

**A REVIEW OF THE EFFECTIVENESS OF
INTERVENTIONS, APPROACHES AND
MODELS AT INDIVIDUAL, COMMUNITY
AND POPULATION LEVEL THAT ARE
AIMED AT CHANGING HEALTH
OUTCOMES THROUGH CHANGING
KNOWLEDGE ATTITUDES AND
BEHAVIOUR**

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EXECUTIVE SUMMARY

1. Background

This document is the summary of a ‘review of reviews’, which aims to bring together a large body of evidence and provide a critical and structured overview of the effectiveness of interventions and models to change attitudes, knowledge and behaviours in six different areas. This overview will provide researchers, policy and decision-makers, and practitioners with accessible, good quality evidence in these topic areas.

The six health behaviours considered here are:

- Cigarette smoking
- Alcohol drinking (excluding alcohol dependency)
- Physical activity
- Healthy eating (excluding diet for weight loss)
- Illicit drug use (excluding drug dependency)
- Sexual risk taking in young people

The main objectives were to evaluate:

- Which are the most effective interventions to change knowledge, attitudes and health behaviours in each of these six areas?
- Is there any evidence to suggest that some interventions are effective / ineffective across the range of health behaviours?
- Which are the most effective models and approaches used in these interventions?
- What is the evidence for the effectiveness of interventions in targeting health inequalities within particular population sub-groups?
- What are the gaps in the evidence base?

Evidence tables are provided in section 4, divided by research question and health behaviour. Please refer to the Table of Contents for page numbers for the relevant tables.

2. Methodology

The methods of this review closely followed recommendations in the NHS National Institute for Health and Clinical Excellence methods manual ‘Methods for the development of NICE public health guidance’.

The evidence included in this rapid review includes:

- a) Cochrane reviews and systematic reviews in DARE
- b) Other good quality reviews which have a low risk of bias
- c) Less robust systematic reviews in areas where no other evidence exists

Although ‘reviews of reviews’ are a useful way of bringing together a large body of evidence, and consider broad questions, several limitations need to be acknowledged. Firstly, reviews do not always compare the same thing – some reviews examine outcome data studies, others look at more prospective studies (some consider both) – so interpretation of what is found is complicated by the state of the data pool.

Secondly, some of the high quality reviews might contain poor quality evidence, because that is all that is available. Thirdly, some of the reviews might overlap, and include the same studies. Fourthly, even though no reviews have been done in a particular area (e.g. mass media interventions for preventing illicit drug use), this does not mean that there is not a large body of good primary evidence on that topic. Finally, when looking at the evidence in reviews, we may be limited by the questions that the review authors have decided are important. These may not be the same questions that we have prioritised.

2.1. Literature Search

Searches were conducted on the Cochrane Database of Systematic Reviews (CDSR), the Database of Abstracts of Reviews of Effects (DARE) the DARE ‘working’ database (reviews not yet published in DARE) for English language systematic reviews date limited to between 1995-February 2006. AMED, ERIC, CinAHL, Embase, Medline, and PsycINFO (via OVID) were also searched for each of the six public health topics, limited also to English language systematic reviews from 2004 to March 2006. Although DARE encompasses these databases, this was a check to find more current reviews. These searches were restricted by additional terms including ‘meta-analysis’, ‘evidence-based review’ or ‘systematic review’. Full search histories are provided in Appendix 2.

2.2. Selection of reviews for inclusion

Two sets of inclusion and exclusion criteria were applied in the selection process: criteria that applied across all the health behaviours; and criteria that were specific to particular health behaviours.

A. Inclusion and exclusion criteria which applied across the six health behaviours

<i>Inclusion Criteria</i>
1. Systematic reviews and meta-analyses
2. English language publications only
3. Focus on public health, health promotion (or related research) or primary care led interventions which contained an educational and/or behavioural component
4. Year of publication limited to 1995-2006
<i>Exclusion Criteria</i>
1. Reviews of health screening
2. Reviews of psychiatric interventions as part of treatment of those with mental illness
3. Reviews of interventions with only a clinical or pharmacological focus (e.g. reducing risk of heart disease, diet for diabetes care etc).
4. Reviews of interventions carried out within secondary or tertiary care
5. Reviews of drug interventions
6. Review of interventions which did not contain a behavioural/educational component to the intervention
7. Reviews of interventions which did not have the aim of changing any of the six health behaviours

B. Inclusion and exclusion criteria for each health behaviour

Interventions aimed at either preventing or delaying onset of the health behaviour (e.g. smoking, alcohol use) were included, as well as those aimed at helping people to change an existing behaviour such as smoking. However, interventions aimed at treating alcohol or drug dependency were not included. Healthy eating and physical activity were limited to outcomes related to changes in knowledge, attitudes or behaviour but did not include outcomes such as weight loss, reduction, obesity treatment, or exercise specifically targeting high risk groups (e.g. people with cardiovascular disease or cancer).

Applying the inclusion/exclusion criteria

Titles and abstracts were screened independently by two reviewers. Any discrepancies in selections were discussed and an agreement reached. Another stage of screening was pursued during a mapping exercise, where references were mapped into categories of evidence and two reviewers agreed to include or exclude further references based on the quality of the reviews and the date of publication. Since Cochrane reviews are usually the most comprehensive and of high quality, they were selected where possible if they were one of several reviews in a particular area. Other reviews were selected on the basis of most recent publication date and quality of the review.

2.3. Quality appraisal

Potentially relevant reviews were assessed for quality using a checklist adapted from Appendix A.1 of the NICE 'Methods for the development of NICE public health guidance'. Reviews were graded both for the quality of the review itself (e.g. likelihood of bias) and for the type of evidence it was reviewing (e.g. RCTs or non-RCTs). Reviews were graded for the likelihood of bias as ++ (high quality, lowest level of bias), + (good quality, low level of bias) or – (variable quality with greater degree of bias). Bias is scored according to the 'systematicity' of the review process – further detail is provided in the main body of the report. Reviews were categorised according to the study types which they included as follows: RCTs only (1), other study types (2), or a mixture of both (1&2). These two scores were then combined, so that, for instance, 1++ denotes a review of RCTs of high quality (with the lowest risk of bias). Added to this was a score for relevance to the UK – as detailed below.

2.4. Study categorisation

Ninety-two reviews were included in this review. Of these, 87 were included in Question 1 and a further five were included in other questions (along with some of those in question 1.)

2.5. Assessing applicability

Each review was scored according to its likely relevance and applicability to the UK setting (see table below).

Relevance to the UK scoring

Score (A-D)	Description
A (directly relevant)	Review includes UK studies
B (probably relevant)	Review includes non-UK studies of interventions that would be most likely to equally apply to UK settings (e.g. exercise programmes)
C (possibly relevant)	Review includes non-UK studies that may have some application to UK settings but should be interpreted with caution. There may be strong cultural or institutional differences that would have impact on the effectiveness of the intervention if applied in the UK (e.g. psychosocial interventions)
D (not relevant)	Review includes non-UK studies that are clearly irrelevant to UK settings (e.g. legislation which would be unlikely to be implemented)

2.6. Data extraction & synthesis

Data were extracted from the reviews into an Access database by one of four people, and a sample checked by another member of the team. Data extraction was guided by the data extraction forms in Appendix D of the NICE 'Methods for the development of NICE public health guidance manual', although this was adapted to suit a review of reviews (see example in Appendix 7). No formal synthesis (such as meta-analysis) was undertaken, as a narrative summary of the results was more appropriate for a review of reviews.

Evidence statements

Evidence statements were drawn up based on the level of evidence, the efficacy of the intervention and the applicability of the research question to the UK. They were based on the guidance in the NICE 'Methods for the development of NICE public health guidance manual'. Each evidence statement is comprised of two parts (a and b).

a) There is evidence of (good/ variable) quality (1++, A / 2-, C etc)..	<i>Quality of the review, the type of study design included in the review and relevance score</i>
b) ...which shows an effect/no effect/mixed (equivocal) effect/lack of evidence of intervention x for health behaviour y	<i>Effect of the intervention</i>

For example, 'There is evidence of good quality (1++, A), that shows an effect of behavioural counselling interventions for problem drinkers.'

3. Summary of findings

3.1 What is the evidence for the effectiveness of interventions to prevent, reduce, or promote *health behaviours*, at what level (individual / community / population), and for which population groups (e.g. young people, pregnant women, elderly)?

Eighty-seven different systematic reviews are included in this section (as some reviews cover more than one health behaviour and therefore appear twice), covering a wide range of different interventions. The focus of interventions varied, depending on the level at which they were delivered. Interventions delivered at individual level generally aimed to change an existing behaviour (e.g. cigarette smoking, alcohol misuse), whilst the community and population level intervention were often more focused on promoting positive behaviours (e.g. healthy eating, exercise).

The remit of this review was to evaluate general interventions at individual, community and population level, aimed at changing health outcomes through behaviours. Therefore, although this section could have been presented in a number of ways, the most logical approach has been to organise it by behaviour, subdivided into the level of intervention (individual, community, population), and further sub-divided into population group. Subsequent questions evaluate which interventions may be effective across behaviours, populations and at different levels.

The levels relate to units of randomisation. For instance, a community level intervention might target one (or more) communities for an intervention and compare this to another community receiving no interventions, usual care or a related intervention. An example of areas that may appear less straight forward are in interventions such as those involving group counselling – this may be done at the individual level, where the comparison is with individuals who do not receive group counselling. In this report, one further area to draw to the reader's attention is that we have noted 'pregnant women' as a separate category who fall within the individual level interventions. While there are many interventions involving pregnant women that take place at the community level, all of those included in this report were conducted at the individual level.

3.1.1 Smoking & Tobacco Use

40 systematic reviews evaluated interventions to aid smoking cessation, prevent relapse, or prevent people taking up smoking. Of these 22 evaluated individual level interventions, 11 evaluated community level interventions, and 7 evaluated population level interventions.

Evidence summary for interventions aimed at individuals

Twenty two systematic reviews evaluated interventions aimed at achieving positive changes in tobacco use in individuals, although the results are varied across the range of intervention types. These changes included both smoking (and smokeless tobacco use) reduction and cessation. Fourteen of these evaluated smoking related

interventions for the general adult population, two focused on interventions for pregnant women with or without postpartum follow-up, five focused on the effectiveness of health professional led interventions and one evaluated interventions for smokeless tobacco use.

Interventions that showed a positive effect include advice from health professionals, the rapid smoking form of aversion therapy, self help materials, telephone counselling (compared to less intensive interventions), nursing interventions, group counselling (which is also more effective than self help) and oral examination and feedback for reducing smokeless tobacco use. In addition, interventions to promote smoking cessation or reduction with pregnant women are generally effective across the range of intervention types and indicate that pregnancy may be a point in the lifecourse that is amenable to positive behaviour change. Relapse prevention interventions were also successful with pregnant women, although this was only supported by a single study. Less clear, poor quality or inconclusive evidence of effect was found for social support interventions (e.g. buddy systems or friends and family), relapse prevention, biomarker feedback or biomedical risk assessment, exercise, and interventions by community pharmacy personnel or dentists. Interventions that had evidence of no effectiveness included hypnotherapy, and stage-based approaches to changing smoking behaviour.

Evidence statements for interventions aimed at individuals

Hypnotherapy

There is good quality evidence (1+, A), that hypnotherapy is not effective in achieving smoking cessation.

Counselling, support and self help

There is evidence of good quality (1+,C), that no conclusions can be made about the impact of partner support on smoking cessation. There is additional evidence of variable quality (1-, C), which shows some effect of buddy systems in a smokers clinic.

There is evidence of good quality (1+, A), that self help materials may increase quit rates compared to no intervention, but the effect is likely to be small. There is no evidence that they have an additional benefit when used alongside other interventions such as advice from a healthcare professional, or nicotine replacement therapy. There is evidence that materials that are tailored for individual smokers are effective, and are more effective than untailored materials, although the absolute size of effect is still small.

There is evidence of good quality (1+, C), that shows a positive effect of telephone counselling (compared to less intensive interventions) on smoking quit rates.

There is evidence of good quality (1+, C), which shows that group counselling is more effective than self help and no intervention for smoking cessation.

Biomedical risk assessment and feedback

There is evidence of good quality (1+, A), that there is no evidence of effectiveness in using biomedical risk assessment along with counselling to promote smoking

cessation. There is evidence of variable quality (1-, B) that shows a small effect of using biomarker feedback with counselling.

Aversive techniques

There is evidence of good quality (1+, B), that rapid smoking is effective in aiding smoking cessation. There is evidence that other aversive methods are not effective.

Relapse prevention

There is evidence of good quality (1&2+, A), that shows insufficient evidence to support the use of any specific intervention for helping smokers who have successfully quit for a short time to avoid relapse.

Stage based approaches

There is evidence of variable quality (1-, C), which shows no effect of stage-based approaches to changing smoking behaviour.

Motivational interventions and counselling

There is evidence of variable quality (1-, A), that shows an inconclusive effect of motivational intervention in smoking cessation.

Exercise

There is evidence from two reviews of good quality (both scoring 1+, B), that shows an inconclusive effect of exercise interventions for smoking cessation.

Smokeless tobacco use

There is evidence of good quality (1++, B), which shows an effect of behavioural interventions which included an oral examination and feedback for reducing smokeless tobacco use.

Pregnant women

There is evidence of good quality (1+, A), which shows significant effects of a wide range of interventions with pregnant women on smoking reduction and smoking cessation.

There is evidence of good quality (1++, C), which shows a modest effect of theoretically based, multi-component interventions provided during the postpartum period, on postpartum smoking relapse rates. However, this evidence only comes from a single study.

Health professional led interventions

There is evidence of good quality (1+, A), which shows a small effect of physician advice on the odds of quitting for all smokers. There is also evidence of a small effect of intensive versus minimal advice on smoking cessation.

There is evidence of variable quality (1&2-, B), which shows an effect of dentists' advice to quit smoking on dental patients.

There is evidence of variable quality (1-, A), that shows little effect of smoking prevention interventions delivered via medical or dental providers' offices in preventing or reducing tobacco smoking in young people (<21 years).

There is evidence of good quality (1+, A), that shows a moderate effect on nursing interventions for smoking cessation in non-hospitalised people.

There is evidence of good quality (1+, A), that shows an inconclusive effect of interventions by community pharmacy personnel for smoking cessation.

Evidence summary for interventions aimed at communities

Eleven reviews evaluated interventions aimed at either prevention of taking up smoking, smoking cessation, or reducing smoking prevalence. Interventions which showed an effect in the workplace included those aimed at encouraging individual's to quit — whether they are more effective than in other settings, such as health clinics, is not clear. Interventions included group therapy, individual counselling, self help materials, smoking bans and restrictions and competitions and incentives. Although cessation rates have not been shown to differ significantly, recruitment rates can be improved by rewarding participation, which may be expected to deliver higher absolute numbers of successful quitters. Interventions in schools and colleges that showed some effect included education, social and refusal skills training, positive identity reinforcement, individual and group counselling and smoking policies and restrictions. There is some evidence that these interventions are not effective in the long term. Interventions aimed at the wider community included multi-component interventions and those which use multiple channels to provide reinforcement, support and norms for not smoking. These showed limited effectiveness.

Evidence statements for interventions at the community level

Workplace interventions

There is evidence of good quality (1&2+, A), which shows that group therapy, individual counselling and nicotine replacement therapy (NRT), are equally effective when offered in the workplace. The evidence is less clear for self-help methods.

There is evidence of good quality (1&2+, C) and evidence from a further two reviews of variable quality (both with the score: 2-, B), which shows that tobacco bans in the workplace decreased cigarette consumption during the day, but the effect on total consumption was uncertain.

There is evidence of good quality from two reviews (1&2+, C; 1&2+, A), which shows that competitions and incentives in the community (e.g. workplace, clinics) are not effective beyond six months.

School or higher education interventions

There is evidence from two reviews (1+, A; 1-, D), showing a mixed effect for some school based interventions (e.g. social influence and educational interventions) at reducing smoking prevalence among young people in the short term, but no evidence for longer term effects.

There is evidence of good quality (1&2+, C), that interventions in universities and colleges can reduce tobacco use and increase acceptability of smoking policies.

There is evidence of variable quality (1&2-, C), that shows very limited evidence demonstrating efficacy of smoking-cessation interventions in adolescents, but no evidence on the long-term effectiveness of such interventions.

Interventions in other community settings

There is evidence of good quality (1&2+, A), which shows that there is a small positive effect of multi-component community interventions in preventing smoking uptake in young people.

There is evidence of good quality (1&2+, B), which shows that multiple channels to provide reinforcement, support and norms for not smoking have a limited effect on smoking prevention or cessation.

Evidence summary for interventions aimed at populations

Seven systematic reviews evaluated population level interventions to prevent the uptake of smoking or reduce smoking rates. Interventions which showed evidence of a small effect in preventing the uptake of smoking included mass media interventions. Interventions which show a small effect on smoking cessation include 'Quit and Win' contests and reducing smoking in public places (although the before and after study design makes it difficult to determine the extent to which the outcomes were directly related to the intervention). Other interventions such as those aiming to reduce tobacco sales to minors have little evidence of effectiveness.

Evidence statement for interventions at the population level

Mass media interventions

There is evidence of good quality (level 1++, A), which shows that mass media interventions have an effect on preventing the uptake of smoking in young people.

There is evidence of variable quality (2-, C), that media campaigns and concurrently implemented tobacco control programmes (or policies) have a strong effect on the reduction in smoking prevalence.

Incentives

There is variable quality evidence (1&2-, C), that shows a small effect of the use of incentives in population-based smoking cessation programmes.

There is good quality evidence (1&2+, C), that shows a small effect of 'Quit and Win' contests on community prevalence of smoking is small.

Legislative measures / tobacco control policies/ reducing access

There is evidence from two reviews (1&2+, C; 2-, B), that show that interventions to reduce underage access to tobacco (by deterring shopkeepers from making illegal sales) has a small effect on reducing the number of illegal sales to young people, but there is no effect on their smoking behaviour.

Reducing smoking in public places

There is evidence of good quality (2+, B), that shows a large, positive effect of comprehensive, multi-component approaches to implementing policies banning smoking within institutions.

3.1.2 Physical Activity

Seventeen systematic reviews evaluated interventions to increase or promote the uptake of physical activity. Of these, eight evaluated interventions aimed at individuals, five evaluated interventions in the community, and four evaluated population based interventions.

Summary of evidence for interventions targeting individuals

Eight systematic review evaluated interventions aimed at increasing physical activity in individuals. Six of these evaluated interventions for the general adult population, and two evaluated interventions for the older population. Interventions such as professional advice and guidance (with continued support) may be moderately effective in the short term (less than three months) in increasing physical activity for the general population. However, effectiveness is not necessarily sustained over a longer time period (e.g. twelve months). Many of the studies were limited by the recruitment of motivated volunteers, and no studies examined the effect of interventions on participants from varying socioeconomic or ethnic groups. In addition even those interventions which are moderately effective in increasing exercise are not meeting a predetermined threshold of physical activity. This conclusion was also supported by the findings from the review of interventions for the older population, which found a small but short-lived effect of home-based, group-based, and educational physical activity interventions on increasing physical activity. There is inconclusive evidence of effect for biomarker feedback or brief motivational interventions on physical activity. There is evidence of no effect for stage of change interventions to increase levels of physical activity.

Evidence statement for interventions targeting individuals

All adults

There is evidence of good quality (1++, A), that shows moderate evidence of effectiveness of individualised physical activity interventions for increasing (in the short term) self reported physical activity levels. However, other evidence of good quality (1 & 2+, A) indicates that most studies have no effect at the first follow-up (three months or more after the end of intervention).

There is evidence of good quality (1++, A), that shows a non-significant effect for reaching a predetermined threshold of physical activity (e.g., meeting current public health recommendations).

There is evidence of variable quality (1-, B), that shows an inconclusive effect of biomarker feedback or brief motivational interventions on physical activity.

There is evidence of good quality (1++, C), that show no effect of 'stage of change' based interventions on physical activity.

There is evidence of good quality (1&2+, C), that shows a mixed and inconclusive effect of counselling interventions on physical activity.

Older People

There is evidence of from two reviews (1++, A; 1-, C), that shows a small but short-lived effect of home-based, group-based, and educational physical activity interventions on increasing physical activity among older people.

Summary of evidence for interventions targeting communities

Five reviews evaluated community level interventions. One systematic review evaluated interventions in the workplace, and four systematic reviews evaluated pre-school or school based interventions. There is evidence of a moderate effect of workplace physical activity programmes on increasing physical activity levels. These interventions consisted of self-help or educational programmes, exercise programmes involving aerobics, walking, jogging, swimming, cycling, muscle strengthening, endurance, flexibility and stretching. There is also moderate evidence of effectiveness for curriculum based activities in schools, but future research must take care to assess the impact of school-based physical activity interventions on indicators of physical activity and fitness. The most effective school-based physical activity interventions include printed educational materials and curricula that promote increased physical activity during the whole day (i.e., recess, lunch, class-time, and physical education classes). The most effective non-curricula based school activities included education and provision of equipment for monitoring TV or video-game use; engaging parents in supporting and encouraging their children's physical activity; those implemented during school breaks (painting school playgrounds, playground supervisors implementing a games curriculum, and taught playground games or introduced equipment). There is evidence that shows no effect of other non-curricula activities such as active travel to school, extracurricular activities and summer schools or camps.

Evidence statements for interventions targeting communities

Work based interventions

There is evidence of good quality (1& 2+, A), that shows a moderate positive effect of workplace exercise programmes on increasing physical activity.

School based interventions

There is evidence of good quality from two reviews (both scoring 1& 2+, A), that shows a moderate positive effect of school based interventions on increasing physical activity in school-aged young people. In 11-16 year olds, the positive effects were restricted to young women.

There is evidence of good quality (1& 2++, B), that shows a possible effect of non-physical exercise, school based, interventions on increasing physical activity among children aged 4-10 years.

There is evidence of variable quality (1& 2-, B), that shows an effect of non-curricula school based interventions (particularly those during school breaks) on increasing physical activity.

Summary of evidence for interventions targeting populations

Four systematic reviews evaluated population based interventions aimed at increasing physical activity. Two evaluated interventions to increase participation in sport, one evaluated interventions to promote walking and cycling, and one evaluated mass media interventions. No studies have been undertaken to identify any intervention designed to increase active and/ or non-active participation in sport (including policy interventions).

There is evidence that targeted behaviour change programmes can be effective in changing the transport choices of motivated subgroups, but the social distribution of their effects and their effects on the health of local populations are unclear. Evidence that other types of intervention have been effective is inconsistent, of low validity, based on single highly contextual studies, or non-existent. There is variable quality evidence that mass media interventions may increase physical activity, but the effects tended to be in small subgroups, or for specific behaviours such as walking

Evidence statements for interventions targeting populations

Participation in sport

There is evidence from two systematic reviews (2+, A; 2++, A) that no evidence exists for interventions designed to increase active and/or non-active participation in sport (including policy interventions).

Promoting modal shift

There is evidence of good quality (1& 2++, A), that shows an effect of behavioral interventions to encourage people to change their mode of transport to walking or cycling. However, the balance of best available evidence about publicity campaigns, engineering measures, and other interventions suggests that they have not been effective in this area.

Mass media

There is evidence of variable quality (2-, A), that shows an effect of community wide mass media interventions on increasing physical activity.

3.1.3 Alcohol Misuse

Twelve reviews evaluated a range of interventions aimed at either reducing alcohol consumption in problem drinkers, preventing or delaying the onset of alcohol use in young people, or reducing dangerous activities associated with drinking (e.g. drink-driving). The majority of the reviews were evaluating interventions aimed at drinking and driving, and associated outcomes. No consistent definitions for drinking patterns are available from existing guidelines or research; however, it is commonly held that less severe alcohol problems are appropriate for behavioural interventions, whereas more severe problems need specialty addiction treatment.

Evidence summary for interventions aimed at individuals

Six reviews evaluated interventions for adult problem drinkers. One review evaluated home visits for pregnant women who were problem drinkers, two targeted convicted drink drivers, and three further reviews covered problem drinkers in general.

There was evidence of a small positive effect of brief behavioural counselling interventions in reducing alcohol intake (mean reduction of approximately 4 drinks per week) in problem drinkers. There was variable quality evidence showing a small, positive effect of behavioural counselling interventions in reducing alcohol consumption. There was insufficient evidence of effect for home visits for women who were alcohol misusers. For drink drivers, there was evidence of an effect of alcohol interlock programmes (car ignition locked until the driver provided an appropriate breath specimen), but the effect of other interventions was inconclusive due to the variable quality of the review.

Evidence statements for interventions aimed at individuals

Problem drinkers

There is evidence of variable quality (1-, C), that shows a small effect of behavioural counselling interventions in reducing alcohol consumption among problem drinkers.

There is evidence of good quality (1++, A; 1&2+, A), that shows an effect of brief behavioural counselling interventions in reducing alcohol intake among problem drinkers .

Pregnant women

There is evidence of good quality (1++, C), that shows insufficient evidence of effect for home visits during pregnancy in reducing alcohol consumption.

Drink drivers

There is evidence of good quality (1&2++, C), that shows a possible effect of alcohol ignition interlock programmes to reduce drink driving offences. There is no evidence on effectiveness of the programmes once the device has been removed.

There is evidence of variable quality (1&2-, C), that shows an effect of drink-driving remediation interventions in reducing drink-driving repeat offences and alcohol-related crashes.

Evidence summary for interventions aimed at communities

The two reviews both targeted school children. There was evidence of a positive effect of school-based instructional programmes for reducing riding with drinking drivers. However, there was insufficient evidence to determine the effectiveness of these programmes for reducing drinking and driving. There was also insufficient evidence to determine the effectiveness of peer organizations and social norming campaigns, due to the small number of available studies. There was evidence of mixed effect for psychological interventions aimed at preventing the onset of alcohol use or alcohol misuse by young people.

Evidence statements for interventions aimed at communities

School based interventions

There is evidence of good quality (1&2+, A), that shows an effect of school-based instructional programmes for reducing riding with drinking drivers.

There is evidence of good quality (1&2+, A) that shows a mixed effect of psychological interventions aimed at preventing the onset of alcohol use or alcohol misuse by young people.

Summary of evidence for interventions aimed at populations

Two reviews evaluated mass media interventions, and two evaluated legislative interventions. None of the four reviews included evidence from RCTs (mainly because of the difficulty of doing such trials in these areas). In addition, three out of the four reviews were of variable quality. One well conducted review found insufficient evidence of effectiveness for ‘designated driver programmes’ in increasing the number of designated drivers. No reviews evaluated evidence relating to mass media interventions to promote ‘safe’ drinking levels or reduce ‘risk drinking’ (e.g. binge drinking). The variable quality reviews found that effective interventions included mass media campaigns, minimum drinking laws, and low blood alcohol concentration law on alcohol and driving related outcomes.

Evidence statements for interventions aimed at populations

Mass media campaigns

There is evidence of variable quality (2-, B), that found an effect of mass media campaigns on reducing alcohol impaired driving and crashes.

There is evidence of good quality (2+, B), that shows insufficient evidence of effectiveness for ‘designated driver programmes’ in increasing the number of designated drivers.

Legislative and policy based interventions targeting young people

There is evidence of variable quality (2-, D), that shows an effect of low blood alcohol concentration laws for younger drivers in reducing injuries or crashes.

There is evidence of variable quality (2-, C), that found a mixed effect of minimum drinking laws on alcohol consumption, drink driving and car accidents.

3.1.4 Healthy Eating

Eight systematic reviews evaluating behavioural or psychological interventions to promote healthy eating were identified. Of these, two evaluated interventions aimed at individuals, and six evaluated community based interventions.

Evidence summary for interventions aimed at individuals

Two reviews evaluated interventions with individuals aimed at promoting healthy eating. There was evidence of a positive effect of nutritional counselling interventions delivered to a primary care population in changing eating habits. There was no conclusive evidence of effect of interventions (health education, counselling, changes in environment and changes in policy) to encourage pregnant women to eat healthily.

Evidence statements for interventions aimed at individuals

Promoting healthy eating in all adults

There is evidence of good quality (1+, C), that shows a positive effect of nutritional counselling interventions delivered to a primary care population in changing eating habits.

Pregnant women

There is evidence of good quality (1&2+, A), that shows no conclusive evidence on the effectiveness of interventions to encourage pregnant women and women of childbearing age to eat healthily.

Evidence summary for interventions aimed at communities

Six reviews evaluated community level interventions. Three evaluated interventions aimed at children, one evaluated workplace interventions, one evaluated community level interventions for older people, and one evaluated other community level interventions (e.g. those set in restaurants and supermarkets). There was evidence of an effect of interventions aimed at increasing fruit and vegetable intake in children aged 4-10 and interventions for youth aged 11-16, but there was insufficient evidence of an effect for interventions in pre-school children. There was evidence of a small effect of workplace interventions on increasing fruit and vegetable intake. There was evidence of little or no effect of interventions to increase fruit and vegetable intake in the elderly. There was some evidence of effectiveness for interventions in communities to increase fruit and vegetable intake and generally eat a healthier diet. There was also evidence that interventions based in supermarkets are effective for promoting positive changes in shopping habits, although this is only in the short term.

Evidence statements for interventions aimed at communities

Healthy eating in children and young people

There is evidence of good quality (1&2+, A) showing that there is currently insufficient evidence available to predict the format of successful healthy eating interventions that are likely to be effective at improving the nutritional well-being of pre-school children.

There is evidence of good quality (1&2+, A) that shows a small but significant positive effect of interventions aimed at increasing fruit and vegetable intake in children aged 4-10 years.

There is evidence of good quality (1&2+, A), that shows an effect of multi-component interventions complementing classroom activities in school wide initiatives (with young people aged 11-16 years) as well as involving parents on promoting healthy eating.

Healthy eating in the workplace

There is evidence of good quality (1&2+,A), that shows a small effect of workplace interventions on increasing fruit and vegetable intake (<0.5 portions a day).

Health eating and older people

There is evidence of good quality (1&2+, C), which show only a very limited effect of interventions to promote healthy eating in older people.

Healthy eating in non workplace based community-based interventions

There is evidence of good quality (1&2+, B), which show no effect of non-workplace based community-based interventions in promoting dietary change.

There is evidence of good quality (1&2+, B), that shows that supermarket based interventions can have an effect on food purchases, but only during the period of the intervention.

Evidence for interventions aimed at populations

No reviews were identified.

3.1.5 Illicit Drug use

Four reviews met our inclusion criteria for this section. The evidence is more abundant in the area of interventions aimed at treating drug users, which was specifically excluded under our search criteria.

Evidence for interventions aimed at individuals

No systematic reviews were identified

Evidence summary for interventions aimed at communities

Four systematic reviews evaluated community level interventions to prevent illicit drug use with young people. The evidence base for this topic is limited and there are substantial gaps in the available evidence, which we discuss further in question 3.7. There is evidence that shows a positive effect of skill based programmes in schools, but inconclusive evidence of effect for non-schools based programmes. There is also some evidence that the 11–13 age range may be a crucial period for intervention with vulnerable young people. Although there is some evidence of effectiveness of drug prevention interventions, this area should be approached with caution since there is also evidence that interventions to prevent illicit drug use may cause an increased uptake of illicit drug use.

Evidence statements for interventions aimed at communities

There is evidence of good quality (1&2++, A), which shows a positive effect of skills based programmes in deterring early-stage illicit drug use in school children.

