HTA Commissioning Board

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Chair – HTA Commissioning Board

Deputy HTA Programme Director

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### HTA Commissioning Board (continued)

<table>
<thead>
<tr>
<th>Name</th>
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<tbody>
<tr>
<td>Professor James Raftery</td>
<td>Chair of NETSCC and Director of the Wessex Institute, University of Southampton</td>
</tr>
<tr>
<td>Professor Barney Reeves</td>
<td>Professorial Research Fellow in Health Services Research, Department of Clinical Science, University of Bristol</td>
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<td>Professor in Stroke Rehabilitation, Associate Director UK Stroke Research Network, University of Nottingham</td>
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<tr>
<td>Dr Duncan Young</td>
<td>Senior Clinical Lecturer and Consultant, Nuffield Department of Anaesthetics, University of Oxford</td>
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### Observers

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<tr>
<td>Dr Morven Roberts</td>
<td>Clinical Trials Manager, Health Services and Public Health Services Board, Medical Research Council</td>
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<td>Senior Clinical Lecturer and Consultant, Nuffield Department of Anaesthetics, University of Oxford</td>
</tr>
</tbody>
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### HTA Clinical Evaluation and Trials Board

<table>
<thead>
<tr>
<th>Role</th>
<th>Name</th>
<th>Position</th>
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<tbody>
<tr>
<td>Chair,</td>
<td>Professor Sallie Lamb</td>
<td>Director, Warwick Clinical Trials Unit, University of Warwick and Professor of Rehabilitation, Nuffield Department of Orthopaedic, Rheumatology and Musculoskeletal Sciences, University of Oxford</td>
</tr>
<tr>
<td>Deputy Chair</td>
<td>Professor Jenny Hewison</td>
<td>Professor of the Psychology of Health Care, Leeds Institute of Health Sciences, University of Leeds</td>
</tr>
<tr>
<td>Programme Director</td>
<td>Professor Tom Walley, CBE</td>
<td>Director, NIHR HTA programme, Professor of Clinical Pharmacology, University of Liverpool</td>
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### Members

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<tr>
<td>Professor Keith Abrams</td>
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<td>Director, Centre for Healthcare Randomised trials (CHART), University of Aberdeen</td>
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### Observers

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<tr>
<td>Ms Kate Law</td>
<td>Director of Clinical Trials, Cancer Research UK</td>
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Dr Ursula Wells,  
Principal Research Officer, Policy Research Programme, Department of Health
### Pharmaceuticals Panel

#### Members

<table>
<thead>
<tr>
<th>Chair</th>
<th>Professor Imti Choonara, Professor in Child Health, University of Nottingham</th>
</tr>
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<tbody>
<tr>
<td>Deputy Chair</td>
<td>Dr Yoon K Loke, Senior Lecturer in Clinical Pharmacology, University of East Anglia</td>
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<tr>
<td></td>
<td>Dr Martin Ashton-Key, Medical Advisor, National Commissioning Group, NHS London</td>
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<tr>
<td></td>
<td>Mr John Chapman, Public contributor</td>
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<tr>
<td></td>
<td>Dr Peter Elton, Director of Public Health, Bury Primary Care Trust</td>
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<tr>
<td></td>
<td>Dr Ben Goldacre, Research Fellow, Division of Psychological Medicine and Psychiatry, King’s College London</td>
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<tr>
<td>Dr James Gray</td>
<td>Consultant Microbiologist, Department of Microbiology, Birmingham Children’s Hospital NHS Foundation Trust</td>
</tr>
<tr>
<td>Ms Kylie Gyertson</td>
<td>Oncology and Haematology Clinical Trials Manager, Guy’s and St Thomas’ NHS Foundation Trust London</td>
</tr>
<tr>
<td>Dr Juriees Hasan</td>
<td>Consultant in Medical Oncology, The Christie, Manchester</td>
</tr>
<tr>
<td>Dr Carl Heneghan</td>
<td>Deputy Director Centre for Evidence-Based Medicine and Clinical Lecturer, Department of Primary Health Care, University of Oxford</td>
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<tr>
<td>Dr Maria Kouimtzis</td>
<td>Pharmacy and Informatics Director, Global Clinical Solutions, Wiley-Blackwell</td>
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<td>Professor Femi Oyebode</td>
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<tr>
<td>Dr Martin Shelly</td>
<td>General Practitioner, Silver Lane Surgery, Leeds</td>
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<tr>
<td>Dr Gillian Shepherd</td>
<td>Director, Health and Clinical Excellence, Merck Serono Ltd</td>
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<tr>
<td>Mrs Katrina Simister</td>
<td>Assistant Director New Medicines, National Prescribing Centre, Liverpool</td>
</tr>
<tr>
<td>Professor Donald Singer</td>
<td>Professor of Clinical Pharmacology and Therapeutics, Clinical Sciences Research Institute, CSR, University of Warwick Medical School</td>
</tr>
<tr>
<td>Mr David Semes</td>
<td>Public contributor</td>
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<tr>
<td>Dr Arnold Zermansky</td>
<td>General Practitioner, Senior Research Fellow, Pharmacy Practice and Medicines Management Group, Leeds University</td>
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</table>

#### Observers

| Dr Kay Pattison | Senior NIHR Programme Manager, Department of Health |
| Mr Simon Reeve | Head of Clinical and Cost-Effectiveness, Medicines, Pharmacy and Industry Group, Department of Health |
| Dr Heike Weber | Programme Manager, Medical Research Council |
| Professor Tom Walley | Director, NIHR HTA programme, Professor of Clinical Pharmacology, University of Liverpool |
| Dr Ursula Wells | Principal Research Officer, Policy Research Programme, Department of Health |

### Psychological and Community Therapies Panel

#### Members

<table>
<thead>
<tr>
<th>Chair</th>
<th>Professor Scott Weich, Professor of Psychiatry, University of Warwick, Coventry</th>
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<tr>
<td>Deputy Chair</td>
<td>Dr Howard Ring, Consultant &amp; University Lecturer in Psychiatry, University of Cambridge</td>
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<td>Professor Jane Barlow, Professor of Public Health in the Early Years, Health Sciences Research Institute, Warwick Medical School</td>
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<td>Dr Sahayasachi Bhaumik, Consultant Psychiatrist, Leicestershire Partnership NHS Trust</td>
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<td>Mrs Val Carlill</td>
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<tr>
<td>Dr Steve Cunningham</td>
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*We look forward to hearing from you.*