There is evidence of good quality (1++, A), which shows inconclusive effects of non-school based interventions in preventing illicit drug use in young people under the age of 25. Motivational interviewing and some family interventions may have some benefit, but more research is needed.

There is evidence of variable quality (1&2-, D), which shows that life skills training in schools with vulnerable young people has a positive effect (at least in the short term).

There is evidence of variable quality (2-, B), which shows adverse effects of drug prevention interventions with young people.

Evidence for interventions aimed at populations

No systematic reviews were identified

3.1.6 Sexual risk-taking in young people

Eight systematic reviews were synthesised in this section. Four reviews evaluated interventions to reduce or prevent HIV or other sexually transmitted infections (STIs) and four reviews explored other sexual health interventions and / or interventions to prevent or reduce teenage pregnancies.

Evidence for interventions aimed at individuals

No systematic reviews were identified

Evidence summary for interventions aimed at communities

Eight systematic reviews evaluated interventions related to sexual risk-taking among young people. Four of these focused on the reduction or prevention of HIV or other STIs and four evaluated sexual health promotion and the reduction or prevention of teenage pregnancies. There was a range of quality of reviews in this section and the majority of the authors commented on the poor quality of existing studies, which made the process of synthesising evidence difficult. However, there are some clear lessons to be learned.

Firstly, in the area of risk reduction and prevention programmes, there is evidence that interventions are most effective in promoting the uptake of condom use, with some success in reducing the number of sexual partners and the frequency of sex. The section related to teenage pregnancy and sexual health provides additional evidence that interventions that seek to promote the use of contraception were more effective than interventions that promote abstinence. There was a single study of counselling to prevent or reduce teenage pregnancies, but the authors found that the available evidence was of such poor quality that they were unable to reach any conclusions as to effectiveness. Clearly there is a need for further research in this area, which we discuss further in section 3.7.

Evidence statements for interventions aimed at communities

There is evidence of variable quality (1-, C) that school-based abstinence versus abstinence plus contraceptive advice interventions have little or no effect on the sexual behaviour of young people, although these interventions show an effect on knowledge and use of contraceptives.

There is evidence of good quality (1++, C), which shows no effect of pregnancy reduction interventions and also no effect on delaying the initiation of sexual intercourse or increasing the use of contraception by young people of either gender.

There is evidence of a negative effect of the intervention to increase the rate of pregnancy among the partners of young men in the abstinence programmes.

There is evidence of variable quality (1&2-, C), which shows a lack of evidence for the effectiveness of counselling in clinical settings to prevent unintended teenage pregnancy.

There is evidence of good quality (1+, C), which shows a positive effect of HIV risk reduction interventions for sexual risk taking in young people.

There is evidence of good quality (1&2++, C), which shows a positive effect of sexual health promotion interventions on improving condom use and reduction in both frequency of sex and number of sexual partners in adolescents to protect against STIs.

There is evidence of variable quality (1&2-, C), which shows a positive effect of sexual risk-reduction interventions on the sexual risk behaviour of sexually experienced adolescents, particularly the risk of having unprotected sex.

There is evidence of variable quality (1&2-, C), which shows mixed effects (both positive and adverse effects) of sexual risk reduction interventions on the sexual risk behaviour of adolescents.

There is evidence of variable quality (1-, C), which shows an effect of gender specific HIV risk reduction interventions for sexual risk taking in young women.

Evidence for interventions aimed at populations

No systematic reviews were identified

3.2 What is the evidence for effectiveness of interventions to change *knowledge* related to health behaviours, at what level (individual / community / population), and for which population groups (e.g. young people, pregnant women, elderly)?

Seven reviews were identified as being relevant to this section. Because of the assumed nature of the relationship between knowledge and behaviours, many of the reviews and studies below also appear elsewhere in this report. For instance, many studies used educational interventions (thereby increasing knowledge) but measured outcomes in terms of changes in behaviour. This section is therefore restricted to reporting only data that was clearly separated from behaviour change data.

Evidence Summary

Although there are many reviews in these areas that report on behaviour change, it is less common for these studies to make changes in knowledge one of their outcome measures. There was only one variable quality review related to physical activity, which showed that mass media interventions influenced short-term recall of physical

activity messages. There were two good quality reviews on healthy eating. One showed evidence of effectiveness in promoting knowledge of healthy eating in the 1-5 year old age group. Most studies within this review demonstrated some positive effect on nutrition knowledge, which was enhanced by including parents in educational sessions. The other showed some evidence of effect in increasing knowledge of nutrition in pregnant women. There were three variable quality reviews related to sexual risk taking among young people. Two of the studies were school-based educational interventions that found an effect on increased knowledge of sexual health (STI's and contraception). The other setting was clinically based and found that there was insufficient evidence regarding the effectiveness of counselling on teenage pregnancy, but there was an increase in knowledge of contraception. Over 80% of programmes measuring contraceptive knowledge showed an increase at follow-up. One review found that school based interventions could improve knowledge of the implications of illicit drug use. There were no reviews that clearly reported changes in knowledge related to either smoking and tobacco use or alcohol misuse.

Evidence Statements

There is evidence of variable quality (2-, A), which shows an effect of mass media interventions in changing knowledge of physical activity messages in the short term among those aged between 16-65 years.

There is evidence of good quality (1&2+, A), which shows an effect on knowledge of interventions to promote healthy diets in children aged 1-5 years.

There is evidence of good quality (1&2+, A), which shows a positive effect of interventions to promote pregnant women's knowledge of healthy eating.

There was evidence of good quality (1&2++, A) that shows a positive effect of school based interventions on knowledge of the negative consequences of illicit drug use.

There was evidence of variable quality (1&2-, D), which shows an effect of sexual health education interventions in schools for positive increases in sexual health knowledge among young people.

There was evidence of variable quality (1&2-, C), which shows an effect of counselling in the clinical setting to increase knowledge of STIs and contraceptives among young people.

There was evidence of variable quality (1-, C), which shows an effect of school-based contraceptive education on young people's knowledge of contraceptives.

3.3 What is the evidence for effectiveness of interventions to change *attitudes* related to health behaviours, at what level (individual / community / population), and for which population groups (e.g. young people, pregnant women, and older people)?

In the same way that findings on knowledge change were limited by its conceptualised relationship with behaviour, we found only three systematic reviews

that explicitly explored a change in attitudes related to interventions in the six health behaviours. The reviews below all appear elsewhere in the report under other research questions, therefore only the data relevant to attitude change is reported here.

Evidence Summary

Only three systematic reviews reported data relevant to this section: two on healthy eating and the other on smoking. All were good quality reviews. One healthy eating review found a positive change in attitudes towards healthy eating in pregnant women and women of child bearing age. Another healthy eating review found inconclusive evidence for curriculum based interventions to promote a change in attitudes in children. A mass media intervention showed that it was effective in changing attitudes towards smoking in young people. There were no reviews relevant to changing attitudes towards physical activity, alcohol misuse, illicit drug use and sexual risk taking among young people.

Evidence Statements

There is evidence of good quality (1&2+, A), which shows an effect of interventions to promote positive attitudes towards healthy eating among women.

There is evidence of good quality (1&2+, B), which shows an inconclusive effect of interventions to promote positive attitudes towards healthy eating among school children.

There is evidence of good quality (1&2+, C), which shows an effect of mass media interventions on attitudes towards smoking and intentions to smoke among young people under 25 years.

3.4 Is there any evidence to suggest that some interventions are effective / ineffective across the range of health behaviours?

Many of the interventions included in this review were behaviour specific – e.g. aversion therapy for smoking cessation, tobacco bans, and drink driver related interventions. However, there were a few interventions that were used across the behaviours such as counselling and physician advice, and motivational interventions. Mass media interventions were also used to promote behaviour change/encourage positive behaviour across several of the behaviours.

Effective

Individual level interventions

Interventions aimed at pregnant women (e.g. smoking cessation, nutritional advice, or exercise) show some evidence of effectiveness.

Physician advice or counselling was effective for smoking cessation, reducing alcohol consumption and promoting healthy eating.

Counselling interventions appear to have an effect in tobacco cessation and alcohol consumption, but the evidence was inconclusive for preventing unwanted pregnancies, and there was no evidence of effect for illicit drug use.

Community level interventions

School based approaches show some effectiveness across all of the health behaviours.

Workplace interventions may have an effect on smoking cessation, and promoting healthy eating and exercise. It is not known whether they are effective for other health behaviours such as alcohol misuse and illicit drug use.

Population level interventions

Mass media interventions show a small to moderate effect in changing knowledge, attitudes and behaviour across a range of activities such as tobacco use, physical exercise, drink driving and riding with drink drivers, and healthy eating.

Legislative and policy interventions such as minimum age drinking laws and smoking bans show some effect.

Inconclusive

Motivational interventions and biomarker feedback have inconclusive evidence of effectiveness for smoking cessation and physical activity.

Ineffective

Hypnotherapy was not found to be effective for smoking cessation.

Stage based approaches are not effective in either smoking cessation or the promotion of physical activity.

3.5. What is the evidence for the effectiveness of different models / theoretical approaches in changing behaviour, attitudes or knowledge?

Evidence Summary

Two reviews evaluated the effectiveness of interventions based on models of health behaviour, and four evaluated the differential effectiveness of school based approaches for substance use (tobacco, alcohol and illicit drugs) and sexual risk taking. There was a lack of evidence to support conclusions regarding the efficacy of models or theories related to changing knowledge, attitudes or behaviour. There was one variable quality review that concluded there was insufficient evidence to evaluate the trans-theoretical model in relation to smoking cessation interventions. Another review of good quality provided evidence that when applied to interventions promoting physical activity, the trans-theoretical model demonstrated effectiveness in the short term.

School based approaches to preventing smoking, alcohol, drug and sexual risk taking include information giving, teaching social skills and competencies (e.g. refusal skills) and mixed approaches. Programmes with positive effects focused on skills that reduce specific sexual risk behaviours. The evidence base of primary studies is poor, but there is some indication that knowledge based approaches may not be effective, and there is inconclusive evidence that skills based approaches may be effective.

Evidence Statements

There is evidence of variable quality (1&2-, C), which shows insufficient evidence to make any statements regarding the effectiveness of the trans-theoretical model applied to interventions in smoking cessation.

There is evidence from two reviews (1&2+, A; 2-, A), which shows a short term effect of interventions based on the trans-theoretical model for promoting physical activity. There is little evidence of effect over the longer term (more than 6 months).

There is evidence of good quality (1+, A) directly relevant to the UK school population that shows a lack of evidence about the effectiveness of combinations of social influences and social competence approaches for preventing smoking. There is also limited evidence about the effectiveness of multi-modal approaches including community initiatives.

There is evidence of good quality (1&2+, A) that shows no conclusive evidence of the effectiveness of different school based approaches for preventing alcohol use.

There is evidence of good quality (1&2++, A) that shows inconclusive evidence for the effectiveness of different school based approaches for preventing illicit drug use.

There is evidence of variable quality (1&2-, C), which shows an effect of interventions based on a range of theories or models applied to sexual risk taking among adolescents.

3.6. What is the evidence for the effectiveness of interventions in targeting health inequalities within particular population sub-groups?

Our review of reviews found no evidence that was substantial enough to provide data on inequalities related to the following:

- Inequalities in smoking and tobacco use; physical activity; alcohol misuse; healthy eating; illicit drug use; and sexual risk taking among young people.
- Inequalities in access to interventions to promote change in attitude, knowledge or behaviour
- Inequalities in recruitment to interventions of 'hard to reach' groups
- Inequalities in outcomes of interventions

As stated in the background to this report, inequalities might include a range of socio-economic factors including:

- Unemployed/income level
- Gender
- Age
- Location (e.g. greater inequalities in health related to rural rather than urban dwellers)
- Education
- Mobility
- Ethnicity

The above are simply an illustration of some of the social determinants of health, and are not meant to be a comprehensive list. Furthermore, this is a simplification of a complex topic, since many of these areas cross-cut (e.g. lower income, ethnic minority, older person), and in any case, are subject to debates over adequate definitions.

One final point to note is that both experiences of health and illness, as well as incidences of illness tend to cluster within lower socio-economic groups¹. This means that it is even more crucial that those conducting systematic reviews (as well as those designing interventions) make health inequalities a central concern.

Evidence for interventions specifically targeting health inequalities

No systematic reviews included sufficient data about health inequalities to inform evidence regarding health inequalities within population sub-groups.

3.7 What are the gaps in the evidence base?

In the course of preparing this report, a number of gaps in the evidence at systematic review level have been identified. It was outside the scope of our review of reviews to determine whether this correspond to gaps in primary data, or whether this is simply a reflection of the research priorities/questions of previous reviews. Given the importance of socio-economic factors on experiences of health, illness and their impact on morbidity (as well as mortality), it is crucial that interventions designed to improve health take account of those very factors that may work against positive outcomes. This is one of the most significant gaps in the evidence base revealed by this review of reviews. Other gaps in the evidence base are:

Summary of Evidence Gaps

Q.1. Evaluations of interventions to effect behaviour change

¹ See for instance: Whitehead, M. 1990. The concepts and principles of equity and health. Copenhagen: WHO Discussion Paper.

Pickett, K.E. & Pearl, M. 2001. Multilevel analyses of neighbourhood socioeconomic context and health outcomes: a critical review. *Journal of Epidemiology and Community Health* 55: 111-122.

Smoking Cessation

There are no reviews that focus on smoking cessation or reduction in older people.

Alcohol Misuse

There are no reviews that target evaluations of interventions to reduce / prevent alcohol misuse in older people or within workplace settings.

Healthy Eating

There are no reviews that target population level interventions to promote healthy eating.

Illicit Drug Use

There are no high quality reviews that evaluate the effectiveness of interventions to prevent illicit drug misuse with pregnant women.

There are no high quality reviews that evaluate the effectiveness of interventions to prevent illicit drug misuse with adults at the individual or community level.

There are no high quality reviews that evaluate the effectiveness of interventions to prevent illicit drug misuse with older people at the individual or community level.

There are no evaluations of interventions to prevent illicit drug misuse at the population level.

Q.2. Evaluations of interventions to effect changes in knowledge

There are no reviews that evaluate the effectiveness of interventions to effect change in knowledge related to tobacco use, alcohol misuse or illicit drug use at either the individual, community or population levels.

Q.3. Evaluations of interventions to effect changes in attitude

There are no reviews that evaluate the effectiveness of interventions to effect change in attitude related to alcohol misuse, illicit drug use, physical activity or sexual risk taking among young people at either the individual, community or population levels.

Q.4. Evaluations of interventions to effect positive changes with reference to health inequalities

There is a lack of reviews that explore the effectiveness of interventions according to socio-economic or cultural differences. This would include studies of effectiveness according to gender, age, ethnicity, social class, and so on.

There are no reviews that evaluate the effectiveness of interventions which address the interconnectedness of negative health behaviours (e.g. alcohol and tobacco use).

There are no reviews of inequalities in smoking and tobacco use; physical activity; alcohol misuse; healthy eating; illicit drug use; and sexual risk taking among young people.

There are no reviews of inequalities in access to interventions to promote change in attitude, knowledge or behaviour

There are no reviews of inequalities in recruitment to interventions of 'hard to reach' groups (e.g. ethnic minorities, socially and economically disadvantaged)

There are no reviews of inequalities in outcomes of interventions

Q.5. Evaluations of interventions to effect positive changes with reference to theoretical models or approaches

There is a lack of reviews that evaluate the effectiveness of particular theoretical models or approaches underpinning interventions aiming to change knowledge, attitudes or behaviours in health.

MAIN REPORT

1. Background

1.1. Knowledge, attitudes, behaviours and health

Many attempts to improve and develop public health are founded on the assumption that there are links between health knowledge, health attitudes, health behaviours and health outcomes. Sometimes it is assumed that there are direct causal relationships between these, but other commentators see the links as more tenuous. Many public health interventions – whether they focus on the individual, community, whole populations or the environment – seek in some way to change knowledge, attitudes and/or behaviours in relation to health, in order to influence health outcomes¹.

It is well established^{2,3,4,5} that some interventions aimed at influencing attitudes, beliefs and behaviours – particularly in the areas of sexual health and nutrition – tend to be more effective when they are planned and delivered within the framework of a considered theoretical approach. There are many models and approaches within public health and related disciplines (including health psychology, and the sociology of health and medicine) that attempt to articulate the relationships between these factors and predict behavioural outcomes (for example, the Health Belief Model⁶ and the Theory of Reasoned Action⁷).

However, many of these models and approaches have been criticised for their inability to consider the context and environment within which health is experienced and enacted⁸. It is far from clear which theoretical model(s) or approaches are the more appropriate or effective, with whom, or in which circumstances – or indeed whether effectiveness is influenced by the model or approach itself or by the planning processes associated with adapting interventions to theoretical models and approaches⁹. Their ability to predict health behaviours and outcomes has also been called into question¹⁰.

In this review we have paid particular attention to the need to provide an evidence base for the effectiveness or otherwise of the different theoretical models or approaches and where possible, have extracted data and synthesised it under appropriate headings (see section 3.5). However, as we discuss in section 3.7 there are substantial gaps in the evidence base in this area.

1.2. Health beliefs and behaviours in context

Health is experienced, and produced, at a number of different levels. In this review we have focused in particular on the effectiveness of interventions at the individual, community and population levels. While on the surface it may seem obvious what these terms mean, in fact on closer inspection they require definition. For instance, while interventions may target individuals, they might nevertheless be within ‘community-based’ interventions or within group counselling sessions. The review team therefore found it necessary to be clear about the definitions of these different levels for the purposes of data extraction and synthesis. The levels have been defined according to the units of randomisation as follows:

- Individual level — randomising or allocating targeted individuals to treatment or control
- Community level — allocating schools or workplaces (or other community settings) to different interventions
- Population level — targeting the whole population without targeting specific groups, settings or individuals — e.g. mass media interventions

Health from the individual to the community: individual

People experience health and health outcomes (positive or negative) at an individual level, through their bodily symptoms and sensations. An individual's sense of good or bad health, the actions they take as a consequence of their perceptions, and their knowledge, beliefs and attitudes, are produced by an interaction between individual biological factors and predispositions and the external world. These factors exert differential influence between individuals, depending on their life experiences, the resources available to them, and their context. In experiencing conscious life, people engage day-to-day in creating their own 'life-worlds' or constellation of things that are important to them and make up their daily 'reality'. Their experience of health and illness, and their ability to change, will at least in part be influenced by their 'life-world' and the salience that people attach to different outcomes and behaviours.

A number of different health promotion and public health approaches target individuals at this level, in order to try and influence attitudes, beliefs, and ultimately behaviours. For example:

- primary care-based brief interventions aimed at influencing individual drinking behaviour or promoting smoking cessation
- individual-oriented interventions to influence dietary behaviour and/or increase physical activity and so reduce levels of obesity.

Health from the individual to the community: community

Communities respond as a group to contexts, environments, vulnerabilities and shared (or different) behaviours and exhibit community-level health outcomes. Community-level health outcomes can be measured through the identification and monitoring of community-level health 'indicators', such as local availability of healthy food, the assessment of community morbidity and mortality using geographical information systems, or the presence and number of smoke-free workplace policies. Some health promotion and public health programmes and interventions attempt to influence health attitudes, beliefs and behaviours at this level by altering community-level structures and opportunities. Examples of community-level public health interventions are the provision of free leisure facilities within a community for the promotion of physical activity or a neighbourhood road safety scheme. Other examples of interventions at this level include:

- school- or workplace-based policies, programmes and interventions (aimed at the whole school/workforce)
- local enforcement of national legislation (for example, prevention of sale of tobacco products to underage children)
- area-based community and regeneration programmes and initiatives (for example, health action zones and New Deal for Communities),

Health from the individual to the community: populations

Whole populations, like communities, also exhibit health behaviours and outcomes – expressed through population trends and mortality and morbidity statistics. At this level, it is usually possible to measure the different beliefs, attitudes and outcomes experienced by groups within a population (for example, the differences between men and women, or between different ethnic groups) and to ascertain how (if at all) these differ from the ‘average’. Sometimes it is possible to use statistics taken at this level in order to understand why health outcomes might be different within populations (for example, the effect of average dietary habits of different ethnic groups on rates of coronary heart disease). Sometimes relationships and explanations are not so clear. Interventions aimed at the whole population tend to focus on altering legislation and macro-level policy in order to influence knowledge, behaviours and/or attitudes and ultimately health outcomes. Examples of public health interventions at this level include:

- legislation to make seatbelt-wearing compulsory
- introduction of speed limits and the use of safety cameras
- introduction of specific health and welfare policies to influence health behaviours and outcomes in school-age children (for example, school meals standards).

Interaction and impact across levels

Just as it is possible to intervene at a number of different levels, so it is probable that whatever ‘level’ an intervention targets its impact may be assessed across the other levels. For example, when planning a brief intervention to influence alcohol consumption among individuals attending primary care, one would hope to be able to evaluate its impact, in the long term, at individual, community and (ultimately) population level (see below).

A range of different social and environmental resources are available to individuals, communities and populations to use at different life stages, and it may be the use of these resources that promotes ‘resilience’ to ill health in otherwise vulnerable people. Such resources include social capital (a resource based on trust and reciprocity that exists within communities and appears to promote better health outcomes¹¹) and other assets for health.

Interventions aimed at individuals, communities and populations may also have an impact at levels other than the intervention point: for example, individuals may benefit (or be harmed by) a community level intervention. An example of this is the creation of a new play area, which may benefit young residents’ physical health, but at the same time, may increase levels of accidental injury and falls. A broader example would be the dietary recommendation to increase the consumption of fish to two portions each week, one of which should be an oily fish. This may have health benefits for the population, but environmental concerns have been raised about the impact of such increases in consumption on existing fish stocks.

This rapid review will therefore consider the effectiveness of different approaches and models aimed at changing knowledge, attitudes and behaviours related to health outcomes, which operate at individual, community and population level.

Life-course and intervention

Health and illness are experienced throughout the life-course, and the way in which they are experienced by the individual is produced through interplay of biological, psychological and social and economic factors. Key life changes and transition points render individuals, communities or populations particularly vulnerable to negative health outcomes^{12, 13,14,15,16,17,18}. Life changes and transitions present unique prospects for intervention and positive change at some or all of the levels described above. These transition points are also times when people are more likely to be in contact with services.

Examples of these life transition points include:

- preconception and planning pregnancy
- pregnancy and first-time parenthood
- the first year of life
- starting pre-school education (age 3)
- starting primary education (age 4+)
- age 7 (this age has been shown to be influential in terms of the relationship between educational achievement and health outcomes¹⁹)
- age 11/beginning secondary education (as above)
- becoming sexually active/first long-term relationship
- end of secondary education (ages 16, 18)
- entry to tertiary education
- start of paid employment
- marriage/long-term relationships (for example, research on health outcomes for married/partnered men/women)
- menopause and mid-life
- end of dependent parenting
- divorce/relationship breakdown
- redundancy/unemployment
- early onset of chronic disease
- retirement/end of paid employment
- later life (55+)
- engagement in caring for older dependents
- death and dying.

Other approaches to life-course work consider the accumulation of ‘advantages’ and ‘deficits’ over the life-course as the key to identifying ‘turning points’ or points of intervention.

This review aimed to consider the opportunities, impacts and consequences of intervention at these transition points or turning points in the life trajectory, for individuals, communities and populations, in order to discover whether these are indeed the most useful points to intervene to change behaviour. However, limited evidence at the above transition points meant that we were obliged to concentrate on life stages more broadly within the three main areas:

- Children and young people — in this review defined as including infants, children and young people up to the age of 20 years old.

- Adults — with pregnant women as a sub-group (unless they fall into the category above)
- Older people — as reported or defined in the literature, but usually assumed to be post-retirement at over 65 years of age.

Socioeconomic determinants of health crosscut both the different levels of interventions and different stages of the life course. While we also aimed to pay close attention to data on health inequalities and socioeconomic determinants of health, we found that this area represented another substantial gap in the literature, which we explore further in section 3.7. Health inequalities include issues of differential access to or experiences of health care as well as measurable inequalities in health and illness related to, for instance:

- Gender
- Age
- Locality — the impact on geographical location on access to health services; the prevalence of illness clusters in specific communities
- Ethnicity
- Social class
- Employment
- Mobility and access to transport
- Education

These areas were explored most famously in ‘The Black Report’ of the 1980’s²⁰ and more recently by papers produced by the Department of Health²¹, the King’s Fund²² and a government sponsored inquiry into health inequalities chaired by Sir Donald Acheson²³. It is over nine years since Macintyre published a critique of the various models of health inequalities suggested in the Black Report and suggested a need for further research on the interventions used to reduce health inequalities²⁴. Our review confirms that this need has not yet been met and we highlight the gaps in the evidence related to health inequalities and the effectiveness of interventions to promote changes in knowledge, attitudes or behaviour (see section 3.7).

1.3. Aims and objectives of the review

The aim of this review is to bring together a large body of evidence, and provide a critical and structured overview (including recommendations) of the effectiveness of interventions and models to change attitudes, knowledge and behaviours. The six health behaviours considered in this review are:

- Tobacco use
- Alcohol drinking (but not alcohol dependency)
- Physical activity
- Healthy eating (but not diet for weight loss)
- Illicit drug use (but not drug dependency)
- Sexual risk taking in young people

The objectives are to evaluate:

- Which are the most effective interventions to change knowledge, attitudes and health behaviours in each of these six areas?

- Is there any evidence to suggest that some interventions are effective / ineffective across the range of health behaviours?
- Which are the most effective models and approaches used in these interventions?
- What is the evidence for the effectiveness of interventions in targeting health inequalities within particular population sub-groups?
- What are the gaps in the evidence base?

2. Methodology

This document is a ‘review of reviews.’ Our aim was to systematically collate, rate and synthesise review-level findings on the effectiveness of interventions to change health behaviours, to provide researchers, policy and decision-makers, and practitioners with accessible, good quality evidence in these topic areas. Reviews – literature reviews, systematic reviews of effectiveness, meta-analyses and so on – are known as ‘secondary’ data sources because they have collated and interpreted original studies (such as evaluations or clinical trials or primary data), and provided an interpretive overview of the collated findings²⁵. The rating system that we have used (see section 2.3) prioritises reviews that have a transparent and replicable data search, methodology and analysis.

In order to complete the review within the given timeframe a stepwise approach was developed. The aim of this approach was to identify all the high quality reviews, and map these against the areas of interest. Where gaps existed, a second search would be undertaken to identify other reviews or high quality primary studies undertaken in the UK. If this did not reveal UK studies, then a third search would be undertaken to identify non-UK studies. However, due to the large numbers of high quality reviews in this area, we were unable to pursue the search for primary studies. Following the steps illustrated in Figure 1, we stopped at Step 2.

Figure 1 illustrates the step wise approach for searching for studies and reviews. Based on this, the evidence included in this review is:

- a) Cochrane reviews and systematic reviews in DARE (identified in step 1.)
- b) Other good quality reviews which have a low risk of bias (also identified in step 1.)
- c) Variable quality reviews in areas where no other evidence exists (identified in step 2.)

Figure 1. Step-wise approach to synthesising the research evidence

Step 1| Search for high quality reviews (Cochrane, DARE 1995-2006)

Identify areas where no such evidence exists.

Step 2| Search for lesser quality reviews (other databases and internet search)

Identify areas where no such evidence exists.

Step 3| Search for RCTs or if not applicable other evidence

Identify areas where no such evidence exists.

Step 4| Identify all areas where no evidence exists

High quality reviews include Cochrane reviews and reviews in the Database of Abstracts of Reviews of Effectiveness (DARE). Cochrane reviews follow a strict protocol that ensures that only reviews of high quality are published in the Cochrane Library. These reviews follow a process that has been developed over time to become a standard that is recognised internationally as the most rigorous and produces highly

reliable evidence with the minimum of bias. DARE includes published and unpublished systematic reviews that have been assessed according to strict quality criteria by the Centre for Reviews and Dissemination (CRD) in York, UK. DARE represents an excellent resource for rapid reviewers since it includes quality assessed systematic reviews sourced by monthly searches of a wide range of electronic databases including MEDLINE, CINAHL, ERIC, BIOSIS Previews, Allied and Alternative Medicine (AMED), PsycINFO, EMBASE, ASSIA, Social Policy & Practice, Social Services Abstracts, Sociological Abstracts, and the Social Science Citation Index. This is supplemented by handsearching a wide range of journals, relevant websites and sources of grey literature.

In areas where no quality-assessed reviews have been undertaken, other good quality reviews were included. Indeed, we accessed another source of reviews by contacting CRD to have our searches run on their working DARE databases that are not normally accessible to the public. A further search of the internet was made to explore other potential sources that may have been missed. This resulted in a further four reviews sourced on the Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre) website ². As a final check to reveal what more recent reviews might be missed through this strategy, we also ran searches on a range of OVID databases — further details are provided in section 2.1.

Although ‘reviews of reviews’ are a useful way of bring together a large body of evidence, and looking at broad questions, several limitations need to be acknowledged. Firstly, reviews do not always compare the same thing – some reviews examine outcome data studies, others look at more prospective studies (some consider both) – so interpretation of what is found is complicated by the state of the data pool. Secondly, some of the high quality reviews might contain poor quality evidence, because that is all that is available. Thirdly, some of the reviews might overlap, and include the same studies. Fourthly, even though no reviews have been done in a particular area (e.g. mass media interventions for preventing illicit drug use), this does not mean that there is not a large body of good primary evidence on that topic. Finally, when looking at the evidence in reviews, we may be limited by the questions that the review authors have decided are important. These may not be the same questions as we think are important.

2.1. Literature Search

The Cochrane Database of Systematic Reviews (CDSR) and DARE were searched from 1995 to present using broad search terms in order to capture all of the relevant reviews. Although these were combined searches, a separate search was conducted on each of the health behaviours in order to simplify what otherwise would have been extremely complex searches. The search terms included the following (see Appendix 2 for full search histories):

- tobacco, tobacco smoking, tobacco use cessation, smoking, smoking cessation, nicotine, nicotine addiction, cigarette, cigarette smoking, smoking prevention
- alcohol, alcohol drinking, alcohol consumption, alcohol abuse, alcohol misuse, alcohol-related disorders, alcohol intoxication, temperance

² EPPI-Centre url: <http://eppi.ioe.ac.uk/EPPIWeb/home.aspx>

- exercise, activity promotion, aerobic exercise, physical fitness, physical activity
- nutrition, diet, dietary fibre, weight control, weight reduction programmes , diet therapy, diet reducing, weight management/loss,
- sexual risk taking, sex behavior, HIV-infection, AIDS, sexually transmitted disease, sex-education, teenage pregnancy, pregnancy in adolescence, sexual health, sexual health education
- substance abuse prevention, drug abuse, drug misuse, substance abuse, substance misuse.

As The Cochrane Library only includes systematic reviews, reviews or RCTs and these are grouped in separate databases, no further search terms were required to restrict the search. The same search strings were run on the DARE ‘working’ database (i.e. reviews identified by DARE as potentially meeting their inclusion criteria, but not yet published on DARE).

Finally, these searches were run on the OVID databases: AMED, ERIC, CinAHL, Embase, Medline, and PsycINFO for each of the six public health topics. The following limits were applied:

- English language
- With abstract
- Years 2004 to March 2006

These searches were restricted by terms including ‘meta-analysis’, ‘evidence-based review’ or ‘systematic review’. These full search histories are also listed in Appendix 2. Although a total of 31 references were found that had not already been captured by the previous searches, only four of these were found to address gaps in our evidence when mapped against the included reference list. These four references were added to the final review.

2.2. Selection of reviews for inclusion

Two sets of inclusion / exclusion criteria were applied in the selection process. Those criteria which applied across all the health behaviours; and those criteria specific to particular health behaviours.

B. Inclusion and exclusion criteria which applied across the health behaviours

<i>Inclusion Criteria</i>
1. Systematic reviews and meta-analyses
2. English language publications only
3. Focus on public health, health promotion (or related research) or primary care led interventions which contained an educational and/or behavioural component
4. Year of publication limited to 1995-2006 (reviews published before 1995 are unlikely to reflect the current evidence)
<i>Exclusion Criteria</i>
8. Reviews of health screening
9. Reviews of psychiatric interventions as part of treatment of those with mental illness
10. Reviews of interventions with only a clinical or pharmacological focus (e.g. reducing risk of heart disease, diet for diabetes care etc).
11. Reviews of interventions carried out within secondary or tertiary care
12. Reviews of drug interventions
13. Reviews of interventions which did not contain a behavioural/educational component to the intervention
14. Reviews of interventions which did not have the aim of changing any of the six health behaviours

B. Inclusion and exclusion criteria for each health behaviour

The following table summarises the inclusion and exclusion criteria for each of the health behaviours. Interventions aimed at either preventing or delaying onset of the health behaviour (e.g. smoking, alcohol use) were included, as well as those aimed at helping people to change an existing behaviour, such as smoking. However, interventions aimed at treating alcohol or drug dependency were not included.

Health Behaviour	Population	*Intervention	*Exclusions	Outcomes
<i>Smoking</i>	Smokers Those with raised risk (e.g. pregnant women) General population	Interventions with a behavioural or educational component; advertising / media campaign; smoke free policies; other (to promote the outcomes)	Nicotine replacement therapy; other drug therapies; acupuncture; interventions aimed at treatment of smoking-related illness	Change in knowledge, attitudes and behaviours Smoking cessation; smoking prevention
<i>Alcohol misuse</i>	Problem drinkers Those with raised risk (e.g. pregnant women,) General population	Interventions with a behavioural or educational component; advertising / media campaign; interventions to reduce drink driving; other (to promote the outcomes)	Programmes to maintain abstinence; reviews of those with alcohol dependence	Change in knowledge, attitudes and behaviours Prevent / reduce alcohol consumption; prevent / reduce drink driving; promote moderate drinking
<i>Exercise</i>	Those with raised risk (e.g. overweight, sedentary or pregnant) General population	Interventions with a behavioural or educational component; advertising / media campaign; other (to promote the outcomes)	Interventions aimed at treating health problems (e.g. arthritis, back pain and intermittent claudication)	Change in knowledge, attitudes and behaviours Prevention of health problems related to sedentary lifestyle; increased uptake of exercise; increase in exercise levels
<i>Diet</i>	General population	Interventions with a behavioural or educational component; advertising / media campaign; other (to promote the outcomes);	Interventions aiming only to reduce risk factors (blood pressure; hypertension); population with a chronic disease (e.g. those with diabetes or heart disease) Weight loss diets without a behavioural/educational component	Change in knowledge, attitudes and behaviours Dietary change
<i>Illicit drug use</i>	General population	Interventions with a behavioural or educational component; advertising / media campaign; other (to promote the outcomes)	Interventions aimed at illicit drug mis-users (i.e. those with a dependency on illicit drugs)	Change in knowledge, attitudes and behaviours Prevention of illicit drug use
<i>Sexual risk taking in young people</i>	Young people	Interventions with a behavioural or educational component; advertising / media campaign; other (to promote the outcomes)	Interventions aimed at sexual risk takers (e.g. treatments for STIs; pregnancy counselling)	Change in knowledge, attitudes and behaviours Reduction of sexual risk taking; reduction of STIs; reduction of teenage pregnancy rates

Applying the inclusion/exclusion criteria

All references retrieved from the searches were downloaded into Reference Manager (v11). Applying the inclusion/exclusion criteria was undertaken in stages. Appendix 3 details the results at each stage in the process of applying the inclusion/exclusion criteria and illustrates the review process.

Stage 1. Titles and abstracts were screened independently by two reviewers. Reviews were excluded on the basis of title or abstract if they did not primarily meet the inclusion criteria. Reviews were also excluded at this stage if they were clearly not conducted systematically, and did not address the scope of the review. Any discrepancies in selections were discussed and an agreement reached.

Stage 2. Full copies of any reviews which appeared to meet the inclusion criteria were obtained, and re-screened for relevance.

Stage 3. Another stage of screening was pursued during a mapping exercise, where references were mapped into categories of evidence and two reviewers agreed to include or exclude further references based on the quality of the reviews and the date of publication. Since Cochrane reviews are usually the most comprehensive and of high quality, they were selected where possible if they were one of several reviews in a particular area. Other reviews were selected on the basis of most recent publication date and quality of the review. The results of the mapping exercise are reported in Appendix 4.

2.3. Quality appraisal

Potentially relevant reviews were assessed for quality using a checklist adapted from Appendix A.1 of the NICE 'Methods for the development of NICE public health guidance'. Reviews were graded both for the quality of the review itself (e.g. likelihood of bias) and for the type of evidence it was reviewing (e.g. RCTs or non-RCTs).

Bias scoring

Once data had been extracted on quality criteria, the quality of the reviews (in particular the likelihood of bias) was classified into three levels using guidance in the NICE 'Methods for the development of NICE public health guidance manual' (section A.2.10). However, because our inclusion criteria for this review (systematic reviews and meta-analyses) meant that only reviews of a relatively high quality (as opposed to non-systematic reviews) were included, we did modify this rating slightly. In particular, those that score a '-' were not necessarily poor quality; they just did not fulfil the criteria of a ++ or + rated review. Furthermore, the scoring system was set extremely high and since some authors did not fully report details of the review process (e.g. whether they consulted experts or restricted their searches to English language) they received a lesser score than they might have warranted if we had been able to clarify these details.

++	All or most of the criteria have been fulfilled. Where they have not been fulfilled the conclusions of review are thought very unlikely to alter.
+	Some of the criteria have been fulfilled. Where they have not been fulfilled, or described the conclusions of review are thought unlikely to alter.
-	Did not fulfil the criteria for a very high quality systematic review, and are of variable quality. Where they have not been fulfilled, or described, the conclusions of review are possibly likely to alter.

The criteria used to determine the classification of the three categories is shown in the table below. The criteria was considered to be not fulfilled, if this was clearly stated (e.g. restricted to English language papers only), if it was not described, or if not enough detail was provided to make a decision.

Criteria used to determine the potential for bias

Criteria	++	+
1. Was there a focused aim or research question?	Yes	Yes
2. Explicit inclusion / exclusion criteria	Yes	Yes
3. More than 1 assessor / selector	Yes	
4. Provide details of databases searched	Yes	Yes
5. Lists years searched	Yes	Yes
6. Followed up references in bibliographies	Yes	
7. Experts consulted for further sources		
8. Grey literature included / searched		
9. Specified search terms / strategy	Yes	Yes
10. Not restricted to English language papers only	Yes	
11. Quality assessed	Yes	Yes
12. Data supports conclusions	Yes	Yes

Notes:

- ++ must *at least* meet the 10 criterion indicated above.
- + must *at least* meet the 7 criterion indicated above.
- did not meet the 7 criterion necessary for + classification.

Evidence scoring

Reviews were also scored for the type of evidence included in the review

Classification	Type of evidence
1	Systematic reviews of RCTs
2	Systematic reviews of individual, non-RCTs, case-control studies, cohort studies, controlled before-and-after (CBA), interrupted time series (ITS), correlation studies
1&2	Systematic reviews of both RCTs and non-RCTs, case-control studies, cohort studies, controlled before-and-after (CBA), interrupted time series (ITS), correlation studies

The classification of bias (e.g. ++) was then combined with the type of evidence (e.g. 1) to give a level of evidence similar to that outlined in table 4.1 of the NICE 'Methods for the development of NICE public health guidance manual.' These are adapted from the Scottish Intercollegiate Guidelines Network (2001). The table (see over) was adapted and simplified to reflect the fact that only reviews (and not primary studies) were included.

Level of evidence	Type of evidence
1 ⁺⁺	High-quality meta-analyses or systematic reviews of RCTs with a very low risk of bias
1 ⁺	Well-conducted meta-analyses, systematic reviews of RCTs with a low risk of bias
1 ⁻	Meta-analyses or systematic reviews of RCTs with a variable risk of bias
2 ⁺⁺	High-quality systematic reviews of non-randomised controlled trials, case-control studies, cohort studies, controlled before-and-after (CBA), interrupted time series (ITS), correlation studies with a very low risk of bias
2 ⁺	Well-conducted systematic reviews of non-randomised controlled trials, case-control studies, cohort studies, controlled before-and-after (CBA), interrupted time series (ITS), correlation studies with a low risk of bias
2 ⁻	Systematic reviews of non-randomised controlled trials, case-control studies, cohort studies, controlled before-and-after (CBA), interrupted time series (ITS), correlation studies variable risk of bias
1&2 ⁺⁺	High-quality meta-analyses or systematic reviews of RCTs and non RCTs with a very low risk of bias
1&2 ⁺	Well-conducted meta-analyses or systematic reviews of RCTs and non RCTs with a low risk of bias
1&2 ⁻	Meta-analyses or systematic reviews of RCTs and non RCTs with a variable risk of bias

2.4. Study categorisation

Ninety-two reviews were included in this review. Of these, 87 were included in Question 1 and a further 5 were included in other questions (along with some of those in question 1.) As described in the previous section, reviews were assessed for their potential for bias. The table below shows the number of reviews fulfilling each of the criteria.

Percentage of total number of included reviews (n=92) meeting each of the criteria for bias

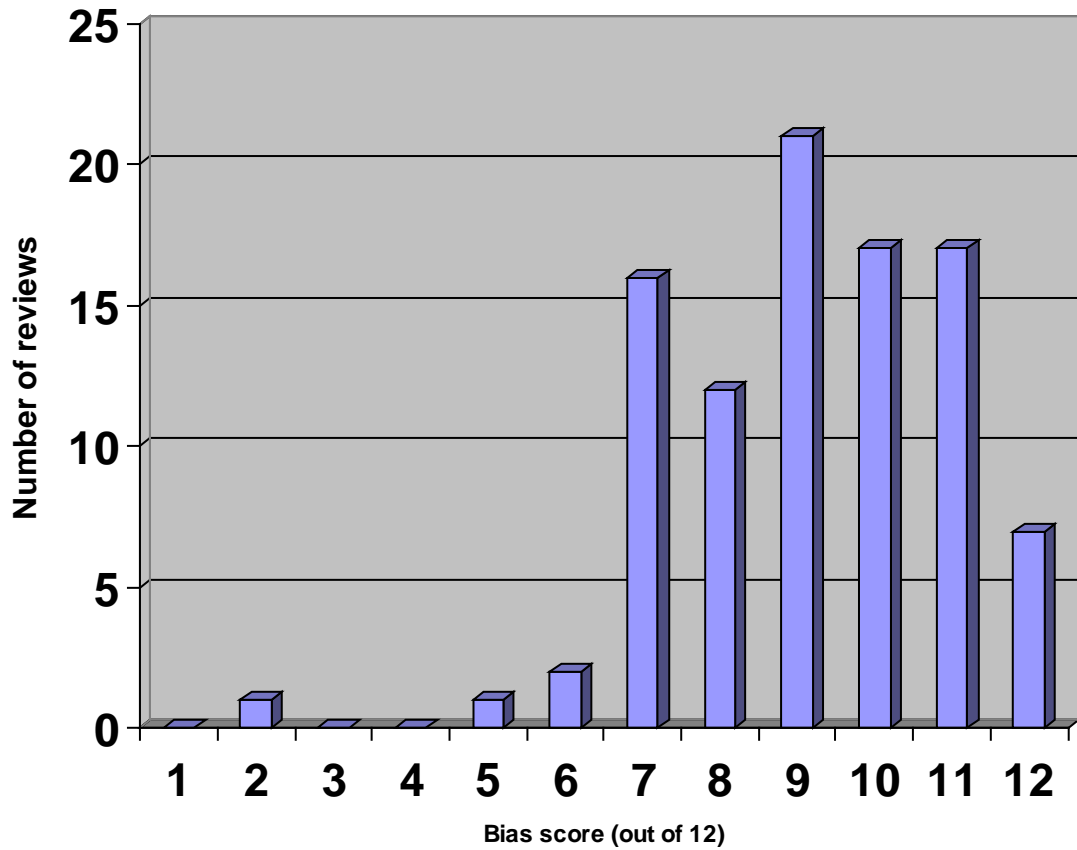
Criteria	n	%
1. Was there a focused aim or research question?	92	100%
2. Explicit inclusion / exclusion criteria	91	99%
3. More than 1 assessor / selector	55	60%
4. Provide details of databases searched	88	96%
5. Lists years searched	86	93%
6. Followed up references in bibliographies	78	85%
7. Experts consulted for further sources	45	49%
8. Grey literature included / searched	42	46%
9. Specified search terms / strategy	81	88%
10. Not restricted to English language papers only	22	24%
11. Quality assessed	70	76%
12. Data supports conclusions	88	96%

Notes: a score of zero was given if the ‘answer’ to the criteria was not stated (e.g. did not state if English language trials only), if we were unsure, or if it was clearly no.

From this table it can be seen that the criteria most commonly fulfilled were: having a focused research question or aim, explicit inclusion and exclusion criteria, providing details and years of the databases searches (and search strategies), following up references in databases and data supporting the conclusions. Over three quarters (76%) assessed the quality of the studies, but only 24% included non-English studies (one of the criteria for a ++ rating.).

The chart below shows the bias scores for the reviews. Reviews could potentially score between 0 (no criteria met) and 12 (all criteria met). Ninety reviews (98%) fulfilled six or more of the criteria, indicating that the quality of the reviews was relatively high. The other two fulfilled less than six of the criteria but were thought to add to the evidence base and therefore included.

Bias score for reviews



The following table shows how many reviews of particular study types were included under each health behaviour when the bias score was combined with the type of evidence.

Health Behaviour	High quality reviews			Well conducted reviews			Reviews of variable quality			Total
	1 ++	1&2 ++	2 ++	1 +	1&2 +	2 +	1 -	1&2 -	2 -	
Smoking	3	0	0	14	10	1	6	3	3	40
Alcohol	2	1	0	0	3	1	1	1	3	12
Physical Activity	5	1	1	0	5	1	2	1	1	17
Healthy eating	0	0	0	1	7	0	0	0	0	8
Illicit drug use	1	1	0	0	0	0	0	1	1	4
Sexual risk taking	1	1	0	1	0	0	2	3	0	8

Notes: columns could not be totalled because some reviews were included in more than one health behaviour

2.5. Assessing applicability

Each review was scored according to its likely relevance and applicability to the UK setting (see table below).

Relevance to the UK scoring

Score (A-D)	Description
A (directly relevant)	Review includes UK studies
B (probably relevant)	Review includes non-UK studies of interventions that would be most likely to equally apply to UK settings (e.g. exercise programmes)
C (possibly relevant)	Review includes non-UK studies that may have some application to UK settings but should be interpreted with caution. There may be strong cultural or institutional differences that would have impact on the effectiveness of the intervention if applied in the UK (e.g. psychosocial interventions)
D (not relevant)	Review includes non-UK studies that are clearly irrelevant to UK settings (e.g. legislation that would be unlikely to be implemented)

2.6. Data extraction & synthesis

Data were extracted from the reviews into an Access database by one of four people, and a sample checked by another member of the team. Data extraction was guided by the data extraction forms in Appendix D of the NICE ‘Methods for the development of NICE public health guidance manual’, although this was adapted to suit a review of reviews (see example in Appendix 7). No formal synthesis was undertaken as this was a review of reviews. Instead a narrative summary of the results was provided.

Evidence statements

Evidence statements were drawn up based on the level of evidence, the efficacy of the intervention and the applicability of the research question to the UK. They were based on the guidance in the NICE ‘Methods for the development of NICE public health guidance manual’ (section 4.4). Each evidence statement is comprised of two parts (a and b).

a) There is evidence of (good/ variable) quality (1++, A / 2-, C etc)..	<i>Quality of the review, the type of study design included in the review and relevance score</i>
b) ...which shows an effect/no effect/mixed (equivocal) effect/lack of evidence of intervention x for health behaviour y	<i>Effect of the intervention</i>

For example, ‘There is evidence of good quality (1++, A), that shows an effect of behavioural counselling interventions for problem drinkers.’

3. Summary Of Findings Based On Research Questions

The findings are divided into two sections. Section A explores the research questions within each health behaviour, while Section B engages with broader questions across all six of the health behaviours.

Section 4 consists of the evidence tables for the findings: summaries of studies used in addressing each area, listed by research question. Findings and details of interventions may be cross-checked with these tables.

Section A: Questions to be explored for each health behaviour

What is the evidence for the effectiveness of interventions to prevent, reduce, or promote *health behaviours*, at what level (individual / community / population), and for which population groups (e.g. young people, pregnant women, elderly)?

Eighty-seven separate systematic reviews are included in this section (some of these appear in several sections). These interventions had a different focus depending on the level of intervention. Individual level interventions were generally trying to change an existing behaviour (e.g. cigarette smoking or alcohol misuse), whilst the community and population level interventions were often more focused on promoting positive behaviours (e.g. healthy eating, exercise).

The remit of the review was to evaluate general interventions at individual, community and population level, aimed at changing health outcomes through behaviours. Therefore, although this section could have been presented in a number of ways, the most logical approach has been to organise it by behaviour, subdivided into the level of intervention (individual, community, population), and further sub-divided into population group. Subsequent questions evaluate which interventions may be effective across behaviours, populations and at different levels.

These levels relate to units of randomisation. For instance, a community level intervention might target one (or more) communities for an intervention and compare this to another community receiving no interventions, usual care or a related intervention. An example of areas that may appear less straight forward are in interventions such as those involving group counselling – this may be done at the individual level, where the comparison is with individuals who do not receive group counselling. In this report, one further area to draw to the reader's attention is that we have noted 'pregnant women' as a separate category who fall within the individual level interventions. While we are aware that there are many interventions involving pregnant women that take place at the community level, all of those included in this report were conducted at the individual level.

The table below shows how this section is organised.

Q.1 What is the evidence for effectiveness of interventions to prevent, reduce, or promote the health behaviours?	
3.1.1	Prevention of tobacco use, smoking cessation and reduction
3.1.1.1	<i>Interventions targeting individuals</i>
	Target population: all adults
	Target population: pregnant women
	Health professional led interventions at individual level
	Smokeless tobacco use
3.1.1.2	<i>Community level interventions</i>
	Interventions in the workplace
	Interventions in schools or colleges: children and young people
	Other community level interventions
3.1.1.2	<i>Population based interventions</i>
	Mass media interventions
	Legislative measures / tobacco control policies
3.1.2	Increasing or promoting the uptake of physical activity
3.1.2.1	<i>Interventions targeting individuals</i>
	Target population: all adults
	Target population: pregnant women
	Target population: older people
3.1.2.2	<i>Community level interventions</i>
	Interventions in the workplace
	Interventions in schools or colleges: children and young people
	Other community level interventions
3.1.2.3	<i>Population based interventions</i>
	Mass media interventions
	Environmental policy based interventions
3.1.3	Reducing alcohol misuse or postponing alcohol use
3.1.3.1	<i>Interventions targeting individuals</i>
	Target population: all adults
	Target population: pregnant women
	Target population: drink drivers or all drivers
3.1.3.2	<i>Community level interventions</i>
	Interventions in schools or colleges: children and young people
	Other community level interventions
3.1.3.3	<i>Population based interventions</i>
	Legislative and policy based interventions targeting young people
3.1.4	Promoting healthy eating
3.1.4.1	<i>Interventions targeting individuals</i>
	Healthy eating: all adults
	Target population: pregnant women
	Target population: older people
3.1.4.2	<i>Community level interventions</i>
	Interventions to promote healthy eating in children and young people
	Other community level interventions
3.1.4.3	<i>Population based interventions</i>
	Policy-based interventions targeting the total population

3.1.5	Preventing illicit drug use
3.1.5.1	<i>Interventions targeting individuals</i>
	Target population: all adults
	Target population: pregnant women
3.1.5.2	<i>Community level interventions</i>
	Interventions with children and young people
	Other community level interventions
3.1.6	Preventing sexual risk taking in young people
	Interventions to reduce or prevent HIV or other STI's
	Interventions aimed at sexual health and reduction of teenage pregnancies

3.1.1 Prevention of tobacco use, smoking cessation and reduction

40 systematic reviews evaluated interventions to aid smoking cessation, prevent relapse, or prevent people taking up smoking. Of these, 22 evaluated individual level interventions, 11 evaluated community level interventions, and 7 evaluated population level interventions.

3.1.1.1 Interventions targeting individuals

Twenty two systematic reviews evaluated interventions aimed at achieving positive changes in tobacco use in individuals. These changes included both smoking (and smokeless tobacco use) reduction and cessation. Fourteen of these evaluated smoking related interventions for the general adult population, two focused on interventions for pregnant women with or without postpartum follow-up, five focussed on the effectiveness of health professional led interventions and one evaluated interventions for smokeless tobacco use.

Target population: all adults

The range of interventions evaluated for smoking cessation included social support, hypnotherapy, counselling, risk assessment, aversive therapies, and relapse prevention.

Hypnotherapy

One Cochrane review (1+, A) evaluated the use of hypnotherapy for smoking cessation (Abbot et al, 1998). This was a systematic review of 9 RCTs (with 915 participants) that compared hypnotherapy with no treatment or with other therapeutic interventions. Participants were smokers who wished to stop smoking, irrespective of gender, number of years smoking or level of nicotine dependence. Studies were mainly USA and Canada based with one Australian and one UK based study. By comparing hypnotherapy with 14 different control interventions, the author found that hypnotherapy was not proven to have a greater effect on six-month quit rates than either other interventions, or no intervention. However the author does suggest that there is a need for large trials to establish efficacy.

Support, self help and behavioural interventions such as counselling

Two reviews explored the role of social support in smoking cessation. A Cochrane review (1+, C) of 9 RCTs aimed to determine whether an intervention to enhance partner support assisted smoking cessation when added as an adjunct to a smoking cessation programme (Park et al, 2004). Partners were defined as spouses, friends, co-workers, buddies, or significant others, although the definition of partner varied among the studies. A partner support intervention could be directed at the smoker, the partner or both, with the aim of assisting the smoker to quit. Examples included training smokers in obtaining social support, encouraging increased contacts between smokers and supportive partners, providing training or written materials to partners to assist them in engaging in supportive behaviours, or intervening with smoker/partner pairs in couple therapy or in larger groups to encourage supportive interactions. All studies included data on self reported smoking cessation rates, but there was limited biochemical validation of abstinence rates. The odds ratio for self-reported abstinence at 6-9 months was 1.08 (CI 95%, 0.81 -1.44); and at 12 months post-treatment was 1.0 (CI 95%, 0.75 - 1.34). Of the six studies that measured partner support at follow-up, only two studies reported significant increase in partner support in the intervention groups. The authors reported that no conclusions can be made about the impact of partner support on smoking cessation.

Another, lesser quality review (1-, C) of 10 RCTs (participants n=3,430) evaluated the role of social support in smoking cessation, and reviewed the evidence regarding the use of 'buddy systems' to aid smoking cessation (May & West, 2000). The authors concluded that the research methodology in many cases was poor. They stated that in the context of a smokers' clinic, there was evidence that the use of buddies may be of some benefit. However there was a lack of evidence on the efficacy of the use of buddies in community interventions.

One review (1+, A) evaluated the effectiveness of different forms of self-help materials, and the adjuncts to self help (computer-generated feedback, telephone hotlines and pharmacotherapy), and the effectiveness of approaches tailored to the individual compared with non-tailored materials (Lancaster and Stead, 2005). This was a systematic review of 60 RCTs from a wide range of countries including the UK. Thirty-three compared self-help materials to no intervention or tested materials used in addition to advice. In 11 trials in which self help was compared to no intervention there was a pooled effect that just reached statistical significance (n = 13,733; OR 1.24, 95% CI: 1.07 to 1.45). The authors of the review did not find evidence of benefit from adding self-help materials to face-to-face advice, or to nicotine replacement therapy. There were seventeen trials using materials tailored for the characteristics of individual smokers, where meta-analysis supported a small benefit of tailored materials (n = 20,414; OR 1.42, 95% CI 1.26 to 1.61). The authors concluded that standard self-help materials may increase quit rates compared to no intervention, but the effect is likely to be small. They did not find evidence that they have an additional benefit when used alongside other interventions such as advice from a healthcare professional, or nicotine replacement therapy. There is evidence that materials that are tailored for individual smokers are effective, and are more effective than untailored materials, although the absolute size of effect is still small.

One Cochrane review (1+, C) evaluated the effects of smoking cessation programmes delivered in a group format compared to other interventions (Stead & Lancaster,

2005a). Interventions were those in which smokers met for scheduled meetings and received some form of behavioural intervention, such as information, advice and encouragement or cognitive behavioural therapy (CBT) delivered over at least two sessions. Fifty-five studies were included (total number of participant not stated). Sixteen studies compared a group programme with a self-help programme. There was an increase in cessation with the use of a group programme (n = 4395, OR 2.04, 95% CI 1.60 to 2.60). Group programmes were more effective than no intervention controls (seven trials, n = 815, OR 2.17, 95% CI 1.37 to 3.45). There was limited evidence that the addition of group therapy to other forms of treatment, such as advice from a health professional or nicotine replacement, produced extra benefit. The authors concluded that group therapy is better for helping people stop smoking than self help, and other less intensive interventions. There is not enough evidence to evaluate whether groups are more effective than intensive individual counselling.

A further Cochrane review (1+, C) evaluated the effect of proactive and reactive telephone support to help smokers quit (Stead et al, 2003). Provision of telephone support includes proactive or reactive counselling or the provision of other information to smokers calling a helpline to assist smoking cessation, to any population. Twenty seven studies were included (total number of participants not stated) but none were undertaken in the UK. Thirteen trials compared proactive counselling to a minimal intervention control. Meta-analysis suggested that telephone counselling compared to less intensive intervention increases quit rates (OR 1.56, 1.38 - 1.77). Other interventions such as adding telephone support to a face to face intervention, telephone support in users of NRT and providing access to a hotline showed little evidence of effectiveness. No differences in outcome were detected in trials that compared different types of telephone counselling. The authors concluded that proactive telephone counselling can be effective compared to an intervention without personal contact. Successful interventions generally involve multiple contacts timed around a quit attempt.

Finally, one systematic review (1-, A) evaluated brief motivational interviewing interventions across several behaviours (including cigarette smoking) (Dunn et al, 2001). Motivational interviewing (MI) is a directive, client-centred style of counselling that helps people to explore and resolve their ambivalence about changing (their health behaviour). Two studies were relevant to this section of the review. In one of the studies, one of the two effect sizes reported was significant (0.23, 95% CI: 0.06, 0.39). In the second study, none of the obtained effect sizes were significant. The authors state that in the areas of smoking cessation the results are promising but not strong enough to recommend its dissemination.

Biomedical risk assessment and feedback

A Cochrane review (1+, A) evaluated the efficacy of biomedical risk assessment as an aid to smoking cessation when provided in addition to various levels of counselling (Bize et al, 2005). Biomedical risk assessment involved genetic testing to determine susceptibility to smoking related diseases, exhaled carbon monoxide monitoring and spirometry results. Studies were included if they measured smoking cessation rates with at least six months follow up. Nine RCTs (participants n=4848) were included and eight trials included in the analysis. The authors concluded that in the absence of evidence of sufficient quality, it was not possible to make definitive statements about the effectiveness of biomedical risk assessment as an aid for smoking cessation. They

suggest that current evidence of lower quality does not support the hypothesis that biomedical risk assessment increases smoking cessation, in comparison with standard treatment.

Another systematic review (1-, B) of eight RCTs (participants n= 4,408) evaluated the effectiveness of using biomarker feedback to motivate and enable health behaviour change in relation to tobacco use, diet, and physical activity (McClure, 2002). Biomarker feedback was provided on tests for expired carbon monoxide (CO), cotinine level, cholesterol level, and the CYP2D genetic marker for lung cancer susceptibility, an index of physical fitness and lung function and self-reported pulmonary symptoms. The results of this review were mixed, but suggest that biological information conveying harm exposure, disease risk or impaired physical functioning may increase motivation to change. The authors conclude that these preliminary findings indicate the potential for health behaviour change of combining biomarkers with appropriate behaviour treatment, but more research is warranted.

Aversive techniques

One Cochrane review (1+, B) evaluated the efficacy of rapid smoking and other aversive methods in helping smokers to stop smoking; and also whether there is a dose-response effect on smoking cessation at different levels of aversive stimulation (Hajek and Stead, 2001). Smoking abstinence at a minimum of 6 months was biochemically validated where reported; otherwise outcomes included self reported abstinence. A meta-analysis of 25 RCTs was conducted. For trials of rapid smoking, the pooled OR of 12 studies included in the analysis was 1.98 with 95% CI of 1.36 to 2.90, suggesting that rapid smoking is effective in aiding smoking cessation. However the single study fulfilling current criteria for methodological adequacy yielded only a non-significant trend, while methodologically less adequate small studies tended to report better results. The authors concluded that existing studies provide insufficient evidence to determine the efficacy of rapid smoking, or whether there is a dose-response to aversive stimulation. Milder versions of aversive smoking seem to lack specific efficacy.

Relapse prevention

Another Cochrane review (1&2+, A) by the same authors evaluated the efficacy of relapse prevention interventions for smoking cessation (Hajek et al, 2005). The preferred outcome was prolonged or multiple point prevalence abstinence at follow-up of at least six months since randomisation. Forty studies were included (total number of participants not stated). The authors detected no benefit of brief and 'skills-based' relapse prevention interventions for women who had quit smoking due to pregnancy, or for smokers undergoing a period of enforced abstinence. They also failed to detect significant effects of trials in other smokers who had quit on their own or with a formal programme. Amongst trials recruiting smokers and evaluating the effect of additional relapse prevention components they also found no evidence of benefit in any subgroup. The authors concluded that the verdict is strongest for interventions focusing on identifying and resolving tempting situations, as most studies were concerned with these. However, until more evidence becomes available it may be more efficient to focus resources on supporting the initial cessation attempt rather than on additional relapse prevention efforts.

Stage based approaches

One systematic review (1-, C) evaluated the effectiveness of interventions which used a stage based approach to changing smoking behaviour and included 23 RCTs (Riemsma et al, 2003). Interventions derived from stage theories of behaviour change usually incorporate several key elements. It is necessary to identify accurately an individual's stage of change (or readiness to change), so that an intervention based on stage specific processes of change can be applied. However, many of the included studies provided only a limited description of the content of the intervention, making it difficult to determine if, how, and to what extent stages of change were used in tailoring the intervention. The authors concluded that there is limited evidence for the effectiveness of stage based interventions in changing smoking behaviour and there is a need for further high quality trials to investigate this approach. Further systematic reviews are also needed to evaluate the effectiveness of interventions based on other theoretical approaches.

Exercise

Two reviews evaluated the effect of exercise interventions on smoking cessation. One review (1+, B) evaluated the effect of group exercise programmes on smoking cessation (Nishi et al, 1998). Exercise group treatments included group counselling and aerobic exercise, smoking cessation programme and use of ergometer, running, and exercise classes for the elderly. The outcome was smoking cessation rate, this outcome was only verified biochemically in two studies. Five studies with a total of 101 participants were included. The summary OR of the three studies which primarily aimed at smoking cessation was 2.35 (95% CI: 0.75, 7.31). When the two other studies were added, the summary odds ratio dropped to 1.85 (95% CI: 0.65, 5.24). The authors concluded that, although the results of this meta-analysis seem to demonstrate a positive effect of exercise on smoking cessation, the effect remains unclear due to the small number of studies and the small sample size for each study. Another review (1+, B) evaluated whether exercise-based interventions alone, or combined with a smoking cessation programme, are more effective than a smoking cessation intervention alone (Ussher, 2005). Interventions included programmes of supervised or unsupervised exercise either alone or as an adjunct to a smoking cessation intervention, compared to a smoking cessation programme alone. Eleven trials were included, six of which had fewer than 25 people in each treatment arm. Only one of the 11 trials offered evidence for exercise aiding smoking cessation at a 12-month follow up. All but one of the other trials were too small to reliably exclude an effect of intervention, or included an exercise intervention which was insufficiently intense to achieve the desired level of exercise.

Target population: pregnant women

A Cochrane systematic review (1+, A) of 64 RCTs with over 28000 participants evaluated interventions aimed at reducing smoking during pregnancy (Lumley et al, 2004). These studies included a wide range of interventions: information leaflets; advice to stop smoking from a health professional; group or individual counselling; peer support; advice on effect on foetus; telephone follow-up; nicotine replacement therapy (NRT); feedback on patho-physiological effects of smoking on the mother or foetus; the supplementation of information and advice with self-help manuals/videos or computer aided messages on strategies for quitting, rewards or incentives; or additional social support. These interventions were conducted in a range of countries

including the UK. Fifty-one RCTs (20931 women) and six cluster-RCTs (over 7500 women) provided data on smoking cessation and/or perinatal outcomes. There was a significant reduction in smoking in the intervention groups of the 48 trials included (RR 0.94, 95% CI: 0.93 to 0.95), an absolute difference of six in 100 women continuing to smoke. The 36 trials with validated smoking cessation had a similar reduction (RR 0.94, 95% CI 0.92 to 0.95). One intervention strategy, rewards plus social support (two trials), resulted in a significantly greater smoking reduction than other strategies (RR 0.77, 95% CI 0.72 to 0.82). Five trials of smoking relapse prevention (over 800 women) showed no statistically significant reduction in relapse. The authors concluded that smoking cessation programmes in pregnancy reduce the proportion of women who continue to smoke, and reduce low birth weight and preterm birth.

Another review (1++, C) of smoking and pregnancy examined the effectiveness of strategies to prevent postpartum smoking relapse (Edwards et al, 2000). The interventions were aimed at women and their partners in the pre- and postnatal period to promote smoking cessation, and prevent relapse. This included physician provided advice and information leaflets; one to one counselling; midwife led counselling; and information to women and their partners. This review included 19 studies: three RCTs, one quasi-experimental study (controlled) and other borderline studies (design not reported). The review found biochemically confirmed evidence from a single study suggesting that a theoretically based, multi-component intervention of sufficient intensity, provided during the postpartum period, can have a modest effect on postpartum smoking relapse rates at six months postpartum. There is no evidence to suggest that relapse prevention strategies which lack an appropriate theoretical base, consist of brief and infrequent interventions, and are provided in an antenatal clinic setting reduce postpartum smoking relapse rates. The optimum timing (early, mid or late pregnancy; and/or postpartum), frequency, and mix of postpartum smoking relapse prevention strategies have not yet been determined. The presence of a smoking partner and other social contacts who smoke are important determinants of postpartum smoking relapse. The evidence from this review should be interpreted with caution. Of the total of 19 studies, the quality of the evidence was graded as: one strong, three moderate and 15 weak. Furthermore, although the review achieves a score of ++ for bias (the review process), in fact there are several errors of reporting leading to some confusion over the number of included studies.

Health professional led interventions at individual level

A Cochrane systematic review (1+, A) was conducted to assess the effectiveness of physician advice on smoking behaviour (Lancaster and Stead, 2004). The review included 39 RCTs (including UK trials) with over 31000 participants. The main outcome measures were abstinence from smoking after at least six months follow up and mortality, using biochemically validated rates where available. Pooled data from 17 trials of brief advice versus no advice (or usual care) revealed a small but significant increase in the odds of quitting (OR 1.74, 95% CI 1.48 to 2.05). This equates to an absolute difference in the cessation rate of about 2.5%. The authors concluded that simple advice has a small effect on cessation rates. Additional advice appears to have only a small effect, though more intensive interventions are marginally more effective than minimal interventions.

Another review (1&2-, B) assessed whether smoking cessation and the use of smoking cessation products should be promoted by Canadian dental offices (Brothwell, 2001). The review questions included:

- does tobacco use affect periodontal health?
- are dentists effective cessation counsellors?
- do smoking cessation products (nicotine-replacement therapy and bupropion) improve the effectiveness of cessation interventions?

Only the second question is reported here as the others do not meet our inclusion criteria. The interventions included smoking cessation counselling and the use of smoking cessation products such as nicotine patches, nicotine gum and bupropion. Studies were restricted to Canada and were reported according to the questions. The second question drew on one meta-analysis, six RCTs, and three case series studies to find that oral health professionals are effective at increasing the proportion of dental patients who successfully quit using tobacco. It is difficult to judge the strength of the evidence for these statements since they report findings narratively, selecting from single studies without attempting to combine the results. Nevertheless, the authors conclude that dental offices should routinely provide systematic smoking cessation services to patients who are attempting to quit.

One review (1-, A) evaluated smoking prevention interventions for young people (<21 years) delivered via medical or dental providers' offices (Christakis et al, 2003). Outcomes included self-reported smoking at baseline. (1), use of tobacco within 30 days of follow-up phone call (1), and tobacco initiation (2). Four RCTs were included with over 21522 participants. Included were two studies conducted in primary care, and one each in dental and orthodontic offices. Three studies found no significant differences between treatment and control groups with respect to initiation of smoking during the follow-up period. Only one study demonstrated a significant effect on smoking initiation; in that study, 5.1% of the intervention group and 7.8% of the control group reported smoking at 12-month follow-up (OR 0.63; 95% CI, 0.44–0.91). None of the studies had follow-up times greater than 3 years. The authors concluded that there is very limited available evidence demonstrating efficacy of smoking prevention interventions in adolescents conducted in providers' offices and no evidence for long-term effectiveness of such interventions.

Another Cochrane review (1+, A) evaluated nursing interventions for smoking cessation (Rice & Stead, 2004). Nursing intervention was defined as the provision of advice, counselling, and/or strategies to help patients quit smoking. The principal outcome was smoking cessation. Twenty-nine studies were included (with a total of over 20000 participants). Twenty studies comparing a nursing intervention to a control or to usual care found the intervention to significantly increase the odds of quitting (OR 1.47, 95% CI 1.29 to 1.68). Smoking interventions in 11 trials in non-hospitalized adults gave an estimated 90% increase in the odds of success (OR 1.90, 95% CI 1.48 to 2.43). The authors concluded that the results indicate the potential benefits of smoking cessation advice and/or counselling given by nurses to patients, with reasonable evidence that interventions can be effective.

Finally a Cochrane review (1+, A) assessed the effectiveness of interventions by community pharmacy personnel to assist clients to stop smoking (Sinclair et al, 2004). Interventions included any intervention by community pharmacy personnel to

promote smoking cessation amongst their clients. The intervention may have been delivered by one or more pharmacists and/or members of pharmacy staff. They may have included advice or more intensive behavioural therapy, with or without the use of any form of NRT or other pharmacotherapy. The primary outcome measure of the review was rates of abstinence from smoking six months or more after the start of the intervention. Two studies were included (97651 pharmacies in one study and 60 in the other). Both trials were set in the UK and involved a training intervention which compared a support programme involving counselling and record keeping against a control receiving usual pharmacy support. In both studies a high proportion of intervention and control participants began using NRT. Both studies reported smoking cessation outcomes at three time points. One study showed a significant difference in self-reported cessation rates at 12 months: 14.3% versus 2.7% ($p < 0.001$); the other study showed a positive trend at each follow-up with 12.0% versus 7.4% ($p = 0.09$) at nine months. The authors concluded that the limited number of studies to date suggests that trained community pharmacists, providing a counselling and record keeping support programme for their customers, may have a positive effect on smoking cessation rates. The strength of evidence is limited because only one of the trials showed a statistically significant effect.

Smokeless tobacco use

A Cochrane review (1++, B) of 14 RCTs (participants $n = 5371$) set in the USA assessed the effects of behavioural and pharmaco-therapeutic interventions to treat smokeless tobacco use (Ebbert et al, 2004). Only the behavioural interventions are reported here since pharmaco-therapeutic interventions are excluded from this review. Interventions were directed at individual smokeless tobacco users or at groups of users (for example, smokeless tobacco users visiting the dentist, attending school or working). Outcome measures were tobacco abstinence six months or more after the start of the intervention. If total tobacco abstinence was not reported, abstinence from smokeless tobacco alone was used. A secondary outcome was abstinence from all tobacco use. Biochemical validation of self-reported abstinence was used where reported. There was statistical heterogeneity among the results of eight trials of behavioural interventions included in the meta-analysis. Three trials showed significant benefits of intervention. The authors concluded that behavioural interventions should be used to help smokeless tobacco users to quit.

Evidence summary for interventions aimed at individuals

There is a large body of good quality evidence (22 reviews) evaluating the effectiveness of interventions to aid smoking cessation (or smokeless tobacco use) at the individual level with adults, although the results are varied across the range of intervention types. Interventions which showed a positive effect include advice from health professionals, the rapid smoking form of aversion therapy, self help materials, telephone counselling (compared to less intensive interventions), nursing interventions, group counselling (which is also more effective than self help) and oral examination and feedback for reducing smokeless tobacco use. In addition, interventions to promote smoking cessation or reduction with pregnant women are generally effective across the range of intervention types and indicate that pregnancy may be a point in the lifecourse that is amenable to positive behaviour change. Relapse prevention interventions were also successful with pregnant women, although this was only supported by a single study. Less clear, poor quality or inconclusive

evidence of effect was found for social support interventions (e.g. buddy systems or friends and family), relapse prevention, biomarker feedback or biomedical risk assessment, exercise, and interventions by community pharmacy personnel or dentists. Interventions that had evidence of no effectiveness included hypnotherapy, and stage-based approaches to changing smoking behaviour.

Evidence statements for interventions targeting individuals

Hypnotherapy

There is good quality evidence (1+, A), that hypnotherapy is not effective in achieving smoking cessation.

Counselling, support and self help

There is evidence of good quality (1+,C), that no conclusions can be made about the impact of partner support on smoking cessation. There is additional evidence of variable quality (1-, C), which shows some effect of buddy systems in a smokers clinic.

There is evidence of good quality (1+, A) that self help materials may increase quit rates compared to no intervention, but the effect is likely to be small. There is no evidence that they have an additional benefit when used alongside other interventions such as advice from a healthcare professional, or nicotine replacement therapy. There is evidence that materials that are tailored for individual smokers are effective, and are more effective than untailored materials, although the absolute size of effect is still small.

There is evidence of good quality (1+, C) that shows a positive effect of telephone counselling (compared to less intensive interventions) on smoking quit rates.

There is evidence of good quality (1+, C) which shows that group counselling is more effective than self help and no intervention for smoking cessation.

Biomedical risk assessment and feedback

There is evidence of good quality (1+, A) that there is no evidence of effectiveness in using biomedical risk assessment along with counselling to promote smoking cessation. There is evidence of variable quality (1-, B) that shows a small effect of using biomarker feedback with counselling.

Aversive techniques

There is evidence of good quality (1+, B) that rapid smoking is effective in aiding smoking cessation. There is evidence that other aversive methods are not effective.

Relapse prevention

There is evidence of good quality (1&2+, A) that shows insufficient evidence to support the use of any specific intervention for helping smokers who have successfully quit for a short time to avoid relapse.

Stage based approaches

There is evidence of variable quality (1-, C) which shows no effect of stage-based approaches to changing smoking behaviour.

Motivational interventions and counselling

There is evidence of variable quality (1-, A) that shows an inconclusive effect of motivational intervention in smoking cessation.

Exercise

There is evidence from two reviews of good quality (both scoring 1+, B) that shows an inconclusive effect of exercise interventions for smoking cessation.

Smokeless tobacco use

There is evidence of good quality (1++, B) which shows an effect of behavioural interventions which included an oral examination and feedback for reducing smokeless tobacco use.

Pregnant women

There is evidence of good quality (1+, A) which shows significant effects of a wide range of interventions with pregnant women on smoking reduction and smoking cessation.

There is evidence of good quality (1++, C) which shows a modest effect of theoretically based, multi-component interventions provided during the postpartum period, on postpartum smoking relapse rates. However, this evidence only comes from a single study.

Health professional led interventions

There is evidence of good quality (1++, A) which shows a small effect of physician advice on the odds of quitting for all smokers. There is also evidence of a small effect of intensive versus minimal advice on smoking cessation.

There is evidence of variable quality (1&2-, B) which shows an effect of dentists' advice to quit smoking on dental patients.

There is evidence of variable quality (1-, A) that shows little effect of smoking prevention interventions delivered via medical or dental providers' offices in preventing or reducing tobacco smoking in young people (<21 years).

There is evidence of good quality (1+, A) that shows a moderate effect on nursing interventions for smoking cessation in non-hospitalised people.

There is evidence of good quality (1+, A) that shows an inconclusive effect of interventions by community pharmacy personnel for smoking cessation.

3.1.1.2 Community level interventions

Eleven reviews evaluated interventions aimed at smoking prevention, prevalence, or smoking cessation in the workplace, schools and colleges, or communities in defined geographical areas. Five reviews explored workplace interventions, three evaluated interventions in schools and colleges, and two further reviews explored other community settings.

Interventions in the workplace

Two systematic reviews evaluated interventions in the workplace aimed at smoking cessation at the individual level. One Cochrane review (1&2+, A) evaluated the effectiveness of workplace interventions for smoking cessation (Moher et al, 2005). Workplace interventions aimed at helping individuals to stop smoking included ten studies of group therapy, seven studies of individual counselling, nine studies of self-help materials and five studies of nicotine replacement therapy. The results were consistent with those found in other settings. Group programmes, individual counselling and nicotine replacement therapy increased cessation rates in comparison to no treatment or minimal intervention controls. Self-help materials were less effective.

Another review (1&2-, B) evaluated the effectiveness of workplace smoking cessation programmes (Smedslund et al, 2004). The included studies used different types of interventions including self-help written materials, cessation groups, incentives, steering committee, non-smoking policy, physician advice and pharmacological treatment. Nineteen studies including 9578 participants were included. The quit rate at 6 months ranged from 6.1 to 30.8% with the interventions and from 1.05 to 19.15% with the control. Workplace smoking cessation interventions significantly increased quit rates at 6 months (OR 2.03, 95% CI: 1.42, 2.90) and 12 months (OR 1.56, 95% CI: 1.17, 2.07) compared with control. There was no statistically significant difference between interventions beyond 12 months (OR 1.33, 95% CI: 0.95, 1.87).

Three systematic reviews (including the Moher et al., 2005 cited above) evaluated the effectiveness of smoke-free workplaces. One systematic review (2-, B) evaluated the effects of smoke-free workplaces on cigarette consumption and to compare these effects with results from raising taxes (Fichtenberg and Glantz, 2002b). Twenty-six studies were included with a total of 120000 participants. Totally smoke-free policies significantly reduced the absolute prevalence of smoking and decreased cigarette consumption per smoker among continuing smokers: the reduction in absolute prevalence was 3.8% (95% CI: 2.8, 4.7) and the decrease in consumption was 3.1 (95% CI: 2.4, 3.8). The reduction in consumption per employee was 29% (95% CI: 11, 53). The effect of smoke-free policies did not change over time (for prevalence, $r=0.08$, $P=0.75$; for consumption per smoker, $r=0.45$, $P=0.09$; for consumption per employee, $r=0.28$, $P=0.43$).

Another review (2-, B) also evaluated evidence regarding interventions to reduce tobacco use and exposure to environmental tobacco smoke (Hopkins et al, 2001). Based on evidence from 10 studies, smoking bans and restrictions were shown to reduce exposure to environmental tobacco smoke in the workplace.

Finally a Cochrane review (1&2+, C) of 15 studies evaluated whether competitions and incentives led to higher long-term quit rates (Hey & Perera, 2005b). Interventions included contests, competitions, incentive schemes, lotteries, raffles, and contingent payments, to reward cessation and continuous abstinence in smoking cessation programmes. Participants in the studies were recruited from workplaces, community and newspaper readers (adverts). None of the studies demonstrated significantly higher quit rates for the incentives group than for the control group beyond the six-month assessment. There was no clear evidence that participants who committed their own money to the programme did better than those who did not, or that different types

of incentives were more or less effective. There is some evidence that although cessation rates have not been shown to differ significantly, recruitment rates can be improved by rewarding participation, which may be expected to deliver higher absolute numbers of successful quitters. These findings were supported by another Cochrane review (Moher et al., 2005 cited above).

Interventions in schools or colleges: children and young people

Two systematic reviews evaluated the effectiveness of school-based programmes for preventing smoking. One Cochrane review (1+, A) assessed the effectiveness of school-based programmes in preventing children and adolescents from starting smoking (Thomas, 2002). Interventions included:

- education
- teaching generic social skills to reinforce societal norms about individual behaviour
- reinforcing the adolescent's self-concept
- teaching social skills and specific tobacco refusal skills.

Seventy-six studies were included (number of participants not stated). Of the 76 randomised controlled trials identified, 16 were classified as category one (most valid). There were no category one studies of information-giving alone. There were 15 category one studies of social influences interventions. Of these, eight showed some positive effect of intervention on smoking prevalence, and seven failed to detect an effect on smoking prevalence. The largest and most rigorous study, the Hutchinson Smoking Prevention Project, found no long-term effect of an intensive eight year programme on smoking behaviour. There was a lack of high quality evidence about the effectiveness of combinations of social influences and social competence approaches. There was limited evidence about the effectiveness of multi-modal approaches including community initiatives.

The other review (1-, D) evaluated school-based smoking prevention trials with long-term follow-up (Wiehe et al, 2005). Eight studies were included (number of participants not stated). The studies differed in intervention intensity, presence of booster sessions, follow-up periods, and attrition rates. Only one study showed decreased smoking prevalence in the intervention group. Few studies have evaluated the long-term impact of school-based smoking prevention programmes rigorously. Among the 8 programmes that have follow-up data to age 18 or 12th grade, there was little to no evidence of long-term effectiveness.

One review (1&2+, C) evaluated interventions to reduce tobacco use in colleges and universities (Murphy-Hoefer et al, 2005). Interventions included individual level interventions or institutional level interventions aimed at cessation of either tobacco smoking or smokeless tobacco use. Fourteen studies were included (total number of participants not stated). Individual approaches included educational group sessions and/or individual counselling that were conducted on campus mostly by healthcare personnel. Results indicated that interventions can have a positive influence on student behaviour, specifically by reducing tobacco use (i.e., prevalence of cigarette smoking and use of smokeless products, amount smoked) among college students, and increasing acceptability of smoking policies and campus restrictions among both tobacco users and nonusers.

One review (1&2-, C) evaluated smoking cessation interventions for adolescents (Garrison et al, 2003). Six studies were included of which three were school-based studies and are relevant to this section of the report. None of the studies had follow-up times of >5.2 months. While the school-based studies demonstrated a positive short-term impact, the brevity of the follow-up time does not permit the assessment of long-term effectiveness. All three of the school-based studies reported significant impacts on cessation rates, although only one of these was a randomised trial. In this school-based study, the intervention group received eight classroom sessions over a 6-week period, while the control group received an informational brochure. At 4 weeks post-intervention, this study found that 52% of students reported that they were smoke-free for the previous 5 days by self-report, compared to 20% in the control group (RR=2.51; 95% CI: 1.25–5.03). In one of the other school-based studies at 3 months post-programme, the 30-day abstinence rates were 17% in the treatment arm and 8% in the control arm, for an odds ratio of 2.36 (95% CI not reported). Another school-based study was unique in that it utilized gender-specific groups, with gender-matched adult leaders. In a stratified analysis, cessation rates were significantly different between treatment and control groups for females (29.6% vs. 8.9%, respectively) but not for males (14.4% vs. 15.9%, respectively). There is very limited evidence demonstrating efficacy of smoking-cessation interventions in adolescents, and no evidence on the long-term effectiveness of such interventions.

Other community level interventions

One Cochrane review (1&2+, A) assessed the effectiveness of community interventions in preventing the uptake of smoking in young people (Sowden & Stead, 2003). Interventions were targeted at entire or parts of entire communities or large areas with the intention of influencing the smoking behaviour of young people. Seventeen studies were included (number of participants not stated). All studies used a controlled trial design, with six using random allocation of schools or communities. Of thirteen studies which compared community interventions to no intervention controls, two - which were part of cardiovascular disease prevention programmes - reported lower smoking prevalence. Of three studies comparing community interventions to school-based programmes only, one found differences in reported smoking prevalence. One study reported a lower rate of increase in prevalence in a community receiving a multi-component intervention compared to a community exposed to a mass media campaign alone. One study reported a significant difference in smoking prevalence between a group receiving a media, school and homework intervention compared to a group receiving the media component only. There is some limited support for the effectiveness of community interventions in helping prevent the uptake of smoking in young people.

A further Cochrane review (1&2+, B) evaluated community-wide programmes which use multiple channels to provide reinforcement, support and norms for not smoking (Secker-Walker et al, 2002). A community intervention was defined as a co-ordinated, multidimensional programme aimed at changing adult smoking behaviour, involving several segments of the community and conducted in a defined geographical area, such as a town, city, county or other administrative district. Thirty two studies were included (number of participants not stated). Change in smoking prevalence was measured using cross-sectional follow-up data in 27 studies. The estimated net decline ranged from -1.0% to 3.0% for men and women combined (10 studies). For women, the decline ranged from -0.2% to + 3.5% per year (n=11), and for men the decline

ranged from -0.4% to +1.6% per year (n=12). Cigarette consumption and quit rates were only reported in a small number of studies. The two most rigorous studies showed limited evidence of an effect on prevalence.

Evidence summary for interventions aimed at communities

Eleven reviews evaluated interventions aimed at either prevention of taking up smoking, smoking cessation or reducing smoking prevalence. Interventions that showed an effect in the workplace included those aimed at encouraging individuals to quit — whether they are more effective than in other settings, such as health clinics, is not clear. Interventions included group therapy, individual counselling, self help materials, smoking bans and restrictions and competitions and incentives. Although cessation rates have not been shown to differ significantly, recruitment rates can be improved by rewarding participation, which may be expected to deliver higher absolute numbers of successful quitters. Interventions in schools and colleges that showed some effect included education, social and refusal skills training, positive identity reinforcement, individual and group counselling and smoking policies and restrictions. There is some evidence that these interventions are not effective in the long term. Interventions aimed at the wider community included multi-component interventions and those which use multiple channels to provide reinforcement, support and norms for not smoking. These showed limited effectiveness.

Evidence statements for interventions at the community level

Workplace interventions

There is evidence of good quality (1&2+, A), which shows that group therapy, individual counselling and nicotine replacement therapy (NRT), are equally effective when offered in the workplace. The evidence is less clear for self-help methods.

There is evidence of good quality (1&2+, C) and evidence from a further two reviews of variable quality (both with the score: 2-, B), which shows that tobacco bans in the workplace decreased cigarette consumption during the day, but the effect on total consumption was uncertain.

There is evidence of good quality from two reviews (1&2+, C; 1&2+, A), which shows that competitions and incentives in the community (e.g. workplace, clinics) are not effective beyond six months.

School or higher education interventions

There is evidence from two reviews (1+, A; 1-, D), showing a mixed effect of some school based interventions (e.g. social influence and educational interventions) in reducing smoking prevalence among young people in the short term, but no evidence for longer term effects.

There is evidence of good quality (1&2+, C), that interventions in universities and colleges can reduce tobacco use and increase acceptability of smoking policies.

There is evidence of variable quality (1&2-, C), that shows very limited evidence demonstrating efficacy of smoking-cessation interventions in adolescents, but no evidence on the long-term effectiveness of such interventions.

Interventions in other community settings

There is evidence of good quality (1&2+, A), which shows that there a small positive effect of multi-component community interventions in preventing smoking uptake in young people.

There is evidence of good quality (1&2+, B), which shows that multiple channels to provide reinforcement, support and norms for not smoking have a limited effect on smoking prevention or cessation.

3.1.1.3 Population based interventions

Seven systematic reviews evaluated population based interventions aimed at either preventing smoking or encouraging smoking cessation. Two of these reviewed mass media interventions, two reviewed legislative measures or reducing access to cigarette interventions, one reviewed the reduction of tobacco consumption in public places and one reviewed the use of incentives in population-based smoking cessation programmes.

Mass media interventions

One Cochrane review (1++, A) evaluated studies that assessed the effectiveness of mass media campaigns (defined as channels of communication such as television, radio, newspapers, bill boards, posters, leaflets or booklets intended to reach large numbers of people and which are not dependent on person to person contact) in influencing the smoking behaviour (either objective or self-reported) of young people under the age of 25 years (Sowden & Arblaster, 1998). Six studies met the inclusion criteria and two of the six interventions were found to be associated with reductions in smoking behaviour.

Campaigns that researched and developed their message to reach their target audience had a higher success rate than those which did not. Effective campaigns also lasted longer and were more intense than less successful ones. The timing and type of broadcast made a difference to their success, with older youths in one study preferring radio to television. Changes in attitudes, knowledge or intention to smoke did not generally seem to affect the long-term success of the campaigns. There is some evidence that the mass media can be effective in preventing the uptake of smoking in young people, but overall the evidence is not strong.

Another review (2-, C) evaluated mass-media campaigns and associated reductions in smoking prevalence and cigarette consumption in both the general population and young people (Friend & Levy, 2002). The included studies were of state-wide or community-wide campaigns aimed at the general population and youths in the USA; and of media campaigns and concurrently implemented tobacco control programmes (or policies) aimed at decreasing or stopping smoking, reducing exposure to environmental tobacco smoke, reducing youth access to cigarettes, and countering pro-tobacco messages. Two well-funded and implemented state-wide campaigns plus concurrent coordinated tobacco control programmes reduced smoking rates in the general population; there was a reduction in net smoking prevalence of 6 to 12%. Two smaller state wide campaigns of shorter duration in less populated counties found smaller reductions in smoking (net decline 4% and 5%, respectively). It is unclear whether all relevant studies were discussed and used in the review.

Legislative measures / tobacco control policies/ reducing access

One Cochrane review (1&2+, C) assessed the effects of interventions to reduce underage access to tobacco by deterring shopkeepers from making illegal sales (Stead and Lancaster, 2005b). Interventions included education, law enforcement, community mobilization, or combinations of strategies that aimed to deter retailers from selling tobacco to minors. Thirty four studies were included (total number of participants not stated) of which 14 had data from a control group for at least one outcome. Giving retailers information was less effective in reducing illegal sales than active enforcement or multi-component educational strategies, or both. No strategy achieved complete, sustained compliance. In three controlled trials, there was little effect of intervention on youth perceptions of access or prevalence of smoking. Interventions with retailers can lead to large decreases in the number of outlets selling tobacco to youths, however few of the communities studied in this review achieved sustained levels of high compliance. This may explain why there is limited evidence for an effect of such intervention on youth perception of ease of access to tobacco, and on smoking behaviour.

Another review (2-, B) evaluated the effectiveness of laws restricting youth access to cigarettes on prevalence of smoking among teens (Fichtenberg & Glantz, 2002a). Similar to the previous review, interventions ranged in intensity from simple enactment of laws to retailer and community education to education combined with active enforcement via compliance testing, warnings, fines, and suspension of tobacco selling licenses. Eight studies were included (number of participants not stated). Based on data from nine studies, there was no detectable relationship between the level of merchant compliance and 30-day or regular smoking prevalence. There was no evidence of a threshold effect. There was no evidence that an increase in compliance with youth access restrictions was associated with a decrease in 30-day (or regular) smoking prevalence. There was no significant difference in youth smoking in communities with youth access interventions compared with control communities; the pooled estimate of the effect of intervention on 30-day prevalence was -1.5% (95% CI: -6.0% to 2.9%).

Incentives

One systematic review (1&2-, C) evaluated the use and impact of incentives in population-based smoking cessation programmes (Bains et al, 1998). These included smoking cessation interventions that were both incentive-based (i.e. cash incentives, cash and holiday prizes) and population-based (i.e. community-based, state-wide or national programmes). Seventeen studies were included with approximately 247523 participants. The population-based interventions discussed in this review generally attracted 1 to 2% of the target population, regardless of the publicity or recruitment tactics used. No specific type of recruitment strategy was shown to be consistently more effective than others. One study had a participation rate of 9.5%, which was achieved through making the recruitment period more flexible. This contest produced the greatest impact although the actual sustained quit rate was low (13%). The quit rates for the programme ranged from 13 to 45% and were in part dependent upon the length of follow-up, with lower quit rates more likely to be reported when this time was prolonged. Incentive-based smoking cessation programmes that target an entire community have the advantage of reaching a large and diverse group of smokers. They may, however, attract only smokers who are already motivated to quit. Realistically, incentive-based programmes aimed at the general population can expect 1% of all their smokers to quit smoking. The quit rates among participants may be

high initially (i.e. mean quit rate of 34% at 1-month follow-up), but decrease over time (i.e. mean rate of 23% at 1 year).

A Cochrane review (1&2+, C) evaluated similar population-based quit and win contests at local, national and international levels (Hey & Perera, 2005a). Four studies were included (total number of participants not stated). Three demonstrated significantly higher quit rates (8% to 20%) for the quit and win group than for the control group at the 12-month assessment. However, the population impact measure, where available, suggests that the effect of contests on community prevalence of smoking is small, with less than one in 500 smokers quitting because of the contest. Although surveys suggest that international quit and win contests may be effective, especially in developing countries, the lack of controlled studies precludes any firm conclusions from this review.

Reducing smoking in public places

One review (2+, B) evaluated interventions to reduce smoking in public places, including restrictions and bans, educational materials/campaigns, written material; non-smoking and warning signs and comprehensive strategies that used a combination of different interventions, that were aimed at populations (Serra et al, 2000). Eleven studies were included (number of participants not stated). All included studies were uncontrolled before and after studies. The most effective strategies used comprehensive, multi-component approaches to implement policies banning smoking within institutions. Less comprehensive strategies, such as posted warnings and educational material had a moderate effect. Five studies showed that prompting individual smokers had an immediate effect, but the authors concluded that those strategies are unlikely to be acceptable as a public health intervention.

Evidence summary for interventions aimed at populations

Seven systematic reviews evaluated population level interventions to prevent the uptake of smoking or reduce smoking rates. Interventions that showed evidence of a small effect in preventing the uptake of smoking included mass media interventions. Interventions which show a small effect on smoking cessation include 'Quit and Win' contests and reducing smoking in public places (although the before and after study design makes it difficult to determine the extent to which the outcomes were directly related to the intervention). Other interventions such as those aiming to reduce tobacco sales to minors have little evidence of effectiveness.

Evidence statement for interventions at the population level

Mass media interventions

There is evidence of good quality (level 1++, A), which shows that mass media interventions have an effect on preventing the uptake of smoking in young people.

There is evidence of variable quality (2-, C), that media campaigns and concurrently implemented tobacco control programmes (or policies) have a strong effect on the reduction in smoking prevalence.

Incentives

There is variable quality evidence (1&2-, C), that shows a small effect of the use of incentives in population-based smoking cessation programmes.

There is good quality evidence (1&2+, C), that shows a small effect of ‘Quit and Win’ contests on community prevalence of smoking is small.

Legislative measures / tobacco control policies/ reducing access

There is evidence from two reviews (1&2+, C; 2-, B), that show that interventions to reduce underage access to tobacco (by deterring shopkeepers from making illegal sales) has a small effect on reducing the number of illegal sales to young people, but there is no effect on their smoking behaviour.

Reducing smoking in public places

There is evidence of good quality (2+, B), that shows some effect of comprehensive, multi-component approaches to implementing policies banning smoking within institutions.

3.1.2 Interventions to increase or promote the uptake of physical activity

Seventeen systematic reviews evaluated interventions to increase or promote the uptake of physical activity. Of these, eight evaluated interventions aimed at individuals, five evaluated interventions in the community, and four evaluated population based interventions.

3.1.2.1 Interventions targeting individuals

Eight systematic reviews evaluated interventions aimed at increasing physical activity in individuals. Six of these evaluated interventions for the general adult population, and two evaluated interventions for the older population.

Target population: all adults

Of the six systematic reviews evaluating interventions aimed at increasing physical activity, one Cochrane review evaluated a range of interventions (Hillsdon et al, 2005) whereas others were more intervention-specific reviews. Such interventions included counselling and advice, biomarker feedback and motivational interviewing. One systematic review looked specifically at the long term impact of physical activity interventions (Holtzman et al, 2004).

The Cochrane review (1++, A) evaluated several different types of interventions for promoting physical activity in adults aged 16 years and older (Hillsdon et al, 2005).³ The interventions included one to one counselling/advice and/or group counselling/advice; self directed or prescribed physical activity; supervised or unsupervised physical activity; home-based or facility-based physical activity; ongoing face-to-face support; telephone support; written support material; and self monitoring. Seventeen studies with a total of 6225 participants were included and meta analysis was performed. The effect of interventions on self reported physical activity (11 studies; 3940 participants) was positive and moderate, with a pooled standardised mean difference (SMD) of 0.31 (95% CI 0.12 to 0.50). The reviewers also evaluated the effect of interventions in achieving a predetermined threshold of

³ This review was also published as a journal article (see Foster, 2004).

physical activity (i.e. meeting current recommended guidelines). Six studies (2313 participants) evaluated this outcome but found no significant difference between interventions and control (OR 1.30 (95% CI 0.87 to 1.95)). There was significant heterogeneity in the reported effects as well as heterogeneity in characteristics of the interventions. The heterogeneity in reported effects was reduced in higher quality studies, when physical activity was self-directed with some professional guidance and when there was on-going professional support. The authors concluded that physical activity interventions have a moderate effect on self reported physical activity and cardio-respiratory fitness, but not on achieving a predetermined level of physical activity.

Another systematic review (1&2+, B) was undertaken to examine the longer term effects of such physical activity interventions (Holtzman et al, 2004). This review focused on studies that examined whether interventions had an effect at least three months after the intervention concluded. The review also reported on outcomes relating to cancer survivors, although these results are not reported here. Seventy-one relevant studies were included. The authors do not state which interventions were most effective, but found evidence to suggest that it is possible to increase physical activity in a manner that can be at least partly maintained for at least three months post-intervention. However, the majority of the studies did not demonstrate any effect on physical activity at the first follow-up (three months or more after the end of any intervention activities).

The following four reviews evaluated specific interventions.

One systematic review (1-, B) evaluated biomarker feedback to motivate and enable health behaviour change (McClure, 2002). In this context, biomarkers refer to biological indices of physical harm, disease, or increased disease risk (from either exposure to harmful agents or by virtue of one's genetic profile). Eight studies (total of 4408 participants) were included, but only one study was relevant to this section. This RCT of 200 volunteers found that giving feedback on exercise tests (compared to not getting feedback) had no significant effect on either intentions to exercise, or levels of exercise.

Another systematic review (1-, A) evaluated brief motivational interviewing interventions across several behaviours, including physical exercise (Dunn et al, 2001). Motivational interviewing (MI) is a directive, client-centred style of counselling that helps people to explore and resolve their ambivalence about changing their health behaviour. Only one study (an RCT) in this review was relevant to this section. The study (undertaken in the UK) evaluated MI for increasing physical exercise among general practice patients. The study found that MI increased both physical exercise scores (effect size 0.40; 95% CI: 0.11 to 0.70) and number of exercise sessions (effect size 0.36; 95% CI: 0.07 to 0.66) at three months, but both outcomes were non-significant at 12 months.

A further systematic review (1++, C) evaluated RCTs assessing the effect of 'stages-of-change' based interventions in primary care on physical activity (as well as smoking and dietary behaviour)(van Sluijs et al, 2004). Participants were adults aged over 18 years. The interventions were lifestyle advice (either verbal or in the form of written material) delivered within primary care. Thirteen studies evaluating physical

activity were included (number of participants not stated). None of the studies found any effect of these interventions on actual levels of physical activity.

Finally, one systematic review (1&2+, C) evaluated whether counselling interventions aimed at adults in primary care settings improved and maintained activity levels (Eden et al, 2002). Participants in the included studies were sedentary or minimally active adults or senior men and women. The majority of the included studies were of brief (three to five minutes) counselling interventions conducted in typical primary care practices. In most studies the clinician advised regular, moderate-intensity physical activity; in some trials clinicians advised vigorous activity as an option. The studies targeted physical activity, either alone or in combination with other behavioural targets, such as diet change or smoking cessation. Ten trials (with a total of 9,320 participants) were included. Five RCTs and one non-randomised controlled trial compared the interventions with a usual care control. The results of these trials were mixed, with four studies finding no statistically significant effects of the intervention either short or long term. The authors of the review concluded that evidence of effectiveness was inconclusive.

Target population: older people

Two systematic reviews evaluated interventions to increase physical activity in older people. The higher quality (1++, A) review (van-der-Bij et al, 2002) is reported here in more detail. This review (van-der-Bij et al, 2002) evaluated interventions consisting of an exercise programme or aimed at promoting physical activity (e.g. information and counselling). Thirty eight studies with 16378 participants were included. Nine studies evaluated home-base physical intervention studies. Of the two studies reporting the outcome change in physical activity, one was a short-term intervention and the others were long-term. The short-term intervention study reported a decline in exercise activity 18 months after the intervention ended: 3.6 days/week versus 2.8 days/week. The long-term intervention study reported a decline in physical activity in both the intervention and control groups, with the decline being significantly larger in the control group.

Thirty eight studies evaluated group-based physical intervention studies. Four studies (two short-term and two long-term interventions) comparing baseline and follow-up physical activity levels for the intervention group reported outcome levels that were significantly higher than baseline. Five studies (three short-term and two long-term interventions) comparing control groups reported significantly higher physical activity levels in the intervention groups; four of these were the same studies reported for baseline to follow-up activity levels in the intervention group. Three studies (two short-term and one long-term intervention) compared activity levels at the end of the intervention with levels after 12, 18 or 120 months. Only one of these studies reported significantly higher physical activity levels in the intervention group than in the control group.

Ten studies evaluated educational physical activity interventions. All of the studies reported on the outcome change in physical activity. The six short-term intervention studies reported a significant increase in physical activity in the intervention group than in the control group. Three of the nine long-term interventions resulted in a significant improvement in physical activity levels. All three types of intervention can result in increased physical activity, but the changes are small and short-lived. The

participation rates for home-based and group-based interventions were comparable, and both seemed to be unrelated to the type or frequency of physical activity. There was no evidence of a beneficial effect of behavioural reinforcement strategies. The quality of the individual studies was unclear and the findings were not discussed in the context of study quality.

Another review of variable quality (1-,C) evaluated interventions aimed at increasing physical activity in older adults (mean age 65 years or older) (Conn et al, 2003). The authors reported that although significant numbers of aging adults increased their physical activity in response to experimental interventions, the amount of increased activity rarely equalled accepted behaviour standards to achieve positive health outcomes.

Summary of evidence for interventions targeting individuals

Eight systematic review evaluated interventions aimed at increasing physical activity in individuals. Six of these evaluated interventions for the general adult population, and two evaluated interventions for the older population. Interventions such as professional advice and guidance (with continued support) may be moderately effective in the short term (less than three months) in increasing physical activity for the general population. However, effectiveness is not necessarily sustained over a longer time period (e.g. twelve months). Many of the studies were limited by the recruitment of motivated volunteers, and no studies examined the effect of interventions on participants from varying socioeconomic or ethnic groups. In addition even those interventions which are moderately effective in increasing exercise are not meeting a predetermined threshold of physical activity. This conclusion was also supported by the findings from the review of interventions for the older population, which found a small but short-lived effect of home-based, group-based, and educational physical activity interventions on increasing physical activity. There is inconclusive evidence of effect for biomarker feedback or brief motivational interventions on physical activity. There is evidence of no effect for stage of change interventions to increase levels of physical activity.

Evidence statement for interventions targeting individuals

All adults

There is evidence of good quality (1++, A), that shows moderate evidence of effectiveness of individualised physical activity interventions for increasing (in the short term) self reported physical activity levels. However, other evidence of good quality (1 & 2+, A) indicates that most studies have no effect at the first follow-up (three months or more after the end of intervention).

There is evidence of good quality (1++, A), that shows a non-significant effect for reaching a predetermined threshold of physical activity (e.g., meeting current public health recommendations).

There is evidence of variable quality (1-, B), that shows an inconclusive effect of biomarker feedback or brief motivational interventions on physical activity.

There is evidence of good quality (1++, C), that show no effect of 'stage of change' based interventions on physical activity.

There is evidence of good quality (1&2+, C), that shows a mixed and inconclusive effect of counselling interventions on physical activity.

Older People

There is evidence of from two reviews (1++, A; 1-, C), that shows a small but short-lived effect of home-based, group-based, and educational physical activity interventions on increasing physical activity among older people.

3.1.2.2 Community level interventions

Five reviews evaluated community level interventions. One systematic review evaluated interventions in the workplace, and four systematic reviews evaluated pre-school or school based interventions.

Interventions in the workplace

One systematic review (1&2+, A) evaluated the effectiveness of worksite physical activity programmes on physical activity, physical fitness, and health (including outcomes such as physical activity levels, cardio respiratory fitness, muscle flexibility, muscle strength, and body weight and composition) (Proper et al, 2003). The interventions in the included studies consisted of self-help or educational programmes and exercise programmes involving aerobics, walking, jogging, swimming, cycling, muscle strengthening, endurance, flexibility and stretching. Fifteen RCTs (11454 participants) and 11 non-RCTs (5552 participants) were identified. Five studies (two RCTs and three non-RCTs) included exercise behaviour as an outcome. The review found that there was evidence from two high-quality RCTs that worksite physical activity programmes increased physical activity levels. One of the RCTs (n=8762) compared individually focussed activities (intervention) with self help programmes (control) over 2.5 years and found that there was a significant increase in physical activity (increase of 10.4% (interim) and 11.9% (end) versus 2.4% and 1.7% in the control group respectively). The other RCT (n=66) compared an exercise programme with a control group over 12 months. There were significant changes in energy expenditure in the intervention group (14.6%) compared with 6.5% in the control group.

Interventions in schools or colleges: children and young people

One review (Brunton et al, 2003) evaluated interventions to promote physical activity amongst children (aged 4-10 years) and focused on physical activity interventions beyond school-based physical education (1&2++, B). In addition, the authors evaluated the qualitative evidence. However, only five interventions (all US based) met the inclusion criteria. Interventions shown to be effective in a least one rigorous study include: education and provision of equipment for monitoring TV or video-game use; engaging parents in supporting and encouraging their children's physical activity; and multi-component, multi-site interventions using a combination of school-based physical education and home-based activities. Five qualitative studies examined children's views about physical activity. The authors found that whilst children have clear views on the barriers to, and facilitators of, their participation in physical activity, their views are often ignored in the development of interventions. Gaps (related to issues identified by the children) were most noticeable in relation to

restricted access to opportunities for physical activity (e.g. busy traffic, poor quality of playgrounds, and the need for local, easily accessible facilities). The authors concluded that whilst there has been a substantial amount of evaluation activity related to promoting children's physical activity, little of this has been conducted in the UK or amongst socially excluded children.

Another review (1&2-, B) also evaluated non-curricular approaches for increasing physical activity in children and adolescents aged 5 to 18 years (Jago & Baranowski, 2004). The included studies (n=9, total number of participants not stated) used physical activity during school breaks, active travel to school, extracurricular activities and summer schools or camps. Five studies evaluated physical activity during school breaks. Of these, three studies found that interventions during school breaks (painting school playgrounds, playground supervisors implementing a games curriculum, and taught playground games or introduced equipment) could increase physical activity by 17% to 60%. Another study found that an increased number of physical activity sessions during the day significantly increased activity among boys, but not girls. Finally one study found that structured break periods significantly increased self-reported physical activity in boys and girls. Of the other interventions (active travel to school, extracurricular activities and summer schools or camps) none of the studies found any significant effect compared with control.

One systematic review (1&2+, A) evaluated the effectiveness of school based interventions in promoting physical activity and fitness among children and youth (Dobbins et al, 2001). Nineteen studies were included in the review (total number of participants not stated) with a wide range of interventions including printed or audio-visual educational materials; school-based activities other than school curricula (e.g., school fun nights, walkathons, educational materials and/or sessions for school staff and parents); community-based interventions, such as training sessions and workshops for parents; counselling, health screening and the development of a community coalition. No synthesis was performed but the authors of the review reported that there is limited, but good evidence that school-based physical activity interventions are moderately effective in increasing physical activity rates in children and adolescents, and in increasing duration of physical activity among children. For example, one study reported that the percentage of adolescents who became regular exercisers at the end of the intervention period (7 weeks) was significantly higher in the intervention group than in the control group (30% of sample vs 20%; $p < 0.0003$). Compared to usual physical activity programmes, school-based physical activity promotion curricula are moderately effective in promoting physical activity and duration of physical activity in children and adolescent girls. Adults who participated in school-based physical activity promotion programmes as children are significantly more active in adulthood than those who did not participate in such programmes. The most effective school-based physical activity interventions include printed educational materials and curricula that promote increased physical activity during the whole day (i.e., recess, lunch, class-time, and physical education classes).

Another review (1&2+, A) synthesised both qualitative and quantitative evidence for interventions to increase physical activity in young people aged 11-16 (Rees et al, 2001). They found similar results but reported that when positive effects were detected these were restricted to young women. In terms of young peoples' views (from the qualitative studies), the vast majority saw physical activity as beneficial for

both health and social reasons. Young women particularly valued the role of physical activity in maintaining weight and a toned figure, but unlike young men, they found that physical activity did not fit in well with their leisure time. Ideas for promoting physical activity included: increasing or modifying practical and material resources, such as creating more cycle lanes, making activities more affordable, increasing access to clubs for dancing, and combining sports with leisure facilities; and more 'non-traditional' activities to choose from in school PE.

Summary of evidence for interventions targeting communities

Five reviews evaluated community level interventions. One systematic review evaluated interventions in the workplace, and four systematic reviews evaluated pre-school or school based interventions. There was evidence of a moderate effect of workplace physical activity programmes on increasing physical activity levels. These interventions consisted of self-help or educational programmes, exercise programmes involving aerobics, walking, jogging, swimming, cycling, muscle strengthening, endurance, flexibility and stretching. There was also moderate evidence of effectiveness for curriculum based activities in schools, but future research must take care to assess the impact of school-based physical activity interventions on indicators of physical activity and fitness. The most effective school-based physical activity interventions include printed educational materials and curricula that promote increased physical activity during the whole day (i.e., recess, lunch, class-time, and physical education classes). The most effective non-curricula based school activities included education and provision of equipment for monitoring TV or video-game use; engaging parents in supporting and encouraging their children's physical activity; those implemented during school breaks (painting school playgrounds, playground supervisors implementing a games curriculum, and taught playground games or introduced equipment). There was evidence that showed no effect of other non-curricula activities such as active travel to school, extracurricular activities and summer schools or camps.

Evidence statements for interventions targeting communities

Work based interventions

There is evidence of good quality (1& 2+, A), that shows a moderate positive effect of workplace exercise programmes on increasing physical activity.

School based interventions

There is evidence of good quality from two reviews (both scoring 1& 2+, A), that shows a moderate positive effect of school based interventions on increasing physical activity in school-aged young people. In 11-16 year olds, the positive effects were restricted to young women.

There is evidence of good quality (1& 2++, B), that shows a possible effect of non-physical exercise, school based, interventions on increasing physical activity among children aged 4-10 years.

There is evidence of variable quality (1& 2-, B), that shows an effect of non-curricula school based interventions (particularly those during school breaks) on increasing physical activity.

3.1.2.3 Population based interventions

Four systematic reviews evaluated population based interventions aimed at increasing physical activity. Two evaluated interventions to increase participation in sport, one evaluated interventions to promote walking and cycling, and one evaluated mass media interventions.

Increasing participation in sport

One systematic review (Jackson et al, 2005a) aimed to identify any intervention designed to increase active and/or non-active participation in sport (2+, A). These could include: mass media campaigns; information or education sessions; management or organisational change strategies; policy changes (e.g. to improve the socio-cultural environment to encourage people of specific age, gender or ethnicity to participate); changes to traditional or existing programmes (e.g. club or association-initiated rule modification programmes); provision of activities beyond traditional or existing programmes (e.g. 'Come and Try' initiatives, for instance teaser or taster programmes); skill improvement programmes; and volunteer encouragement programmes. No studies were identified which met the inclusion criteria. Another review (2++, A) by the same authors aimed to identify studies looking at the effectiveness of policy interventions organised through sporting organisations (Jackson et al, 2005b). However, as for the previous review, no studies were identified.

Promoting modal shift

Another systematic review (1&2+, A) evaluated interventions aimed at promoting walking and cycling as an alternative to using cars (Ogilvie et al, 2004). Population level interventions range from mass media campaigns to schemes to offer free bus passes, free bikes and so on. Twenty-two studies were included in the review (total number of participants not stated). There was some evidence that targeted behaviour change programmes (e.g. those offering information and advice tailored to peoples particular requirements) can change the behaviour of motivated subgroups, resulting (in the largest study) in a shift of around 5% of all trips at a population level. For example, the Walk In to Work Out self help package in Glasgow (Scotland) was evaluated in a randomised controlled trial in commuters identified as contemplating or actively preparing to change their behaviour. After six months, the intervention group reported an increase in mean time spent walking to work each week 1.93 (95% confidence interval 1.06 to 3.52) times greater than in people in the control group. The review found that the balance of best available evidence about publicity campaigns, engineering measures, and other interventions suggests that they have not been effective. Participants in trials of active commuting experienced short term improvements in certain measures of health and fitness, but no good evidence was found on effects on health of any effective intervention at population level.

Mass media

One review (2-, A) evaluated any studies of community-wide mass media interventions aimed at increasing physical activity (Finlay & Faulkner, 2005). Eight studies met the inclusion criteria (total number of participants not stated). The authors reported that six studies investigated changes in physical activity, and all but one

found an increase in physical activity post intervention. The increases in physical activity tended to be in small subgroups, or for specific behaviours such as walking.

Summary of evidence for interventions targeting populations

Four systematic reviews evaluated population based interventions aimed at increasing physical activity. Two evaluated interventions to increase participation in sport, one evaluated interventions to promote walking and cycling, and one evaluated mass media interventions. No studies have been undertaken to identify any intervention designed to increase active and/ or non-active participation in sport (including policy interventions). There is evidence that targeted behaviour change programmes can be effective in changing the transport choices of motivated subgroups, but the social distribution of their effects and their effects on the health of local populations are unclear. Evidence that other types of intervention have been effective is inconsistent, of low validity, based on single highly contextual studies, or non-existent. There is variable quality evidence that mass media interventions may increase physical activity, but the effects tended to be in small subgroups, or for specific behaviours such as walking

Evidence statements for interventions targeting populations

Participation in sport

There is evidence from two systematic reviews (2+, A; 2++, A) that no evidence exists for interventions designed to increase active and/or non-active participation in sport (including policy interventions).

Promoting modal shift

There is evidence of good quality (1& 2++, A), that shows an effect of behavioral interventions to encourage people to change their mode of transport to walking or cycling. However, the balance of best available evidence about publicity campaigns, engineering measures, and other interventions suggests that they have not been effective in this area.

Mass media

There is evidence of variable quality (2-, A), that shows an effect of community wide mass media interventions on increasing physical activity.

3.1.3 Alcohol misuse

Twelve reviews evaluated a range of interventions aimed at either reducing alcohol consumption in problem drinkers, preventing or delaying the onset of alcohol use in young people, and reducing dangerous activities associated with drinking (e.g. drink-driving). The majority of the reviews were evaluating interventions aimed at drinking and driving, and associated outcomes. No consistent definitions for the drinking patterns are available from existing guidelines or research; however, it is commonly held that less severe alcohol problems are appropriate for behavioural interventions, whereas more severe problems need specialty addiction treatment (Whitlock et al, 2004). Whitlock defines alcohol related behaviour as the following:

Risky or hazardous drinkers are at risk from consumption that exceeds daily, weekly, or per-occasion thresholds (other terms further distinguish risky/harmful users who exceed longer-term thresholds—“high-average” or “heavy users”—from “heavy occasional” or “binge” drinkers, who exceed per-occasion thresholds). *Harmful drinkers* experience physical, social, or psychological harm from their above-threshold alcohol use without meeting criteria for dependence. *Alcohol-abusing/-dependent drinkers* continue to use alcohol despite significant negative physical, psychological, and social consequences; generally meet criteria for abuse or; and are candidates for specialty addiction treatment.

Some of the reviews described participants as problem drinkers, which may be similar to either risky or hazardous drinkers, or harmful drinkers.

3.1.3.1 Interventions targeting individuals

Six reviews evaluated interventions for adult problem drinkers, pregnant women who were problem drinkers, or people convicted of drink driving.

Target population: all adults

One systematic review (1-, C) evaluated behavioural self-control training for problem drinkers (Walters Glenn, 2000). Interventions included:

- abstinence training
- standard programme
- education
- no contact
- information
- coping skills
- waiting-list controls
- counselling
- self-monitoring only.

Participants were classified as either being alcohol- dependent or problem drinkers (not clearly defined in the review). Seventeen studies were included with approximately 1118 participants in total. The fixed-effect model yielded a combined effect size for the entire sample of 17 studies of 0.33 (standard error 0.08). Behavioural self-control training was superior to no intervention or alternative non-abstinence-orientated interventions, but was not statistically significantly better than abstinence-programmes. Additional analyses found behavioural self-control training to be equally effective for use with alcohol-dependent and problem-drinking individuals, and for follow-ups spanning several months to several years. Compared with no treatment and non-abstinence-orientated interventions, behavioural self-control training for problem drinkers succeeded in reducing the amount of alcohol consumed and the degree to which a person experienced drinking-related difficulties.

Another review (1&2+, A) evaluated brief behavioral counseling interventions in primary care settings to reduce risky and harmful alcohol consumption (Whitlock et al, 2004). Participants were non-dependent drinkers 12 years of age or older who

received a primary care behavioral counseling intervention primarily to reduce alcohol intake. The authors included evidence from both systematic reviews and primary studies. Twelve controlled trials (total number of participants not stated) were included. Six to 12 months after good-quality, brief, multi-contact behavioural counseling interventions (those with up to 15 minutes of initial contact and at least one follow-up), participants reduced the average number of drinks per week by 13% to 34% more than controls did, and the proportion of participants drinking at moderate or safe levels was 10% to 19% greater compared with controls. One study reported maintenance of improved drinking patterns for 48 months. The authors concluded that behavioral counseling interventions for risky/harmful alcohol use among adult primary care patients could provide an effective component of a public health approach to reducing risky/harmful alcohol use.

A very similar review (1++, A) published the following year evaluated the same brief interventions (Bertholet et al, 2005). Nineteen studies were included (with a total of 5639 participants). The adjusted intention-to-treat analysis showed a mean pooled difference of -38 g of ethanol (approximately 4 drinks) per week (95% CI: -51 to -24g/wk) in favour of the brief alcohol intervention group. Evidence of other outcome measures was inconclusive. The authors also concluded that brief alcohol interventions are effective in reducing alcohol consumption at six and 12 months.

Target population: pregnant women

One review (1++, C) evaluated home visits during pregnancy and after birth for women identified as alcohol or drug mis-users (Doggett C, 2005). Only data relevant to this section is reported here. Women who were problem drinkers were defined as those who self reported a problem or women who 'risk-drunk' on average in excess of 80 g/day or were binge drinkers. Six studies (total number of participants 709 women) were included but none provided a significant antenatal component of home visits. Most studies had methodological limitations, particularly large losses to follow up. There were no significant differences in continued alcohol use (RR 1.08, 95% CI 0.83 to 1.41). The authors concluded that there is insufficient evidence to recommend the routine use of home visits for women who misuse drugs or alcohol.

Target population: drink drivers or all drivers

One Cochrane review (1&2++, C) evaluated alcohol ignition interlock programmes for reducing repeat drink driving offences (Willis et al, 2004). The ignition interlock system is designed to affect the driver's behaviour by requiring a change in their habits related to drinking and driving, as it provides immediate feedback on inappropriate alcohol consumption. The driver must provide a breath specimen and the vehicle will not start if the alcohol reading is too high. Further random tests are required during a journey. One randomised controlled trial (RCT) and 13 controlled trials were identified (total number of participants not stated). The RCT found that the interlock programme was effective while the device was installed in the vehicle; relative risk 0.36 (95% CI 0.21 to 0.63). Controlled trials support this conclusion, with a general trend in both first-time and repeat offenders towards lower recidivism (repeat offence) rates when the interlock device is installed. Neither the RCT nor the controlled trials provided evidence for any effectiveness of the programmes continuing once the device has been removed. The authors concluded that in order to eliminate potential selection bias, more RCTs need to be conducted in this area so that effectiveness, as well as efficacy, can be ascertained. The interlock programme

appears to be effective while the device is installed in the vehicle of the offender. Studies need to address ways of improving recidivism rates in the long term, as the major challenges are participation rates, compliance and durability.

Another systematic review (1&2-, C) evaluated remedial interventions with drink/drive offenders (Wells et al, 1995). Interventions included psychotherapy or counselling, education, contact probation, Alcoholics Anonymous, antabuse, general alcohol treatment and combined interventions. One hundred and ninety four studies were included (total number of participants not stated). The authors concluded that drink-driving remediation interventions generally have a positive effect on alcohol-related traffic events: a reduction of at least 7 to 9% in drink-driving recidivism and alcohol-related crashes. It also suggested that some combined interventions may be more effective than single strategy approaches. This review was undertaken in 1995, which means that the conclusions may need to be interpreted with caution, as new evidence might have been published more recently.

Evidence summary for interventions aimed at individuals

Six reviews evaluated interventions for adult problem drinkers. One review evaluated home visits for pregnant women who were problem drinkers, two targeted convicted drink drivers, and three further reviews among problem drinkers in general. There was evidence of a small positive effect of brief behavioural counselling interventions in reducing alcohol intake (mean reduction of approximately 4 drinks per week) in problem drinkers. There was variable quality evidence showing a small, positive effect of behavioural counselling interventions in reducing alcohol consumption. There was insufficient evidence of effect for home visits for women who were alcohol misusers. For drink drivers, there was evidence of an effect of alcohol interlock programmes, but the effect of other interventions was inconclusive due to the variable quality of the review.

Evidence statements for interventions targeting individuals

Problem drinkers

There is evidence of variable quality (1-, C), that shows a small effect of behavioural counselling interventions in reducing alcohol consumption among problem drinkers.

There is evidence of good quality from two reviews (1++, A; 1&2+, A), that shows an effect of brief behavioural counselling interventions in reducing alcohol intake among problem drinkers .

Pregnant women

There is evidence of good quality (1++, C), that shows insufficient evidence of effect for home visits during pregnancy in reducing alcohol consumption.

Drink drivers

There is evidence of good quality (1&2++, C), that shows a possible effect of alcohol ignition interlock programmes to reduce drink driving offences. There is no evidence of effectiveness of the programmes once the device has been removed.

There is evidence of variable quality (1&2-, C), that shows an effect of drink-driving remediation interventions in reducing drink-driving repeat offences and alcohol-related crashes.

3.1.3.2 Community level interventions

Interventions in schools or colleges: children and young people

Two reviews evaluated school based programmes to either prevent drinking and driving or prevent the onset of alcohol drinking. One systematic review (1&2+, A) evaluated the effectiveness of school-based programmes for reducing drinking and driving and riding with drinking drivers (Elder et al, 2005). Three types of interventions were evaluated: school-based instructional programmes, peer organisations, and social norming campaigns. Thirteen studies met the inclusion criteria (total number of participants not stated). For instructional programmes, the median estimated change was -0.10 standard deviations (SDs) (range: -0.22 to 0.04 SD). The median estimated change in the four studies evaluating the effects of such programmes on self-reported riding with drinking drivers was -0.18 SD (range: -0.72 to -0.10 SD). The instructional programmes varied widely with respect to several variables identified in previous research as being potentially important to programme effectiveness, including exposure time, programme content, and degree of interaction with students. There is sufficient evidence to recommend as effective school-based instructional programmes for reducing riding with drinking drivers. However, there is insufficient evidence to determine the effectiveness of these programmes for reducing drinking and driving. There was also insufficient evidence to determine the effectiveness of peer organizations and social norming campaigns, due to the small number of available studies.

A Cochrane review (1&2+, A) evaluated psychosocial or educational interventions aimed at preventing the onset of alcohol use or alcohol misuse by young people (Foxcroft et al, 2002). Psychosocial interventions are defined as those interventions that specifically aim to develop psychological and social skills in young people (e.g. peer resistance) so that they are less likely to misuse alcohol. Educational interventions are defined as those interventions that specifically aim to raise awareness of the potential dangers of alcohol misuse (e.g. increased knowledge) so that young people are less likely to misuse alcohol. Fifty-six studies were included (with a total of 88614 participants). Twenty of the 56 studies included showed evidence of ineffectiveness. However, no firm conclusions about the effectiveness of prevention interventions in the short- and medium-term were possible.

Evidence summary for interventions aimed at communities

The two reviews both targeted school children. There was evidence of a positive effect of school-based instructional programmes for reducing riding with drinking drivers. However, there is insufficient evidence to determine the effectiveness of these programmes for reducing drinking and driving. There is also insufficient evidence to determine the effectiveness of peer organizations and social norming campaigns, due to the small number of available studies. There is evidence of mixed effect for

psychological interventions aimed at preventing the onset of alcohol use or alcohol misuse by young people.

Evidence statements for interventions targeting communities

School based interventions

There is evidence of good quality (1&2+, A), that shows a positive effect of school-based instructional programmes for reducing riding with drinking drivers.

There is evidence of good quality (1&2+, A), that shows a mixed effect of psychological interventions aimed at preventing the onset of alcohol use or alcohol misuse by young people.

3.1.3.3 Population based interventions

Four studies evaluated population based interventions. Two evaluated mass media campaigns to reduce drink driving and two evaluated legislative interventions targeting young people

Mass media interventions

One systematic review (2-, B) evaluated mass media campaigns for reducing alcohol-impaired driving (AID) and alcohol-related crashes (Elder et al, 2004). Eight studies were included (number of participant not stated). The median decrease in alcohol-related crashes resulting from the campaigns was 13% (IQR: 6% to 14%). The authors concluded that the mass media campaigns reviewed were generally carefully planned, well executed, attained adequate audience exposure, and were implemented in conjunction with other ongoing prevention activities, such as high visibility enforcement. The authors also concluded that there is strong evidence that, under these conditions, mass media campaigns are effective in reducing AID and alcohol-related crashes. However, the evidence in the review, and the quality of the review, does not support this conclusion.

Another review (2+, B) evaluated the effectiveness of designated driver programmes for reducing alcohol-impaired driving (Ditter et al, 2005). Interventions included the use of mass media campaign to promote use of designated drivers and also interventions in 'drinking establishments' to provide incentives to use designated drivers. A single study of a population based designated driver promotion campaign was identified. Survey results indicated a 13 % increase in respondents "always" selecting a designated driver, but no significant change in self-reported alcohol-impaired driving or riding with an alcohol impaired driver. Eight studies of incentive programmes at drinking establishments met inclusion criteria. Seven of these evaluated the number of patrons who identified themselves as designated drivers before and after programmes were implemented, with a mean increase of 0.9 designated drivers per night. The eighth study reported a 6 percentage point decrease ($p < 0.01$) in self-reported driving or riding in a car with an intoxicated driver among respondents exposed to an incentive programme. The authors concluded that the present evidence is insufficient to draw conclusions about the effectiveness of either type of designated driver promotion programme evaluated.

Legislative and policy based interventions targeting young people

One systematic review (2-, D) evaluated the effectiveness of low blood alcohol concentration laws for younger drivers (Zwerling and Jones, 1999). These are laws limiting the blood alcohol concentration (BAC) permitted in younger drivers. In Australia, these laws limited the BAC permitted in all first year drivers, most of whom were 20 years of age or younger. In the US, these laws generally limited the BAC permitted among drivers 20 years of age or younger. Six studies were included (total number of participants not stated). Included studies were heterogeneous in terms of types of interventions, participants and outcome measures. However, all six studies showed a reduction in injuries or crashes after the implementation of the law, although, for 3 studies, these reductions were not statistically significant. Reductions in outcome in the other studies ranged from 11% to 33% with a cluster of parameter estimates just under 20%. The authors concluded that despite some methodological difficulties, the 6 ecologic studies reviewed represent accumulating evidence in support of the effectiveness of low BAC laws. The sum of the evidence is strengthened because similar results were found in different countries, using different laws, using different outcome variables, and using different research methodologies.

Another systematic review (2-, C) evaluated the effects of effects of minimum drinking age laws (Wagenaar & Toomey, 2002). The authors' objective was to determine the effectiveness of a policy of a minimum legal drinking age (MLDA) of 21 years in reducing the consumption of alcohol by the under-21s and the occurrence of alcohol-related harm. The outcomes assessed in the review were alcohol consumption, drink-driving and car accidents. The review included 132 studies (total number of participants not stated). *Alcohol consumption*: of the 55 analyses including comparison groups, 23 (42%) found a significant inverse relationship (higher minimum drinking age resulted in lower alcohol consumption); only 4 found a significant positive relationship. *Drink-driving and car accidents*: Of all analyses that reported significant effects, 98% found higher drinking ages associated with lower rates of traffic crashes. Only 2% found the opposite. However, the evidence was not entirely consistent: 35% of the analyses found no association between the legal age and indicators of traffic crashes. Of the 79 studies of higher methodological quality (i.e., those that include a longitudinal design, comparison groups and probability sampling or use of a census) 46 (58%) found a significant relationship between higher drinking ages and lower rates of traffic crashes; none found a significant positive relationship.

Summary of evidence for interventions targeting populations

Two reviews evaluated mass media interventions, and two evaluated legislative interventions. None of the four reviews included evidence from RCTs (mainly because of the difficulty of doing such trials in these areas). In addition, three out of the four reviews were of variable quality. One well conducted review found insufficient evidence of effectiveness for 'designated driver programmes' in increasing the number of designated drivers. No reviews evaluated evidence relating to mass media interventions to promote 'safe' drinking levels or reduce 'risk drinking' (e.g. binge drinking). The variable quality reviews found that effective interventions included mass media campaigns, minimum drinking laws, and low blood alcohol concentration law on alcohol and driving related outcomes.

Evidence statements for interventions targeting populations

Mass media campaigns

There is evidence of variable quality (2-, B), that found a positive effect of mass media campaigns on reducing alcohol impaired driving and crashes.

There is evidence of good quality (2+, B), that shows insufficient evidence of effectiveness for 'designated driver programmes' in increasing the number of designated drivers.

Legislative and policy based interventions targeting young people

There is evidence of variable quality (2-, D), that shows an effect of low blood alcohol concentration laws for younger drivers in reducing injuries or crashes.

There is evidence of variable quality (2-, C), that found a mixed effect of minimum drinking laws on alcohol consumption, drink driving and car accidents.

3.1.4 Healthy eating

Eight systematic reviews evaluating behavioural or psychological interventions to promote healthy eating were identified. Of these, two evaluated interventions aimed at individuals, and six evaluated community based interventions.

3.1.4.1 Interventions targeting individuals

Healthy eating: all adults

One systematic review (1+, C) evaluated the effectiveness of counselling in the primary care setting to promote a healthy diet (Ammerman et al, 2002). Outcomes were reducing the intake of total and saturated fat, increasing the intake of fruit and vegetables, and increasing the intake of fibre. Twenty nine studies were included in the review (total number of participants not stated). There were 17 studies of counselling about dietary fat, 10 of fruit and vegetable intake, seven of dietary fibre, and 12 of more than one nutrient or food group. *Effect of counselling on dietary fat intake:* six studies reported large effects, five had medium effects and six had small effects (large, >10% change in total fat or >3% change in saturated fat; medium, >5% to 10% change in total fat or >1.3% to 3% change in saturated fat; and small, 0% to 5% change in total fat or 0% to 1.3% change in saturated fat). *Effect of counselling on fruit and vegetable intake:* two studies reported large effects, five had medium effects and three had small effects (large, >1 serving; medium, 0.2 to 0.9 servings; and small, <0.2 servings). *Effect of counselling on dietary fibre intake:* four had medium effects and three had small effects, (large >6 g increase in consumption of fibre per day; medium, 1 g to 6 g increase in daily consumption; and small, <1 g change in consumption). The reviewers concluded that counselling patients can improve dietary habits. More intensive counselling, particularly that aimed at higher risk patients, may produce larger changes in behaviour.

Healthy eating: pregnant women and women of childbearing age

One systematic review (1&2+, A) evaluated the effectiveness of interventions to promote healthy eating in pregnant women and women of childbearing age (van

Teijlingen et al, 1998). Interventions included health education, counselling, changes in environment and changes in policy. Nine studies were included with over 4000 participants. In the five studies of women of childbearing age, results showed that participants could improve their dietary intake and that the changes were statistically significantly greater in groups receiving an intervention compared with the controls. In the four studies of pregnant women, only one study provided specific outcome data in relation to a healthy diet and that study had adequate statistical power and demonstrated small improvements in both control and intervention groups, with a greater, but statistically non-significant, improvement in the intervention group. The other three studies suggested that pregnant women appear to improve their intake of energy and possibly protein in response to interventions designed to improve pregnancy outcomes, but they did not provide data on other components of a healthy diet. Taken together, the authors concluded that it was not possible to show whether or not healthy eating interventions in pregnancy are effective.

Evidence summary for interventions aimed at individuals

Two reviews evaluated interventions with individuals aimed at promoting healthy eating. There was evidence of a positive effect of nutritional counselling interventions delivered to a primary care population in changing eating habits. There was no conclusive evidence of effect of interventions (health education, counselling, changes in environment and changes in policy) to encourage pregnant women to eat healthily.

Evidence statements for interventions aimed at individuals

Promoting healthy eating in all adults

There is evidence of good quality (1+, C), that shows a positive effect of nutritional counselling interventions delivered to a primary care population in changing eating habits.

Pregnant women

There is evidence of good quality (1&2+, A), that shows no conclusive evidence on the effectiveness of interventions to encourage pregnant women and women of childbearing age to eat healthily.

3.1.4.2 Community level interventions

Six reviews evaluated community level interventions. Three evaluated interventions aimed at children, one evaluated both workplace and other community-based interventions, another evaluated interventions outside the workplace and one evaluated interventions for older people.

Interventions to promote healthy eating in children and young people

One systematic review (1&2+, A) evaluated the effectiveness of interventions to promote healthy eating in preschool children aged 1 to 5 years (Tedstone et al, 1998). Fourteen studies were included with over 1800 participants in total. The results of the narrative synthesis are summarised below.

Interventions targeting children: Traditional, video or computer-based teaching methods were successful at increasing nutrition knowledge, and their effectiveness

was enhanced by including parents. A single study showed the same intervention to be more effective when delivered in a pre-school setting by teachers than in a home setting by parents. Studies assessing food consumption only measured snack selection as an outcome measure, and these showed variable results. The two studies that presented healthy and unhealthy snacks together appeared to show a less positive effect than those where only healthy snacks were offered to the children for evaluation purposes. Behavioural modification techniques using repeated exposure to initially novel foods were successful at increasing willingness to consume the foods, but only if tasting was used as part of the exposure. One study showed that the use of a reward to encourage consumption of foods was unsuccessful once the reward had been removed.

Interventions targeting carers. One-to-one diet counselling was successful at bringing about improvements in diet quality and food-related organisational skills in UK mothers. Nutrition education workshop and a related newsletter were shown to have differential positive effects on children's diets (based on parental questionnaire) when implemented in two different geographical locations. A nutrition education workshop had no effect on the menus offered by school meal providers in day-care centres. The authors concluded that there is currently insufficient evidence available to predict the format of successful healthy eating interventions that are likely to be effective at improving the nutritional well-being of UK pre-school children.

One review (1&2+, A) evaluated interventions to promote healthy eating in order to evaluate the barriers to, and facilitators of, healthy eating amongst children aged four to 10 years old (Thomas et al, 2003). This review combined both qualitative and quantitative studies. Of the 41 included studies, 33 were outcome evaluations and eight were process evaluations, which included children's views or the views of their parents/carers. Only the former meets our inclusion criteria and is reported below. A total of 16 of the 41 studies were carried out in the UK. The types of interventions evaluated by these studies were largely school-based, and often combined learning about the health benefits of fruit and vegetables with 'hands-on' experience in the form of food preparation and taste-testing. The majority targeted parents and/or involved them in intervention delivery alongside teachers and health promotion practitioners. Some included environmental modification involving, for example, changes to the foods provided at school. The results of the meta-analysis revealed that these kinds of interventions have a small, but significant positive effect. Pooled estimates from the nineteen studies suggest that implementation of these interventions will, on average, increase children's fruit intake by one-fifth of a portion per day and their vegetable intake by a little less than one-fifth of a portion per day. The results of the meta-analysis suggest that it is easier to increase children's consumption of fruit than vegetables.

A similar review (1&2+, A) evaluated healthy eating interventions in young people aged 11-16 years (Shepherd et al, 2002). Several multi-component interventions complementing classroom activities with school wide initiatives as well as involving parents were found to have positive effects. Although attitudes towards healthy eating were generally positive, personal preferences for fast foods on grounds of taste tended to dominate food choice. Young people particularly valued the ability to choose what they eat. Healthy foods were predominantly associated with parents/adults and the home, whilst fast food was associated with pleasure, friendship and social

environments. Factors inhibiting their ability to eat healthily included poor availability of healthy meals at school, healthy foods sometimes being expensive, and wide availability of, and personal preferences for, fast foods. Ideas for promoting nutrition included the provision of information on nutritional content of school meals (for young women particularly), and better food labelling.

Interventions to promote healthy eating in the workplace

One systematic review (1&2+, A) identified two studies of interventions with adults in the workplace (Ciliska et al, 1999).⁴ The results of the first trial indicated that the intake of fruits and vegetables increased from 2.6 to 2.8 servings/day in the intervention group, compared with 2.58 to 2.6 servings/day in the control group ($p < 0.001$). The results of the second trial showed that there was no post-test difference in the mean servings per month of fruit. The intervention group also experienced significant mean reduction in the servings/week of margarine and butter.

Interventions to encourage healthy eating in older people

One review (1&2+, C) evaluated 23 studies of interventions aimed at promoting healthy eating in older people (Fletcher & Rake, 1998). The interventions included: nutrition education targeted at the individual or the community; individual counselling; and policies to facilitate healthy eating behaviour, but not the provision of a meal.

Nutrition interventions with older people in the community meal setting: Only one study out of three found short-term benefits of the programme. Success was related to focusing on high-risk individuals, use of a motivational group-led model, and the emphasis on improving vitamin, protein and mineral intakes.

Nutrition interventions with older people in communal setting: None of the studies demonstrated adequate evidence for a benefit of intervention, although conversely, none provided adequate evidence for no benefit.

Nutrition interventions in the older population living in the community: Evidence for the effect of nutrition interventions targeting older people in the general community was poor.

Nutrition interventions as part of health promotion interventions: The results of three RCTs suggest that a feedback/goal-setting type intervention may lead to improved eating behaviours in older people. There was limited evidence for the effectiveness of healthy eating interventions in this age range. A strategy of individual feedback and goal-setting tended to be associated with a positive intervention. Two large trials that included nutrition as part of a general health promotion showed some benefits, but the setting was US-based and may not be easily applied in the UK.

Other community level interventions

A systematic review (1&2+, B) evaluated three non-worksites interventions with adults (see above Ciliska et al, 1999) We report only the results from the two interventions that fall within our inclusion criteria. In one trial, where participants received either tailored or non-tailored information regarding dietary change, there were no differences between the groups observed at 4-month follow-up. Both groups increased their fruit and vegetable intake by 0.25 servings/day. The results of the other study,

⁴ This review also evaluated increasing fruit and vegetable intake in children, but is superseded by Thomas et al, 2004.

which assessed the effectiveness of having a Healthy Heart Coalition, showed that there was no change in the proportion of people who consumed at least five servings of fruits and vegetables per day, whether or not they were from a community that had an active coalition.

One review (1&2+, A) evaluated health promotion interventions to promote healthy eating in the general population (Roe et al, 1997). The aim of the review was to summarise recent evaluations of 'Healthy Eating Interventions', and to critically assess the reliability of evidence on effectiveness and implications for future practice. There was a range of settings in the studies including school/ university, workplaces, primary care, and communities. Seventy six studies were included (over 100000 participants in total). Most good quality studies, which reported a dietary outcome measure, showed a benefit of intervention (15 studies out of 25). Long-term interventions in the population achieved reductions in dietary fat of 1 to 4% of energy intake. The greatest magnitude in change in diet was seen in studies with highly motivated volunteers in intensive programmes. A substantial number of studies showed no effect of the intervention on the main outcomes measured, compared with controls. The authors concluded that they found clear evidence from recent controlled studies that, despite difficulties inherent in achieving dietary change in the general population, healthy eating interventions were effective in a variety of settings and populations. This review also evaluated supermarket based interventions. The majority of interventions in supermarket and catering settings showed a positive effect on food purchases in the short term, that is, while the intervention was in place.

Evidence summary for interventions aimed at communities

Six reviews evaluated community level interventions. Three evaluated interventions aimed at children, one evaluated workplace interventions, one evaluated community level interventions for older people, and one evaluated other community level interventions (e.g. those set in restaurants and supermarkets). There is evidence of an effect of interventions aimed at increasing fruit and vegetable intake in children aged 4-10 and interventions for youth aged 11-16. However there is insufficient evidence of an effect for interventions in pre-school children. There is evidence of a small effect of workplace interventions on increasing fruit and vegetable intake. There is evidence of little or no effect of interventions to increase fruit and vegetable intake in the elderly. There was some evidence of effectiveness for interventions in communities to increase fruit and vegetable intake and generally eat a healthier diet. There is also evidence that interventions based in supermarkets are effective for promoting positive changes in shopping habits, although this is only in the short term.

Evidence statements for interventions aimed at communities

Healthy eating in children and young people

There is evidence of good quality (1&2+, A), that show that there is currently insufficient evidence available to predict the format of successful healthy eating interventions that are likely to be effective at improving the nutritional well-being of pre-school children.

There is evidence of good quality (1&2+, A), that shows an small, but significant positive effect of interventions aimed at increasing fruit and vegetable intake in children aged 4-10 years.

There is evidence of good quality (1&2+, A), that shows an effect of multi-component interventions complementing classroom activities in school wide initiatives (with young people aged 11-16 years) as well as involving parents on promoting healthy eating.

Healthy eating in the workplace

There is evidence of good quality (1&2+,A), that shows a small effect of workplace interventions on increasing fruit and vegetable intake (<0.5 portions a day).

Health eating and older people

There is evidence of good quality (1&2+, C), which show only a very limited effect of interventions to promote healthy eating in older people.

Healthy eating in non workplace based community-based interventions

There is evidence of good quality (1&2+, B), which show no effect of non-workplace based community-based interventions in promoting dietary change.

There is evidence of good quality (1&2+, B), that shows that supermarket based interventions can have an effect on food purchases, but only during the period of the intervention.

3.1.4.3 Population based interventions

No reviews were identified

3.1.5 Illicit drug use

Four reviews met our inclusion criteria for this section. The evidence is more abundant in the area of interventions aimed at treating drug users, which was specifically excluded under our search criteria.

3.1.5.1 Interventions targeting individuals

No reviews were found that met our selection criteria for this section.

3.1.5.2 Community level interventions

Four reviews met our selection criteria. The target population for the interventions in both reviews were young people (aged 25 or less). One review evaluated school based interventions, one evaluated non-school based interventions, one evaluated drug use prevention interventions with vulnerable young people and the last explored the adverse effects or negative behaviour change associated with drug use interventions.

Interventions with children and young people

One Cochrane review (1&2++, A) evaluated the effectiveness of school-based interventions in improving knowledge, developing skills, promoting change, and preventing or reducing drug use versus usual curricular activities or a different school-based intervention (Faggiano et al, 2005)). Thirty-two studies (29 RCTs and three controlled prospective studies) were included with 46539 participants. Thirty were conducted in North or Central America and one was conducted in the UK; most were focused on 6th-7th grade students, and based on post-test assessment. Knowledge focused programmes improved drug knowledge (standardised mean difference (SMD) 0.91; 95% CI: 0.42 to 1.39). Skills based interventions increased drug knowledge (weighted mean difference (WMD) 2.60; 95% CI 1.17 to 4.03), and decreased drug use (RR 0.81; CI 95% 0.64 to 1.02), marijuana use (RR 0.82; CI 95% 0.73 to 0.92) and hard drug use (RR 0.45; CI 95% 0.24 to 0.85). The authors concluded that skills based programmes appear to be effective in deterring early-stage illicit drug use.

Another Cochrane review (1++, A) evaluated interventions delivered in non schools settings intended to prevent or reduce illicit drug use by young people under 25 (Gates et al, 2006). Randomised trials were included that evaluated an intervention targeting illicit drug use by young people under 25 years of age, delivered in a non-school setting, compared with no intervention or another intervention, that reported substantive outcomes relevant to the review. Seventeen studies were included (total number of participants 1483). The majority of the studies were undertaken in the USA, with one in the UK and another in China. The included studies evaluating four types of intervention: motivational interviewing or brief intervention, education or skills training, family interventions and multi-component community interventions. Many studies had methodological drawbacks, especially high levels of loss to follow-up and there were too few studies for firm conclusions to be drawn across the reviews. One study of motivational interviewing suggested that this intervention was beneficial on cannabis use. Three family interventions (Focus on Families, Iowa Strengthening Families Programme and Preparing for the Drug-Free Years), each evaluated in only one study, suggested that they may be beneficial in preventing cannabis use. The studies of multi-component community interventions did not find any strong effects on illicit drug use outcomes, and the two studies of education and skills training did not find any differences between the intervention and control groups. The authors concluded that there is a lack of evidence of effectiveness of the included interventions. Motivational interviewing and certain family interventions may have some benefit.

A third systematic review (1&2-, D) of 16 studies with a mixture of study designs (RCTs, controlled quasi-experimental studies, nested cohort quasi-experimental etc) explored interventions aimed at preventing illicit drug-use among vulnerable young people (Roe and Becker, 2005). The definition of 'vulnerable young people' included young people leaving care, those with mental health problems, prostitutes and so on. All of the interventions included in this review were conducted in the USA and the findings have limited applicability to UK since many of the participants were from ethnic minorities and a wide range of social contexts that are not necessarily represented in the UK. A wide range of interventions were evaluated, including, for instance: life skills / social competence training; parent training, school-home liaison, anger management and other training for young people; social influence based drug prevention programme; individual, pair or group counselling; teacher training along

with combinations of the above and so on. The most common setting for these evaluations was in schools, where life-skills training interventions showed positive results in reducing illicit drug use (at least in the short term). In the community an intensive multi-component intervention (the Children at Risk programme) was the most effective. Across different settings the 11–13 age range appeared to be a crucial period for intervention with vulnerable young people. As the most vulnerable young people may not be attending schools it is also necessary to look at what works in other settings. This review found that in the community the CAR programme, an intensive multi-component prevention programme, produced positive results. The CAR programme made use of case managers to assess the multiple needs of at-risk young people and to co-ordinate the provision of necessary services.

Finally a review (2-, B) of 17 studies (participants n=11,995) from a range of international settings (including USA, Australia and Canada) evaluated the iatrogenic effects of interventions to prevent or slow the onset of alcohol, tobacco or drug use, or to reduce misuse (Werch & Owen, 2002). ‘Iatrogenic’ refers to the unintended, negative consequences associated with interventions. The studies had experimental or quasi-experimental research designs and participants included youths or young adults, especially those in grades 4 to 12 (U.S. education system, and/or equivalent) and college students. The interventions included drug prevention programmes (n=9) and alcohol prevention programmes (n=8); both types of programme included tobacco use. Only drug-related data is reported here. Drug prevention programmes resulted in 24 harmful effects, which included increases in alcohol use, cigarette use, marijuana use and multiple illicit drug use. The majority of negative effects were behavioural measures, resulting in increased consumption. The non-behavioural measures included increased drug-use offers. The authors concluded that researchers, publishers and practitioners should pay special attention to monitoring, measuring and reporting negative outcomes of prevention programmes. It is important that more is learned about which programme elements interact with which contextual factors to cause harm to which groups of young people.

Evidence summary for interventions aimed at communities

Four systematic reviews evaluated community level interventions to prevent illicit drug use with young people. The evidence base for this topic is limited and there are substantial gaps in the available evidence, which we discuss further in question 3.7. There is evidence that shows a positive effect of skill based programmes in schools, but inconclusive evidence of effects for non-schools based programmes. There is also some evidence that the 11–13 age range may be a crucial period for intervention with vulnerable young people. Although there is some evidence of effectiveness of drug prevention interventions, this area should be approached with caution since there is also evidence that interventions to prevent illicit drug use may cause an increased uptake of illicit drug use.

Evidence statements for interventions aimed at communities

There is evidence of good quality (1&2++, A), which shows a positive effect of skills based programmes in deterring early-stage illicit drug use in school children.

There is evidence of good quality (1++, A), which shows inconclusive effects of non-school based interventions in preventing illicit drug use in young people under the age

of 25. Motivational interviewing and some family interventions may have some benefit, but more research is needed.

There is evidence of variable quality (1&2-, D), which shows that life skills training in schools with vulnerable young people has a positive effect (at least in the short term).

There is evidence of variable quality (2-, B), which shows adverse effects of drug prevention interventions with young people.

3.1.5.3 *Population based interventions*

No reviews relevant to this section were found that met our selection criteria.

3.1.6 Sexual risk-taking in young people

Eight systematic reviews were synthesised in this section. Four reviews evaluated interventions to reduce or prevent HIV or other sexually transmitted infections and four reviews explored other sexual health interventions and / or interventions to prevent or reduce teenage pregnancies.

3.1.6.1 *Interventions targeting individuals*

No reviews were found that met our selection criteria for this section.

3.1.6.2 *Interventions targeting communities (e.g. schools)*

Interventions to reduce or prevent HIV or other STI's

A systematic review (1+, C) of 22 RCTs (participants n=5356) was conducted to evaluate human immunodeficiency virus (HIV) risk reduction interventions for adolescents (Pedlow & Carey, 2003). The participants were aged from 9 to 20 years from both general and high-risk populations. Only one study was conducted with homosexual teenagers. The interventions were conducted in schools, community sites and health care settings. The multi-component interventions evaluated in the review included group discussions, counselling, communication and negotiation skills, pamphlets on sexually transmitted infections (STIs), goal setting, social and self-rewards, education, HIV and youth speakers, problem-solving, self-management, cognitive skills training, modelling behavioural rehearsal with feedback, role-play, skills training, story telling, videos and games. Sixteen studies evaluated group interventions, with the number of sessions ranging from 1 to 12. Seven evaluated individual interventions, six with a single session and one with five sessions. Of the 23 interventions (within 22 RCTs), 13 achieved a statistically significant reduction in risk. Eight studies (four individual and four group) reported on the contraction of

STIs, which was reduced in 29% of the studies (one individual, one group). Fifteen studies (five individual, 10 group) reported on the number of sexual partners, which was reduced in 27% of the studies (one individual, three group). Fifteen studies (six individual, nine group) reported on condom use, which improved in 53% of the studies (two individual, six group). Seven studies (one individual, seven group) reported on the frequency of unprotected sex, which was reduced in 75% of the studies (six group). Seven studies (two individual, five group) reported on abstinence, which increased by 14% in one study (a group intervention of eight sessions). Four group intervention studies reported on delayed onset of sex, which increased in 50% of the studies. Twelve studies (intervention types unclear) reported on the frequency of sex, which was reduced by 42%. There was considerable evidence for the efficacy and effectiveness of HIV prevention programmes for adolescents. The authors also concluded that there was a need to improve research methodologies in this area.

Another review (1&2-, C) evaluated the effectiveness of behavioural and social interventions on the sexual risk behaviour of sexually experienced adolescents (13-19 years old) in the United States in both in-school and out-of-school settings (Mullen, 1999). The 20 included studies used control or comparison groups with either random assignment or non-random methods such as matching. A meta-analysis drew on 16 of these studies. The content of the interventions included interpersonal skills, technical skills and personal skills, with and without practice, as well as the provision of condoms, responsibility enhancement and content designed to increase the perceived risk of HIV/AIDS. Sex without condoms was less likely in the sexual risk reduction intervention group than the control/comparison group (13 studies): OR 0.66 (95% CI: 0.55, 0.79, $p < 0.001$). Intervention also had a positive protective effect on the mixed behavioural risk index (two studies) and the composite behavioural risk outcome (16 studies); the ORs were 0.66 (95% CI: 0.50, 0.88, $p < 0.01$) and 0.65 (95% CI: 0.50, 0.85, $p < 0.01$), respectively. Intervention was not associated with having fewer sexual partners in comparison with the control/comparison group (OR 0.89, 95% CI: 0.76, 1.05) or with reduced STI incidence (two studies; OR 1.18, 95% CI: 0.48, 2.86). There was a statistically-significant protective effect of sexual risk-reduction interventions, both in and out of the classroom, on sexual risk behaviour, primarily the risk of having sex without condoms.

Another review (1-, C) of six RCTs (participants $n = 1,043$) evaluated HIV prevention interventions targeted at adolescent females who were less than 19 years of age (Morrison-Beedy and Nelson, 2004). The interventions included group or individual sessions of information provision, motivational sessions, behavioural skills, parenting classes, videos, role play and counselling. Four of the six studies reported a significant effect of the intervention on an outcome measure. Two reported an increase in condom use, two a decrease in the number of sexual partners, and two a decrease in risky sex. The study reporting an increase in condom use and a decrease in risky sex was a community-based programme that gave information and improved motivation and behavioural skills. The study reporting a decrease in the number of sexual partners and risky sex was conducted in a school setting, and provided 2-hour interactive sessions with videos, skills-building exercises and role play. The study reporting an increase in condom use was set in a family planning clinic, and involved participants in a 10- to 20-minute discussion about STIs and condom use, and demonstration and role play. The study reporting a decrease in sexual partners was based in a children's hospital, and provided one 7-minute video and counselling, with

booster sessions. The authors stated that there was a paucity of research in this area and recommended that further clinical trials should be undertaken.

A review (1&2++, C) of 24 RCTs and CCTs (clinical controlled trials) with 34281 participants was conducted to evaluate the effectiveness of primary prevention interventions for preventing sexually transmitted infections (STIs) in adolescents aged 10 to 19 years (Yamada et al, 1999). Studies were based in schools, clinics and community-based programmes and were designed to prevent STDs by delaying the onset of intercourse or promoting safe sex behaviours. The validity of the studies was rated as 'moderate' for four studies (n=1,391) and 'weak' for the remaining 20 studies. Only one of the moderately rated studies measured initiation of sexual intercourse or abstinence and found non-significant results. One weak study reported a statistically significant improvement as a result of the intervention. Eight studies (three rated as moderate) found a statistically significant improvement in condom use. Four studies (one rated as moderate) found a statistically significant reduction in the number of sexual partners. Three studies (one rated as moderate) demonstrated a reduction in the frequency of sexual partners. Five studies (two rated as moderate) found a statistically significant reduction in the frequency of unprotected sexual intercourse. None of the moderately rated studies measured diagnosed cases of STIs. The authors concluded that it was possible to improve behaviours in adolescents that will protect against STIs. It also found that both community- and school-based STI prevention interventions did not lead to an increase in the number of adolescents who chose to become sexually active, or in the frequency of sexual intercourse.

Interventions aimed at sexual health and reduction of teenage pregnancies

A review (1-, C) compared the effectiveness of school-based abstinence-only programmes with those including contraceptive information (abstinence-plus) to determine which has the greatest impact on teen pregnancy (Bennett & Assefi, 2005). This was based on USA studies including 16 RCTs with sample sizes ranging from 36 to 10600. 50% of the trials had more than 1000 participants who were young people under 18 years of age. The settings of the programmes varied from the suburbs to the inner city and participants varied in ethnicity although the majority were white or African-American. Approaches used included encouraging abstinence, providing education about birth control, promoting community service activities, teaching skills to cope with peer pressure, career mentorship and school-wide activities to complement the classroom teaching. The results show that some abstinence-only and abstinence-plus programmes can change teens' sexual behaviours, although the effects are relatively modest and may last only short term. In one of three interventions using the abstinence only approach, there was a statistically significant positive effect on sexually inexperienced young people remaining so at the six month follow-up (77% compared to 50% of the control group). However, neither form of intervention affected the number of partners of sexually experienced young people. There was no evidence that teaching students about contraception in addition to abstinence encourages sexual activity. Although neither abstinence-only nor abstinence-plus programmes had sweeping effects on teens' sexual activity, programmes that offered contraceptive education significantly influenced students' knowledge and use of contraception. Over 80% of abstinence-plus programmes measuring contraceptive knowledge showed an increase at follow-up. In the absence of strong evidence that either type of programme can affect sexual activity, prohibiting contraceptive education in school-based pregnancy prevention

programmes prevents students' exposure to information that has the greatest potential to decrease the pregnancy rate.

Another review (1++, C) of 26 RCTs (including cluster RCTs) with 32207 participants evaluated the effectiveness of prevention programmes at delaying intercourse, increasing the use of contraceptives and reducing unplanned pregnancy among young people aged between 11 to 18 years (DiCenso et al, 2002). The pregnancy prevention interventions consisted of sex education classes, which were set in clinics based in schools, family planning clinics and also community-based. The included studies were carried out in North America, Australia, New Zealand or Western Europe, although most of the participants were African-American or Hispanic, and were from low socioeconomic groups. The intervention did not reduce pregnancy rates among young women in the programmes (12 trials; OR 1.04, 95% CI: 0.78, 1.40). There was evidence to suggest that the intervention increased the rate of pregnancy among the partners of young men in the programme (four of the five studies were abstinence programmes) (OR 1.54, 95% CI 1.03, 2.29). The intervention did not delay the initiation of sexual intercourse among either young women (13 trials; OR 1.12, 95% CI: 0.96, 1.30) or young men (11 trials; OR 0.99, 95% CI: 0.84, 1.16). The intervention did not increase the use of contraception at every intercourse among either young women (eight trials; OR 0.95, 95% CI: 0.69, 1.30) or young men (three trials; OR 0.90, 95% CI: 0.70, 1.16). The intervention did not increase the use of contraception at last intercourse among either young women (5 trials; OR 1.05, 95% CI: 0.50, 2.19) or young men (4 trials; OR 1.25, 95% CI: 0.99, 1.59). Intervention programmes did not decrease the number of pregnancies in adolescent women in the programme, but they might increase the pregnancy rates among partners of male participants in abstinence programmes. In addition, such programmes did not delay the initiation of sexual intercourse or increase the use of contraception by young people of either gender.

A systematic review (1&2-, C) of USA studies explored the effectiveness of counselling in the clinical setting to prevent unintended pregnancy (Moos et al, 2003). We report only the section relevant to behaviour change, involving four studies (3607 participants) including young people aged between 12-20 years of age from white, African American and Hispanic backgrounds. The included studies were of slide presentation plus reproductive health consultation with a health professional compared with control; traditional counselling compared with contingency planning counselling; individual and group interventions as part of a wider programme; and experimental counselling. Study designs including one RCT, two longitudinal cohort studies, and one cohort study with retrospective analysis. The authors found that there was no good-quality evidence available to assess the effectiveness of counselling. Methodological flaws included the potential for selection bias, the potential for non-comparable treatment groups and a high drop-out rate. No experimental studies that analysed harms were identified. They therefore concluded that there were insufficient good-quality studies to assess the effectiveness of counselling on unintended pregnancy.

A systematic review (1&2-, C) of 24 RCTs and non-randomised studies (participants n=27978) was conducted, drawing on studies set in the USA (Robin et al, 2004). This review evaluated adolescent sexual risk-reduction programmes that used quasi-experimental or experimental methods. A range of interventions were evaluated,

although all included some form of knowledge based education (sexual health, condom use etc) or skills based (condom use), life skills, careers advice, problem solving and abstinence. The studies were based on a range of models or theories including: social cognitive theory of planned behaviour; protection motivation; problem solving therapy; health belief model; social learning; social inoculation; and the social influences model. Among frequently measured behaviours, condom use (eight studies of 12) was affected most consistently, and delayed initiation of sexual intercourse (four studies of 11) was affected least consistently. Among measures less commonly used, the most consistent impact was observed for whether participants became pregnant or impregnated their sexual partners. Three studies reported negative findings: (a) increased likelihood of males in the intervention group engaging in sex within the last month relative to the control group; (b) increased reports of pregnancy and STD; (c) less contraceptive use at most recent sex among females who were sexually inexperienced at baseline; or (d) less contraceptive efficiency (i.e. an index measure combining the consistency of contraceptive use and effectiveness of the selected method of contraception) among females in the intervention group. It is worth noting that most studies did not test the treatment by subgroup interaction before conducting subgroup analyses. Programmes with positive effects most commonly employed interactive and participatory educational strategies. Although we have found that effective programmes emphasize skills that reduce specific behaviours, interventions more generally targeted toward increasing youth resiliency and competencies are emerging as promising approaches to reducing sexual risk behaviour. The authors found that focusing on appropriate skills, adapting programmes for length, being clear about what constitutes a given programme, and deciding who should facilitate them should all be considered. Additionally, resiliency-based programmes should be further explored to determine their efficacy in reducing sexual risk behaviours among adolescents. Researchers should also design studies that will clearly reveal which programme characteristics drive positive effects in sexual risk-reduction. Research in this decade will build on the advances in sexual risk-reduction evaluations and programmes of the 1990's.

Evidence summary for interventions aimed at communities

Eight systematic reviews evaluated interventions related to sexual risk-taking among young people. Four of these focused on the reduction or prevention of HIV or other STIs and four evaluated sexual health promotion and the reduction or prevention of teenaged pregnancies. There was a range of quality of reviews in this section and the majority of the authors commented on the poor quality of existing studies, which made the process of synthesising evidence difficult. However, there are some clear lessons to be learned. Firstly, in the area of risk reduction and prevention programmes, there is evidence that interventions are most effective in promoting the uptake of condom use, with some success in reducing the number of sexual partners and the frequency of sex. The section related to teenage pregnancy and sexual health provides additional evidence that interventions that seek to promote the use of contraception were more effective than interventions that promote abstinence. There was a single study of counselling to prevent or reduce teenage pregnancies, but the authors found that the available evidence was of such poor quality that they were unable to reach any conclusions as to effectiveness. Clearly there is a need for further research in this area, which we discuss further in section 3.7.

Evidence statements for interventions aimed at communities

There is evidence of variable quality (1-, C), that school-based abstinence versus abstinence plus contraceptive advice interventions have little or no effect on the sexual behaviour of young people, although they do show an effect on knowledge and use of contraceptives.

There is evidence of good quality (1++, C), which shows no effect of pregnancy reduction interventions and also no effect on delaying the initiation of sexual intercourse or increasing the use of contraception by young people of either gender. There is evidence of an effect of the intervention to increase the rate of pregnancy among the partners of young men in the abstinence programmes.

There is evidence of variable quality (1&2-, C), which shows a lack of evidence for the effectiveness of counselling in clinical settings to prevent unintended teenage pregnancy.

There is evidence of good quality (1+, C), which shows a positive effect of HIV risk reduction interventions for sexual risk taking in young people.

There is evidence of good quality (1&2++, C), which shows a positive effect of sexual health promotion interventions on improving condom use and reduction in both frequency of sex and number of sexual partners in adolescents to protect against STIs.

There is evidence of variable quality (1&2-, C), which shows a positive effect of sexual risk-reduction interventions on the sexual risk behaviour of sexually experienced adolescents, particularly the risk of having unprotected sex.

There is evidence of variable quality (1&2-, C), which shows mixed effects (both positive and adverse effects) of sexual risk reduction interventions on the sexual risk behaviour of adolescents.

There is evidence of variable quality (1-, C), which shows an effect of gender specific HIV risk reduction interventions for sexual risk taking in young women.

3.1.6.3 Interventions targeting populations

No reviews were found that met our selection criteria for this section.

3.2 What is the evidence for effectiveness of interventions to change knowledge related to health behaviours, at what level (individual / community / population), and for which population groups (e.g. young people, pregnant women, older people)?

Seven reviews were identified as being relevant to this section. Because of the assumed nature of the relationship between knowledge and behaviours, many of the reviews and studies below also appear elsewhere in this report. For instance, many studies used educational interventions (thereby increasing knowledge) but measured outcomes in terms of changes in behaviour. This section is therefore restricted to reporting only data that was clearly separated from behaviour change data.

3.2.1. Smoking & tobacco use

There were no reviews relevant to smoking and tobacco use that reported on changes in knowledge.

3.2.2. Physical activity

A systematic review (2-, A) of eight studies with a pre-test and post-test design investigated the effectiveness of physical activity interventions using mass media at the community level (Finlay and Faulkner, 2005). Participants ranged in ages from 16-65 years and included two UK studies. Differing combinations of the following mass media interventions were used: television programmes and advertising, radio programmes and advertising, direct mail, newspapers, posters, leaflets, campaign events and merchandise, incidental news coverage, magazines, public service announcements, publicity tours, resource manuals, videos, postcards, websites, books, information lines, and workplace flyers. Overall, the eight studies showed that mass media interventions influenced short-term recall of physical activity messages. Changes in knowledge were noted in certain demographic groups. Mass media interventions were effective in increasing short-term physical activity message recall and in producing more moderate changes in physical activity knowledge.

3.2.3. Alcohol misuse

None of the reviews of alcohol misuse reported on changes in knowledge.

3.2.4. Healthy eating

A systematic review (1&2+, A) of 14 studies (RCTs and non-RCTs, prospective cohort studies with concurrent controls, intervention studies with a historical control group, retrospective controlled studies) was conducted to evaluate interventions promoting healthy diets in children aged 1 to 5 years (Tedstone et al, 1998).

Participants (n= 1886) included children, their parents, other family members, and other carers such as nursery staff. The socioeconomic backgrounds and ethnicity of participants varied widely across the studies. Interventions included a wide range of healthy eating promotions aimed at children in a pre-school or day-care setting, children at home; new nutrition education curriculum and delivery techniques (with and without parental involvement); exposure to novel foods; and healthy eating promotions aimed at carers or parents. Most studies demonstrated some positive effect on nutrition knowledge. There were no data to evaluate the long-term effectiveness on knowledge. Traditional, video or computer-based teaching methods were successful at increasing children's knowledge of nutrition, and their effectiveness was enhanced by including parents. Nutrition education workshop and a related newsletter were shown to have differential positive effects on children's diets (based on a parental questionnaire) when implemented in two different geographical locations. A nutrition education workshop had no effect on the menus offered by school meal providers in day-care centres.

Another systematic review (1&2+, A) evaluated the effectiveness of specific interventions on changes in pregnant women's dietary knowledge (van Teijlingen et al, 1998). This included nine studies (4,075 participants) of RCTs, non-randomised controlled before-and-after studies, and non-randomised controlled trials and interrupted time series analyses. In the five studies of women of childbearing age, results showed that participants could improve their knowledge and dietary intake and that the changes were statistically significantly greater in groups receiving an intervention compared with the controls. One study of pregnant women evaluated changes in knowledge and demonstrated small changes in the desired direction in control and intervention groups; the difference in knowledge scores between the groups reached statistical significance but the magnitude of the difference is unlikely to represent an improvement that is worthwhile in practice. The authors state that women of childbearing age, and women who are pregnant, may be responsive to interventions designed to promote healthy eating. However, the evidence is insufficiently robust to recommend immediate implementation of the interventions without further evaluations.

3.2.5. Illicit drug use

One Cochrane review (1&2++, A) evaluated the effectiveness of school-based interventions in improving knowledge, developing skills, promoting change, and preventing or reducing drug use versus usual curricular activities or a different school-based intervention (Faggiano et al, 2005). 32 studies (29 RCTs and three controlled prospective studies) were included with 46539 participants. Thirty were conducted in North or Central America and one was conducted in the UK; most were focused on 6th-7th grade students, and based on post-test assessment. Knowledge focused programmes improved knowledge about the negative consequences of drug use (standardised mean difference (SMD) 0.91; 95% CI: 0.42 to 1.39). Skills based interventions also increased knowledge of issues related to drug use (weighted mean difference (WMD) 2.60; 95% CI 1.17 to 4.03). Programmes based on skills enhancement, when compared with knowledge-based programmes, showed a slight effect on knowledge about drugs at post-test (SMD 0.02; 95% CI -0.18 to 0.22 - test for heterogeneity $p = 0.50$).

3.2.6. Sexual risk taking in young people

A review (1&2-, D) of 67 studies based in the USA evaluated the effects of school-based sexual health education interventions on adolescents' sexual knowledge (Song et al, 2000). The study designs were not reported apart from stating that the review was based on studies with statistical data. The 67 studies reported 72 outcomes regarding sexual knowledge, which were grouped into six independent variables related to knowledge about sexuality. For all studies, 97% of weighted effect sizes were positive. The weighted average effect size on sexual knowledge across all studies of 0.41 was statistically significant, indicating a significant difference occurred between control and experimental groups' mastery of objectives related to sexual health knowledge. It was concluded that sexual health education programmes positively affect overall knowledge of sexual health.

A systematic review (1&2-, C) of four studies with 3,607 participants (RCTs, longitudinal cohort studies, or cohort studies with retrospective analysis) was conducted to evaluate the effect of counselling in a clinical setting in the USA to prevent unintended pregnancy in adults and adolescents (Moos et al, 2003). Participants were aged between 12-20 years and were from white, African American and Hispanic backgrounds. The interventions, randomised at the individual level, were of slide presentation plus reproductive health consultation with a health professional compared with control; traditional counselling compared with contingency planning counselling; individual and group interventions as part of a wider programme; and experimental counselling. The authors concluded that there was no good-quality evidence available to assess the effectiveness of counselling. The four studies were not well designed and had poor internal and external validity. However, one RCT (1449 teenage boys) showed increased knowledge about STIs and one cohort study (79 pregnant teenagers) showed that at six months the programme significantly increased contraceptive knowledge between teenagers with and with no repeat pregnancy, but found no significant difference at two years.

Another systematic (1-, C) review of 16 RCTs, compared school-based abstinence-only programmes with those including contraceptive information (abstinence-plus) to determine which has the greatest impact on teenage pregnancy, including adolescents' contraceptive knowledge (Bennett and Assefi, 2005). Participants were under 18 years of age and attending school in the USA. Programmes that offered contraceptive education significantly influenced students' knowledge and use of contraception. Over 80% of abstinence-plus programmes measuring contraceptive knowledge showed an increase at follow-up.

Evidence Summary

Although there are many reviews in these areas that report on behaviour change, it is less common for these studies to make changes in knowledge one of their outcome measures. There was only one variable quality review related to physical activity, which showed that mass media interventions influenced short-term recall of physical activity messages. There were two good quality reviews on healthy eating. One showed evidence of effectiveness in promoting knowledge of healthy eating in the 1-5 year old age group. Most studies within this review demonstrated some positive effect

on nutrition knowledge, which was enhanced by including parents in educational sessions. The other showed some evidence of effect in increasing knowledge of nutrition in pregnant women. There were three variable quality reviews related to sexual risk taking among young people. Two of the studies were school-based educational interventions that found an effect on increased knowledge of sexual health (STI's and contraception). The other setting was clinically based and found that there was insufficient evidence regarding the effectiveness of counselling on teenage pregnancy, but there was an increase in knowledge of contraception. Over 80% of programmes measuring contraceptive knowledge showed an increase at follow-up. One review found that school based interventions could improve knowledge of the implications of illicit drug use. There were no reviews that clearly reported changes in knowledge related to either smoking and tobacco use or alcohol misuse.

Evidence Statements

There is evidence of variable quality (2-, A), which shows an effect of mass media interventions in changing knowledge of physical activity messages in the short term among those aged between 16-65 years.

There is evidence of good quality (1&2+, A), which shows an effect of interventions to promote healthy diets in children aged 1-5 years.

There is evidence of good quality (1&2+, A), which shows a positive effect of interventions to promote pregnant women's knowledge of healthy eating.

There was evidence of good quality (1&2++, A) that shows a positive effect of school based interventions on knowledge of the negative consequences of illicit drug use.

There was evidence of variable quality (1&2-, D), which shows an effect of sexual health education interventions in schools for positive increases in sexual health knowledge among young people.

There was evidence of variable quality (1&2-, C), which shows an effect of counselling in the clinical setting to increase knowledge of STIs and contraceptives among young people.

There was evidence of variable quality (1-, C), which shows an effect of school-based contraceptive education on young people's knowledge of contraceptives.

3.3. What is the evidence for effectiveness of interventions to change attitudes related to health behaviours, at what level (individual / community / population), and for which population groups (e.g. young people, pregnant women, and older people)?

In the same way that findings on knowledge change were limited by its conceptualised relationship with behaviour, we found only three systematic reviews that explicitly explored a change in attitudes related to interventions in the six health behaviours. The reviews below all appear elsewhere in the report under other research questions, therefore only the data relevant to attitude change is reported here.

3.3.1. Smoking & tobacco use

A systematic review (1&2+, C) evaluating the effectiveness of mass media campaigns in preventing the uptake of smoking in young people also explored the impact on attitudes towards smoking in young people aged less than 25 years (Sowden & Arblaster, 1998). The review included six studies (five in the USA and one in Norway): randomised trials, controlled trials without randomisation and time series studies. Two of these studies found statistically significant differences between the intervention and control groups on intermediate outcomes, such as attitudes towards smoking, smoking norms and intentions to smoke in the future.

3.3.2. Physical activity

None of the reviews of physical activity reported on attitude change.

3.3.3. Alcohol misuse

None of the reviews of alcohol misuse reported on attitude change.

3.3.4. Healthy eating

One systematic review (1&2+, A) evaluated the effectiveness of specific interventions on changes in pregnant women's attitudes towards healthy eating (van Teijlingen et al, 1998). This review included nine studies (4075 participants) of RCTs, non-randomised controlled before-and-after studies, and non-randomised controlled trials and interrupted time series analyses. In one of the four studies of pregnant women, changes in knowledge and attitudes were evaluated, demonstrating small positive changes in the desired direction in control and intervention groups. The authors state that women of childbearing age, and women who are pregnant, may be responsive to interventions designed to promote healthy eating. However, the evidence is insufficiently robust to recommend immediate implementation of the interventions without further evaluations.

Another review (1&2+, B) evaluated attitudes of school children toward healthy eating programmes (Ciliska et al, 1999). There was also a significant improvement in attitude towards eating nutritious foods and vegetables, but not towards eating new foods. A second study, which assessed a curriculum taught over grades 3, 4 and 5 on the experience of eating a variety of foods, indicated that there were no overall significant differences in the groups on attitude scores at post-test.

3.3.5. Illicit drug use

There were no reviews that used change in attitudes towards illicit drug misuse as an explicit outcome measure.

3.3.6. Sexual risk taking in young people

No systematic reviews were found that were relevant to change in attitudes towards sexual risk taking in young people.

Evidence Summary

Only three systematic reviews reported data relevant to this section: two on healthy eating and the other on smoking. All were good quality reviews. One healthy eating review found a positive change in attitudes towards healthy eating in pregnant women and women of child bearing age. Another healthy eating review found inconclusive evidence for curriculum based interventions to promote a change in attitudes in children. A mass media intervention showed that it was effective in changing attitudes towards smoking in young people. There were no reviews relevant to changing attitudes towards physical activity, alcohol misuse, illicit drug use and sexual risk taking among young people.

Evidence Statements

There was evidence of good quality (1&2+, A), which shows an effect of interventions to promote positive attitudes towards healthy eating among women.

There was evidence of good quality (1&2+, B), which shows an inconclusive effect of interventions to promote positive attitudes towards healthy eating among school children.

There was evidence of good quality (1&2+, C), which shows an effect of mass media interventions on attitudes towards smoking and intentions to smoke among young people under 25 years.

B. Research Questions: the evidence across health behaviours

3.4. Is there any evidence to suggest that some interventions are effective / ineffective across the range of health behaviours?

Many of the interventions included in this review were behaviour specific – e.g. aversion therapy for smoking cessation, tobacco bans, and drink driver related interventions. However, there were a few interventions that were used across the behaviours such as counselling and physician advice, and motivational interventions. Mass media interventions were also used to promote behaviour change/encourage positive behaviour across several of the behaviours. This section is divided into three sub-sections: the forms of intervention that were found to be effective across the range of health behaviours; interventions that had inconclusive evidence of effectiveness and finally, those interventions that have been ineffective across the health behaviours.

Effective

Individual level interventions

Interventions aimed at pregnant women (e.g. smoking cessation, nutritional advice, or exercise) show some evidence of effectiveness.

Physician advice or counselling was effective for smoking cessation, reducing alcohol consumption and promoting healthy eating.

Counselling interventions appear to have an effect in tobacco cessation and alcohol consumption, but the evidence was inconclusive for preventing unwanted pregnancies, and there was no evidence of effect for illicit drug use.

Community level interventions

School based approaches show some effectiveness across all of the health behaviours.

Workplace interventions may have an effect on smoking cessation, and promoting healthy eating and exercise. It is not known whether they are effective for other health behaviours such as alcohol misuse and illicit drug use.

Population level interventions

Mass media interventions show some effect in changing knowledge, attitudes and behaviour across a range of activities such as tobacco use, physical exercise, drink driving and riding with drink drivers, and healthy eating. However the evidence is not strong and the effects are likely to be small.

Legislative and policy interventions such as minimum age drinking laws and smoking bans show some effect.

Inconclusive

Motivational interventions and biomarker feedback have inconclusive evidence of effectiveness for smoking cessation, physical activity, and healthy eating.

Ineffective

Stage based approaches are not effective in either smoking cessation or the promotion of physical activity.

3.5. What is the evidence for the effectiveness of different models / theoretical approaches in changing behaviour, attitudes or knowledge?

As discussed in the background to this report, different theories and models have been applied to try to understand and predict a range of health behaviours. The main theories of health behaviour are based on social cognition models. Such models assume that an individual's behaviour is best understood by perceptions of the social environment.²⁶ There are two distinct types of health behaviour models. Firstly, those that can be seen as continuum accounts of behaviour (the Health Belief Model, and the Theory of Planned Behaviour) and secondly, those that are stages of behaviour (e.g. Transtheoretical Model).²⁷ Although many of the interventions included within this report may be informed by models or theories of health behaviours, few reviews actually focused on an investigation of the efficacy of these models and theories. The model most often discussed in the reviews was the trans-theoretical model (TTM). The TTM model identifies five stages of change: pre-contemplation, contemplation, preparation, action and maintenance. The effectiveness of different models or theoretical approaches is another area that lacks an evidence base, which we discuss further in section 3.7.

3.5.1. Smoking & tobacco use

A systematic review (1&2-, C) of 16 studies (RCTs, CTs, pre-test post-test studies, surveys and cohort studies) evaluated the effectiveness of the trans-theoretical model (TTM) in smoking cessation interventions (Andersen et al, 1999). TTM was used in a wide range of interventions including information provision, with or without follow-up phone calls; stage-tailored letters; counselling sessions; Quit and Win contest; support groups; teaching of coping and problem solving skills; NRT; church based self help intervention; doctor provided information and advice to quit; and a population based intervention comparing intensive culturally specific intervention and self help. Co-interventions included financial rewards for participation in study. Only results from the RCTs are reported here. One RCT allocated smokers with low readiness to change to three tailored letters, one tailored letter, self-help guide, or no materials and reported that at 6 months both tailored letters led to greater stage transition among immotives, and that three tailored letters led to significantly greater intention to quit. One RCT compared TTM and action oriented conditions in 135 adolescents enrolled on a two year smoking cessation program and reported no statistically significant difference between conditions. One RCT allocated volunteer smokers recruited by newspaper ads to standardised self-help manuals (ALA) individualised manuals matched to stage (TTT), interactive expert systems computer reports (ITT), or personalised with four counsellor calls, stage manuals, and computer reports (PITT) and found that, at 18 months, ITT produced significantly more prolonged abstinence, TTT group were significantly better than ALA, and ITT was significantly better than both ALA and TTT. One RCT allocated 521 low-income pregnant women to usual care or physician provided information, cessation pamphlet and advice to quit and found there to be no significant differences in stages of change

between second and 36th week in either group. Another RCT allocated 22 African American churches either to intensive culturally specific intervention or self-help and found that after 18 months there were no significant differences in quit rates between the groups, though there was significantly more progress along stages of changes and more awareness of and contact with cessation programmes in intervention groups. The authors concluded that TTM has not been fully tested in smoking cessation interventions, nor have the process mediators been used to determine the mechanism of smoking behaviour change.

3.5.2. Physical activity

Two systematic reviews also evaluated the trans-theoretical model of change for physical exercise. One systematic review (1&2+, A) of 16 studies with 7,465 participants (set in both the UK and USA) evaluated whether interventions based on the trans-theoretical model (TTM) are more effective than other interventions in promoting physical activity (Adams & White, 2003). Study designs included RCTs, non-randomised studies and uncontrolled before-and-after studies. The specific interventions in the included studies were counselling and/or written information. There was substantial heterogeneity in the programmes reviewed and this made comparison difficult. Losses to follow-up were often high, ranging from 3 to 61%. In the short term (less than 6 months), most studies (11 out of 15) reported some significant benefit of TTM-based interventions over control conditions, in terms of either stage progression or activity levels. Only 6 studies showed a statistically-significant benefit in terms of increased activity. In one study, the control group (who were given 6 months' free gym membership, starting with 3 weeks of supervised exercise instruction) showed a statistically-significant increase in activity levels in comparison with TTM interventions. In the longer term (over 6 months), only 2 out of 7 studies reported some benefit of TTM-based programmes. The authors concluded that TTM-based activity promotion programmes generally found some short-term benefits in terms of activity levels or stage of activity change. Few studies demonstrated any longer term benefits (over 6 months).

Another review (2-, A) also evaluated the trans-theoretical model of change in relation to physical activity and exercise (Marshall & Biddle, 2001). The review contained 71 published studies from a range of countries including the UK. The stage of change and physical activity was consistent with the TTM; the level of physical activity increased as individuals moved to a higher stage of change. The largest effect was evident for preparation for action ($d=0.85$, 95% CI: 0.64, 1.07). Small to moderate increases in physical activity were also evident from pre-contemplation to contemplation ($d=0.34$, 95% CI: 0.14, 0.55; failsafe $k=7$), suggesting that transitions between inactive stages are associated with changes in physical activity. Self efficacy: the effect estimates across the stage transitions were all positive and significant, suggesting that confidence to be active increased with each stage of change, as proposed by the TTM. The authors offer three general conclusions. Firstly, existing data are unable to confirm whether physical activity behaviour change occurs in a series of stages that are qualitatively different, or along adjacent segments of an underlying continuum. Secondly, there is a growing need to standardise and improve the reliability of measurement of the stages of the TTM. Finally, the role of processes

of change requires re-examination, as higher order constructs are not apparent in the physical activity domain and stage by process interactions.

3.5.3. Alcohol misuse

There were no systematic reviews that evaluated the effectiveness of different models to interventions related to alcohol misuse.

3.5.4. Healthy eating / diet

No systematic reviews were found that evaluated the effectiveness of different models used in interventions aimed at promoting healthy eating.

3.5.5. Illicit drug misuse

Illicit drug misuse was another area where no reviews were found that evaluated the effectiveness of different theories related to changing knowledge, attitudes or behaviour.

3.5.6. Sexual risk taking in young people

No systematic reviews were found that evaluated the effectiveness of different models used in interventions aimed at sexual risk taking in young people.

3.5.7 School based approaches for substance related and risk taking behaviours

Approaches other than theories based on social cognition models are often used in school based interventions to promote or change behaviour. Over the past three decades the school has been a particular focus of efforts to influence behaviours such as smoking, illicit drug use, alcohol misuse and sexual risk taking. The main perceived advantages are that almost all children can be reached through schools. There are five main types of interventions in schools, each based on a different theoretical orientation which are described in one of the reviews (with particular reference to tobacco smoking).²⁸

Information-giving/knowledge based curricula present participants with information about the behaviour, including health risks and assume that information alone will lead to changes in behaviour.

Social competence curricula use enhancement interventions (also called Affective Education). This model hypothesises that children learn drug use by modelling, imitation, and reinforcement, influenced by the child's pro-drug cognitions, attitudes and skills. Susceptibility is increased by poor personal and social skills and a poor

personal self-concept. These programmes use cognitive-behavioural skills (instruction, demonstration, rehearsal, feedback, reinforcement, and out-of-class practice in homework and assignments). They teach generic self-management personal and social skills, such as goal-setting, problem-solving, and decision making, and also teach cognitive skills to resist media and interpersonal influences, to enhance self-esteem, to cope with stress and anxiety, to increase assertiveness, and to interact with others of both genders.

Social influence approaches/social norming approaches, use normative education methods and anti-tobacco/drug/sex resistance skills training. These include correcting adolescents' overestimates of the rates of smoking etc., adults and adolescents, recognising high-risk situations, increasing awareness of media, peer, and family influences, teaching and practising refusal skills, and making public commitments not to smoke/drink etc.

Combined methods draw on social competence and social influence approaches.

Multi-modal programmes combine curricular approaches with wider initiatives within and beyond the school, including programmes for parents, schools, or communities and/or initiatives to change school policies about tobacco etc.

Four reviews compared the effectiveness of one or more of these approaches.

Tobacco smoking

One Cochrane review (1+, A) identified 76 randomised controlled trials and classified 16 as category one or most valid (Thomas et al, 2002). There were no category one studies of information giving alone. There were fifteen category one studies of social influences interventions. Of these, eight showed some positive effect of intervention on smoking prevalence, and seven failed to detect an effect on smoking prevalence. The largest and most rigorous study, the Hutchinson Smoking Prevention Project, found no long-term effect of an intensive 8-year programme on smoking behaviour. There was a lack of high quality evidence about the effectiveness of combinations of social influences and social competence approaches. There was limited evidence about the effectiveness of multi-modal approaches including community initiatives.

Alcohol misuse

Another Cochrane review (1&2+, A) evaluated educational and psychosocial primary prevention interventions for young people up to 25 years old (Foxcroft et al, 2002). The 56 studies included in the systematic review reported a range of different prevention interventions over the short-, medium- and longer-term. These different prevention interventions represented a number of different theoretical perspectives, from knowledge only programmes through to normative, social learning and multi-component community based interventions. Different settings for prevention programmes and a range of different outcome measures added to the diversity of studies included in this systematic review. Therefore the reviewers were not able to provide any conclusive evidence of the differential effectiveness of these approaches. The reviewers also noted that whether interventions focused on alcohol alone, or alcohol as one of a number of drugs, appeared to have no effect on outcome in the studies reviewed. However, the majority of these studies were conducted in the U.S.A., where the goal of misuse prevention programmes tends to be abstinence from

any substance use (including alcohol). This may not be the target outcome for drinking behaviour in other countries, where the emphasis tends to be sensible drinking rather than abstinence. Different philosophies underlie the two approaches so caution must be taken if the adoption of intervention programmes from the United States is contemplated. For example, in the UK different messages are given for alcohol compared with tobacco or illegal drugs - sensible age-related use for the former, abstinence for the latter.

Drug misuse

A third Cochrane review (1&2++, A) evaluated three types of school based programmes for preventing illicit drug use (Faggiano et al, 2005). The authors reported that three groups of prevention programmes (knowledge, skills and affective-focused (social competence) displayed different patterns of efficacy with regard to individual outcomes:

- *knowledge focused* programmes improve mediating variables (especially drug knowledge) compared with usual curricula, but were not more effective than skills based programmes. When final outcomes are considered (drug use), their effects are comparable to those of the usual curricula and the other two types of programmes;
- *affective-focused (social competence)* programmes improve decision making skills and drug knowledge compared to usual curricula and knowledge-focused interventions. Two low quality studies gave conflicting results: one showed a positive effect for drug use, whereas another showed an opposite effect for marijuana
- *skills focused (social norming) programmes* had a positive effect on both mediating variables (drug knowledge, decision making, self-esteem and peer pressure resistance) and final outcomes, compared to usual curricula.

The meta-analysis on drug (ns), hard drug and marijuana use (dichotomous variables) show a lower use in the intervention groups at the post test, even years after the intervention, with most of the RCTs included having a satisfactory methodological quality (mainly quality score = B). On the other hand the only difference stemming from the comparison of skills focused programmes with other kind of interventions relates to self-esteem improvement.

The authors discussed the results of their review and thought that they appeared to be consistent with the Cochrane reviews (reported above) of alcohol prevention among young people (Foxcroft et al, 2002) and school-based smoking prevention (Thomas, 2002) though only on the short term. They noted that this confirms the theory that both the pathways of risk and risk factors for alcohol, tobacco and drug use among young people are similar; it also suggests that positive behaviour changes might be effected through a single, school-level intervention to prevent initial smoking, alcohol and drug misuse.

Sexual risk taking

A systematic review (1&2-, C) of interventions to reduce the incidence of HIV, STIs, and pregnancy among adolescents (24 RCTs and non-randomised studies with 27978 participants) was conducted, drawing on studies set in the USA (Robin et al, 2004). This review evaluated adolescent sexual risk-reduction programmes that used quasi-experimental or experimental methods. A wide range of interventions were included in this evaluation, although all included some form of knowledge based education (sexual health, condom use etc) or skills based (condom use), life skills, careers

advice, problem solving and abstinence. The studies were based on a range of models or theories including: social cognitive theory of planned behaviour; protection motivation; problem solving therapy; health belief model; social learning; social inoculation; and the social influences model. Programmes with positive effects most commonly employed interactive and participatory educational strategies. Virtually no key study features or programme characteristics clearly distinguished studies with positive, null, and negative effects from each other. However, when the authors aggregated the studies, four implications for effective programmes become apparent: (a) they have focused on skills that reduce specific sexual risk behaviours; (b) the duration and intensity of a programme may play a role in its effectiveness; (c) the need for researchers and health educators to carefully determine what constitutes an entire programme; and (d) programme facilitators' training may be more important than whether facilitators' and participants' demographic characteristics match.

The authors reported that the importance of emphasizing skills focusing on reducing specific sexual risk behaviours is underscored by the fact that, although most of the programmes contained skills-building activities (e.g., sexual communication, decision-making, problem solving), programmes reporting null and negative effects (with the exception of one study) appeared to emphasize skills that were less specific. The authors also found that many of these programmes were likely to have evaluations published in 1995 or before, and to be between 7 and 15 hours in duration. These findings are consistent with prior literature reviews. Programmes for which evaluations were published after 1995 were of longer duration, and longer programmes also contained more general types of skills and knowledge. This may reflect a shift toward multi-component interventions that target a variety of youth competencies. Such broad-based programmes may be appealing because community objections to them are less likely than objections to programmes focused specifically on sexuality and sexual risk-reduction behaviours. However, more narrowly focused programmes have been more extensively evaluated and their effects are better understood. Consequently, health educators should exercise caution in depending solely on broad-based programmes to reduce sexual risk behaviours among youth.

Evidence Summary

Two reviews evaluated the effectiveness of interventions based on models of health behaviour, and four evaluated the differential effectiveness of school based approaches for substance use (tobacco, alcohol and illicit drugs) and sexual risk taking. There was a lack of evidence to support conclusions regarding the efficacy of models or theories related to changing knowledge, attitudes or behaviour. There was one variable quality review that concluded there was insufficient evidence to evaluate the trans-theoretical model in relation to smoking cessation interventions. Another review of good quality provided evidence that when applied to interventions promoting physical activity, the trans-theoretical model demonstrated effectiveness in the short term.

School based approaches to preventing smoking, alcohol, drug and sexual risk taking include information giving, teaching social skills and competencies (e.g. refusal skills) and mixed approaches. Programmes with positive effects focused on skills that reduce specific sexual risk behaviours, such as unprotected sex and condom use. The evidence base of primary studies is poor, but there is some indication that knowledge

based approaches may not be effective, and there is inconclusive evidence that skills based approaches may be effective.

Evidence Statements

There is evidence of variable quality (1&2-, C), which shows insufficient evidence to make any statements regarding the effectiveness of the trans-theoretical model applied to interventions in smoking cessation.

There is evidence from two reviews (1&2+, A; 2-, A), which shows a short term effect of interventions based on the trans-theoretical model for promoting physical activity. There is little evidence of effect over the longer term (more than 6 months).

There is evidence of good quality (1+, A) directly relevant to the UK school population that shows a lack of evidence about the effectiveness of combinations of social influences and social competence approaches for preventing smoking. There is also limited evidence about the effectiveness of multi-modal approaches including community initiatives.

There is evidence of good quality (1&2+, A) that shows no conclusive evidence of the effectiveness of different school based approaches for preventing alcohol use.

There is evidence of good quality (1&2++, A) that shows inconclusive evidence for the effectiveness of different school based approaches for preventing illicit drug use.

There is evidence of variable quality (1&2-, C), which shows an effect of interventions based on a range of theories or models applied to sexual risk taking among adolescents.

3.6 What is the evidence for the effectiveness of interventions in targeting health inequalities within particular population sub-groups?

There was no evidence, from any of the systematic reviews, which could substantiate conclusions regarding the effectiveness of interventions in targeting health inequalities within particular population sub-groups.

Although one of the strengths of a ‘review of reviews’ is that we are able to provide a broad overview of a complex topic, this wide-ranging discussion comes at a price. While this report draws on an authoritative breadth of data, we are unable to pursue this to the depth that is possible when analysing primary data. Furthermore, we are restricted by the kinds of questions that authors use to frame their evaluations of interventions, and although ‘inequalities’ may often receive brief mention, they did not explore inequalities as core research questions. This means that the data is simply not available for analysis at the ‘review of review’ level. This is further confounded by the fact that although inequalities data may not be available within the systematic reviews, we cannot assume that primary studies have ignored inequalities.

While elsewhere in this report we have provided data that could be linked to inequalities in health, such as data that is gender or age specific, these studies do not contextualise their data in ways that we could use to draw conclusions about effectiveness of interventions according to particular population sub-groups. This would require comparative work across reviews rather than within them. However, this is a time-consuming task that is not feasible given the short time frame for a rapid review. Furthermore, our knowledge of the data included in this report reveals that it would be extremely difficult to conduct an analysis across reviews related to inequalities since there are too many confounding variables that would make any conclusions tenuous at best. For instance, one review of 16 RCTs might include 10 different types of interventions, delivered in different countries within a range of socio-cultural contexts. So not only is there the problem of comparing effectiveness at the sub-group level when groups are not participating in the same kind of intervention, but they may also have widely differing cultural backgrounds.

Given the importance of socio-economic factors on experiences of health, illness and their impact on morbidity (as well as mortality), it is crucial that interventions designed to improve health take account of those very factors that work against positive outcomes. We explore this further in the following section.

Our review of reviews found no evidence that was substantial enough to provide data on inequalities related to the following:

- Inequalities in smoking and tobacco use; physical activity; alcohol misuse; healthy eating; illicit drug use; and sexual risk taking among young people.
- Inequalities in access to interventions to promote change in attitude, knowledge or behaviour
- Inequalities in recruitment to interventions of ‘hard to reach’ groups

- Inequalities in outcomes of interventions

As stated in the background to this report, inequalities might include a range of socio-economic factors including:

- Unemployed/income level
- Gender
- Age
- Location (greater inequalities in health related to rural rather than urban dwellers)
- Education
- Mobility
- Ethnicity

The above are simply an illustration of some of the social determinants of health, and are not meant to be a comprehensive list. Furthermore, this is a simplification of a complex topic, since many of these areas cross-cut (e.g. lower income, ethnic minority, older person), and in any case, are subject to debates over adequate definitions.

One final point to note is that both experiences of health and illness, as well as incidences of illness tend to cluster within lower socio-economic groups⁵. Furthermore, negative health behaviours (which lead to higher morbidity) also may be experienced in clusters, and may well be interconnected. For instance, a person who might benefit from a healthy eating intervention may also be a candidate for increasing physical activity levels, cutting down alcohol consumption and giving up smoking. This means that it is even more crucial that those conducting systematic reviews (as well as those designing interventions) make health inequalities a central concern.

This could have a number of impacts on the kinds of evidence that might be of use to those designing or commissioning public health interventions. Firstly, it may be beneficial to explore smoking cessation and alcohol reduction within one intervention, since anecdotal evidence suggests that smokers who drink, may find alcohol one of the key triggers to tobacco craving. Similarly, illicit drug use, alcohol misuse and smoking may well occur together, although tackling more than one problem behaviour at a time (particularly with reference to drug use) may place an unrealistic burden on intervention participants.

⁵ See for instance: Whitehead, M. 1990. The concepts and principles of equity and health. Copenhagen: WHO Discussion Paper.

Pickett, K.E. & Pearl, M. 2001. Multilevel analyses of neighbourhood socioeconomic context and health outcomes: a critical review. *Journal of Epidemiology and Community Health* 55: 111-122.

3.7 What are the gaps in the evidence base?

Although this review was wide-ranging in scope and included a total of 92 papers, nevertheless we were unable to find high quality evidence of effectiveness in a number of areas. It was outside the scope of our review of reviews to determine whether this correspond to gaps in primary data, or whether this is simply a reflection of the research priorities/questions of the included reviews. Given the importance of socio-economic factors on experiences of health, illness and their impact on morbidity (as well as mortality), it is crucial that interventions designed to improve health take account of those very factors that may work against positive outcomes. This is one of the most significant gaps in the evidence base revealed by this review of reviews.

The tables in Appendix 4 summarise the evidence included within this review of reviews, and below we discuss the gaps in this evidence base in more detail. We begin by discussing the gaps in the evidence particular to each health behaviour before addressing those areas where the lack of evidence is common to all.

3.7.1. Smoking & tobacco use

The most comprehensive evidence base on the effectiveness of interventions to effect changes in knowledge, attitudes and behaviour is related to smoking and tobacco use with a total of 40 papers included in this report. Individual, community and population level interventions are all well-represented, as are interventions that are led by health professionals (dentists, General Practitioners or nurses) as opposed to other sources. Although the life course is well represented at the levels of children and young people; pregnant women and all adults, the main gap here is in the area of smoking and older people since there were no reviews found that targeted this sub-group.

3.7.2. Physical activity

Similarly, in the area of physical activity (20 papers), the individual, community and population level interventions were adequately represented. The life course was also represented by papers focusing on children and young people; older people; and all adults, although there was less available evidence related to older people (2). There were no systematic reviews of physical activity interventions with pregnant women.

3.7.3. Alcohol misuse

The evidence base for this section was smaller (12 papers), and hence there are more gaps in the evidence. While young people, adults and pregnant women were represented (albeit the latter very marginally with just one relevant review), older people and alcohol misuse were not. Another gap in the evidence base is evaluations of the effectiveness of workplace interventions for supporting problem drinkers, or promoting safe alcohol use.

3.7.4. Healthy eating / diet

There were eight papers included under this topic: only two papers related to interventions with individuals, and six at the community intervention level. There were no systematic reviews of interventions at the whole population level, although clearly 'healthy eating' is promoted widely through mass media campaigns.

3.7.5. Illicit drug use

This is an area that is poorly researched in terms of our inclusion criteria since the majority of interventions for illicit drug use concentrate on people who are drug dependent and often focus on treatments or rehabilitation. We only found four good quality systematic reviews related to the prevention of illicit drug misuse and these were all at the community level with children and young people. There is a huge gap in the evidence base for interventions to prevent drug misuse among pregnant women, all adults and older people at the individual, community (including workplaces) and population levels. There are no evaluations of interventions at the population level for any of the sub-groups. If illicit drug use were to include the misuse of prescription drugs (albeit bearing in mind the inherent definitional problems in that area) then the potential gaps in the evidence base would be even more considerable.

3.7.6. Sexual risk taking in young people

There is a good range of evaluations of interventions targeting sexual risk taking behaviour in young people. The two main areas covered by the reviews are in the prevention and reduction of HIV and other STIs and also the prevention of teenage pregnancies. These cover both wider community and school-based interventions.

3.7.7. Evidence gaps common to all 6 health behaviours: changes in knowledge

There appears to be a tendency to conflate knowledge, attitude and behaviour within many of the interventions and although we acknowledge how changes in one are intertwined with changes in the others, nevertheless it would be valuable to explore these within separate reviews. Sexual risk taking is one of the areas that has more relevant papers (3), while physical activity has one and healthy eating two systematic reviews. These reviews do not specifically target changes in knowledge, but it was possible to extract some relevant data from them since changes in knowledge was an outcome. Both tobacco use and alcohol misuse had no systematic reviews with data related to changes in knowledge.

3.7.8. Evidence gaps common to all 6 health behaviours: changes in attitudes

Similar to the above, there is little evidence across the six behaviours relevant to positive changes in attitudes. However, this is clearly a difficult area to evaluate given that measures of changes in attitude are likely to be self reported. There were two reviews in healthy eating with relevant data to attitude change and one in tobacco use.

The other health behaviours (physical activity, sexual risk taking, illicit drug use and alcohol misuse) did not have any relevant data / reviews.

3.7.9. Evidence gaps common to all 6 health behaviours: inequalities

The effectiveness of most health prevention and promotion measures may be affected by social and economic factors that often encourage the adoption (and continuation) of unhealthy or cancer-causing behaviours. What is not clear is whether current health promotion schemes are effective in improving the health of those who might benefit most. It has been argued that the inverse care law is not always considered in relation to local provision for health promoting activities.⁶ Health promotion interventions frequently increase, rather than decrease, socioeconomic inequalities in health⁷ as health promotion messages and interventions may be differentially taken up by different social class groups. For example, more affluent and well-educated people are more likely to modify their diets, give up smoking, and take up healthy physical activities than are poorer and less well educated people.⁸ It is often assumed that the barriers to the take up of health promotion messages lie in personal factors such as lack of motivation, fatalism or short-termism, or lack of personal resources such as money, time, equipment, or knowledge.⁶ What is important is that research is carried out to understand attitudes, health beliefs, and social content of different socio-economic groups in order to develop successful health promoting interventions.

Population sub-group analysis (e.g. looking at the differential effect of interventions in different socioeconomic or ethnic groups) within each of the six health behaviours is largely absent in the reviews included within this report. Although socio-economic data receives a brief mention in some of the reviews, it is usually mentioned in passing rather than made a central part of the analysis. For instance, although a paper may mention that 30% of participants across 16 studies were African American, they do not conduct any analysis that allows the reader to draw conclusions regarding the comparative effectiveness of interventions related to ethnicity. As stated earlier in this report, it is not clear whether the gap in this evidence is related to the lack of socio-economic/ethnicity data and analysis within the primary studies themselves, or whether the gap is a reflection of the lack of interest in health inequalities by those conducting systematic reviews. As we also stated earlier, it is outside the scope of this review to revisit the primary data in order to clarify this, but clearly at the review level there is a substantial lack of evidence of effectiveness across the whole area of health inequalities, including ethnicity, social class, gender, locality, and so on.

As mentioned previously, illness tends to cluster within lower socioeconomic groups and it is therefore crucial that the lack of attention to socioeconomic factors at the review level is addressed. The effectiveness of interventions can only be fully

⁶ McIntyre, S. (2000). The social patterning of exercise behaviours: the role of personal and local resources. *British Journal of Sports Medicine*.34:6.

⁷ Acheson D. (1998). Independent inquiry into inequalities in health: report. London, TSO.

⁸ Vetter, N. (2005). Health promotion--quo vadis now? *J Public Health*.27:239-240.

explored and evaluated when they are contextualised within social locations. For instance, a drink driving intervention conducted with participants in good health, and who live in an environment that strongly censures this kind of behaviour, may be expected to have a much greater success rate than with participants who may also have other negative health behaviours, and indeed may have social problems that far outweigh the possibility of a driving ban if compliance is not achieved. The interconnectedness of negative health behaviours should also be explored. Although physical activity and diet for weight loss are a focus of many interventions (excluded within this review) there should be some notice taken of the connection between, for instance, smoking and alcohol use or drug misuse and smoking.

3.7.10. Evidence gaps common to all 6 health behaviours: models and approaches

Another substantial area that lacks evidence is that of theoretical models or approaches which underpin interventions aimed at changing knowledge, attitudes and behaviour. Only a small number of interventions mentioned theoretical approaches such as the trans-theoretical model (sometimes also called ‘stages of change’). Only a very small number of papers attempt to illustrate the utility of a particular model or approach, and there is little that can be said at the ‘review of reviews’ level regarding the effectiveness of one approach over another. We must question whether the primary interventions are conducted with little understanding or regard for the theory that underpins their practice, or whether this remains implicit within the choice of intervention. Again it is possible that the lack of data on theories and models at the review level is a reflection of the reviewers’ research priorities and interests rather than what can be synthesised from the primary data. However, this leaves many questions unanswered:

- What theoretical models or approaches are most effective within particular health behaviours?
- Do any models or approaches apply equally well across all health behaviours?
- Are there any models or approaches that are not effective and should be abandoned?

Summary of Evidence Gaps

Q.1. Evaluations of interventions to effect behaviour change

Smoking Cessation

There are no reviews that focus on smoking cessation or reduction in older people.

Alcohol Misuse

There are no reviews that target evaluations of interventions to reduce / prevent alcohol misuse in older people or within workplace settings.

Healthy Eating

There are no reviews that target population level interventions to promote healthy eating.

Illicit Drug Use

There are no high quality reviews that evaluate the effectiveness of interventions to prevent illicit drug misuse with pregnant women.

There are no high quality reviews that evaluate the effectiveness of interventions to prevent illicit drug misuse with adults at the individual or community level.

There are no high quality reviews that evaluate the effectiveness of interventions to prevent illicit drug misuse with older people at the individual or community level.

There are no evaluations of interventions to prevent illicit drug misuse at the population level.

Q.2. Evaluations of interventions to effect changes in knowledge

There are no reviews that evaluate the effectiveness of interventions to effect change in knowledge related to tobacco use, alcohol misuse or illicit drug use at either the individual, community or population levels.

Q.3. Evaluations of interventions to effect changes in attitude

There are no reviews that evaluate the effectiveness of interventions to effect change in attitude related to alcohol misuse, illicit drug use, physical activity or sexual risk taking among young people at either the individual, community or population levels.

Q.4. Evaluations of interventions to effect positive changes with reference to health inequalities

There is a lack of reviews that explore the effectiveness of interventions according to socio-economic or cultural differences. This would include studies of effectiveness according to gender, age, ethnicity, social class, and so on.

There are no reviews that evaluate the effectiveness of interventions which address the interconnectedness of negative health behaviours (e.g. alcohol and tobacco use).

There are no reviews of inequalities in smoking and tobacco use; physical activity; alcohol misuse; healthy eating; illicit drug use; and sexual risk taking among young people.

There are no reviews of inequalities in access to interventions to promote change in attitude, knowledge or behaviour

There are no reviews of inequalities in recruitment to interventions of 'hard to reach' groups (e.g. ethnic minorities, socially and economically disadvantaged)

There are no reviews of inequalities in outcomes of interventions

Q.5. Evaluations of interventions to effect positive changes with reference to theoretical models or approaches

There is a lack of reviews that evaluate the effectiveness of particular theoretical models or approaches underpinning interventions aiming to change knowledge, attitudes or behaviours in health.

4. EVIDENCE TABLES

4.1 Evidence tables for question 1. What is the evidence for the effectiveness of interventions to prevent, reduce, or promote the health behaviour, at what level (individual / community / population), and for which population groups (e.g. young people, pregnant women, elderly)?

4.1.1 Prevention of tobacco use, smoking cessation and reduction

Reviews of prevention of tobacco use, smoking cessation and reduction					
Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
Abbot 1998	Systematic review (RCT) <i>Level:</i> 1 <i>Review quality:</i> + <i>No. studies:</i> 9	Smokers	The objective of this review was to evaluate the effects of hypnotherapy for smoking cessation.	Nine studies compared hypnotherapy with 14 different control interventions. There was significant heterogeneity between the results of the individual studies, with conflicting results for the effectiveness of hypnotherapy compared to no treatment or to advice. The authors therefore did not attempt to calculate pooled odds ratios for the overall effect of hypnotherapy. There was no evidence of an effect of hypnotherapy compared to rapid smoking or psychological treatment.	<i>Study countries:</i> USA, UK (1), Australia, Canada <i>Relevance score:</i> A
Bains 1998	Systematic review (RCT + non-RCT) <i>Level:</i> 1+2 <i>Review quality:</i> - <i>No. studies:</i> 17	Tobacco smokers in the general population. The majority of studies included only adult smokers, i.e. those aged at least 16 years.	To review the current published literature on population-based smoking cessation interventions that involve incentives, and to examine whether such interventions are effective in reducing the prevalence of smoking.	The population-based interventions discussed in this review generally attracted 1 to 2% of the target population, regardless of the publicity or recruitment tactics used. No specific type of recruitment strategy was shown to be consistently more effective than others. One study had a participation rate of 9.5%, which was achieved through making the recruitment period more flexible. This contest produced the greatest impact although the actual sustained quit rate was low (13%). The quit rates for the programmes ranged from 13 to 45% and were in part dependent upon the length of follow-up, with lower quit rates more likely to be reported when this time was prolonged. The community-based programmes generally employed a contest approach, with smokers pledging to quit smoking for a specified number of days in exchange for the chance to win prizes in a lottery draw ('quit and win' contests). There was no evidence that particular types of incentives were able to influence participation or quit rates more than others, but the size of the incentive did appear to be important. Larger incentives were viewed as more effective at	<i>Study countries:</i> Not stated <i>Relevance score:</i> B

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Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
				motivating smokers to quit and stay smoke free than smaller ones.	
Bize 2005	Systematic review (RCT) Level: 1 Review quality: + <i>No. studies:</i> 9	Smokers	To determine the efficacy of biomedical risk assessment provided in addition to various levels of counselling, as a contributing aid to smoking cessation	Eight trials were retained for data extraction and analysis. One of the eight used CO alone and CO + Genetic Susceptibility as two different intervention groups, giving rise to three possible comparisons. Three of the trials isolated the effect of exhaled CO on smoking cessation rates resulting in the following odds ratios (ORs) and 95% confidence intervals (95% CI:): 0.73 (0.38 to 1.39), 0.93 (0.62 to 1.41), and 1.18 (0.84 to 1.64). Combining CO measurement with genetic susceptibility gave an OR of 0.58 (0.29 to 1.19). Exhaled CO measurement and spirometry were used together in three trials, resulting in the following ORs (95% CI:): 0.6 (0.25 to 1.46), 2.45 (0.73 to 8.25), and 3.50 (0.88 to 13.92). Spirometry results alone were used in one other trial with an OR of 1.21 (0.60 to 2.42). Two trials used other motivational feedback measures, with an OR of 0.80 (0.39 to 1.65) for genetic susceptibility to lung cancer alone, and 3.15 (1.06 to 9.31) for ultrasonography of carotid and femoral arteries performed in light smokers (average 10 to 12 cigarettes a day).	<i>Study countries:</i> <i>Relevance score:</i> A
Brothwell 2001	Systematic review (RCT + non-RCT) Level: 1+2 Review quality: - <i>No. studies:</i> 33	Smokers aged 19 years and above.	To apply an evidence-based approach to determine whether the use of smoking cessation products should be promoted by Canadian dental offices.	Transdermal nicotine patches more than doubled the quit rates obtained in smoking cessation programmes (odds ratios: 2.07 to 2.6). Nicotine gum increased cessation rates by about 50% (odds ratios: 1.4 to 1.6). Bupropion nearly doubled smoking cessation success, with reported quit rates of 23.1 and 30.3% vs 12.4 and 15.6% for placebo. Tobacco use is associated with deteriorating periodontal health. Smokers respond less favourably to periodontal therapy, and former smokers show periodontal health intermediate to that found in current smokers and individuals who have never smoked.	<i>Study countries:</i> Canada only. <i>Relevance score:</i> B
Christakis 2003	Systematic review (RCT) Level: 1 Review quality: - <i>No. studies:</i> 4	Youth, aged <21 years	To conduct a systematic review of RCTs of smoking prevention interventions for youth delivered via medical or dental providers' offices.	Four articles met the inclusion criteria. Included were two studies conducted in primary care, and one each in dental and orthodontic offices. Three studies found no significant differences between treatment and control groups with respect to initiation of smoking during the follow-up period. Only one study demonstrated a significant effect on smoking initiation; in that study, 5.1% of the intervention group and 7.8% of the control group reported smoking at 12-month follow-up (odds RATIO= 0.63; 95% confidence interval, 0.44–0.91). None of the studies had follow-up times greater than 3 years.	<i>Study countries:</i> Two studies in USA and one each in UK and Finland. <i>Relevance score:</i> A

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Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
Dunn 2001	Systematic review (RCT) Level: 1 Review quality: - <i>No. studies:</i> 29	Not stated	To examine the effectiveness of brief behavioural interventions adapting the principles and techniques of motivational interviewing (MI) in relation to substance abuse, smoking, HIV risk and diet/exercise.	Smoking cessation (2 studies): in one of the studies, one of the two ESs reported was significant (0.23, 95% CI: 0.06, 0.39). In the second study, none of the obtained ESs were significant. Diet/exercise studies (5 studies): three of the studies had significant ESs, ranging from 0.36 (95% CI: 0.07, 0.66) to 2.17 (95% CI: 0.93, 3.41). The regression analysis found no significant decline in ESs across the studies as a function of follow-up time (p=0.84). Within studies (using 5 studies with significant ESs and more than one follow-up period) the results were mixed.	<i>Study countries:</i> Not stated <i>Relevance score:</i> A
Ebbert 2004	Systematic review (RCT) Level: 1 Review quality: ++ <i>No. studies:</i> 14	Those visiting dental surgery, workplaces, schools and individuals.	To assess the effects of behavioural and pharmacotherapeutic interventions to treat smokeless tobacco use.	One trial of bupropion did not detect a benefit of treatment after six months (Odds Ratio (OR) 1.00, 95% CI: : 0.23 to 4.37). Three trials of nicotine patch did not detect a benefit (OR 1.16, 95% CI: 0.88 to 1.54), nor did two trials of nicotine gum (OR 0.98, 95% CI: 0.59 to 1.63). There was statistical heterogeneity among the results of eight trials of behavioural interventions included in the meta-analysis. Three trials showed significant benefits of intervention. In a post-hoc analysis the trials of interventions which included an oral examination and feedback about ST-induced mucosal changes had homogeneous results and when pooled showed a significant benefit (OR 2.41 95% CI: 1.79 to 3.24).	<i>Study countries:</i> USA <i>Relevance score:</i> B
Edwards 2000	Systematic review (RCT + non-RCT) Level: 1+2 Review quality: ++ <i>No. studies:</i> 19	Women and their families - postnatally and prenatal	The objective of this review was to examine the effectiveness of strategies to prevent postpartum smoking relapse.	There is emerging biochemically confirmed evidence from a single study suggesting that a theoretically based, multi-component intervention of sufficient intensity, provided during the postpartum period, can have a modest effect on postpartum smoking relapse rates at six months postpartum. There is no evidence to suggest that relapse prevention strategies which lack an appropriate theoretical base, consist of brief and infrequent interventions, and are provided in an antenatal clinic setting reduce postpartum smoking relapse rates. The optimum timing (early, mid or late pregnancy; and/or postpartum), frequency, and mix of postpartum smoking relapse prevention strategies have not yet been determined. The presence of a smoking partner and other social contacts who smoke are important determinants of postpartum smoking relapse.	<i>Study countries:</i> Not stated <i>Relevance score:</i> C

Reviews of prevention of tobacco use, smoking cessation and reduction					
Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
Fichtenberg 2002	Systematic review (non-RCT) Level: 2 Review quality: - <i>No. studies:</i> 26	Employees in Government offices, hospitals, a telecom company, an ambulance service and a health maintenance organisation.	To assess the effects of smoke-free workplaces on cigarette consumption and to compare these effects with results from raising taxes.	Totally smoke-free policies significantly reduced the absolute prevalence of smoking and decreased cigarette consumption per smoker among continuing smokers: the reduction in absolute prevalence was 3.8% (95% CI: 2.8, 4.7) and the decrease in consumption was 3.1 (95% CI: 2.4, 3.8). The reduction in consumption per employee was 29% (95% CI: 11, 53). The effect of smoke-free policies did not change over time (for prevalence, $r=0.08$, $P=0.75$; for consumption per smoker, $r=0.45$, $P=0.09$; for consumption per employee, $r=0.28$, $P=0.43$). The funnel plot showed no evidence of publication bias.	<i>Study countries:</i> USA, Australia, Canada and Germany <i>Relevance score:</i> B
Fichtenberg 2002	Systematic review (non-RCT) Level: 2 Review quality: - <i>No. studies:</i> 8	Adolescents and tobacco salespersons in community shops	To determine the effectiveness of laws restricting youth access to cigarettes on prevalence of smoking among teens.	Based on data from 9 studies, there was no detectable relationship between the level of merchant compliance and 30-day ($r = .116$; $n = 38$ communities) or regular ($r = .017$) smoking prevalence. There was no evidence of a threshold effect. There was no evidence that an increase in compliance with youth access restrictions was associated with a decrease in 30-day ($r = .294$; $n = 18$ communities) or regular ($r = .274$) smoking prevalence. There was no significant difference in youth smoking in communities with youth access interventions compared with control communities; the pooled estimate of the effect of intervention on 30-day prevalence was 1.5% (95% CI: 6.0% to 2.9%).	<i>Study countries:</i> Not stated <i>Relevance score:</i> C
Friend 2002	Systematic review (non-RCT) Level: 2 Review quality: - <i>No. studies:</i> Not stated	General population and young people.	To evaluate the effect of state and local mass-media campaigns on smoking prevalence and cigarette consumption.	Mass-media campaigns directed at the general population: two well-funded and implemented state-wide campaigns (California \$0.5 per capita and Massachusetts \$2.0 per capita) plus concurrent coordinated tobacco control programmes reduced smoking rates in the general population; there was a reduction in net smoking prevalence of 6 to 12%. In California, the tax increase was not offset by lower prices as occurred in Massachusetts. These two campaigns had mixed effects on youths. Some studies of the Californian campaign found no significant difference between youths exposed to the campaign and unexposed youths in terms of the rates of thinking about stopping smoking, while other studies found that exposure significantly reduced smoking prevalence and rates of starting smoking. Two studies of the Massachusetts campaign found that fewer exposed youths took up smoking compared with youths in other states: smoking prevalence among eight graders was reduced by 2% in	<i>Study countries:</i> USA only <i>Relevance score:</i> B

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Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
				<p>Massachusetts, compared with an increase of 26% in other states, while among tenth graders, the increase in smoking was 16% in Massachusetts versus 23% in other states. Two smaller state wide campaigns of shorter duration in less populated areas (Michigan \$0.2 per capita and Oregon \$0.6 per capita) found smaller reductions in smoking (net decline 4% and 5%, respectively). The studies suggested that the greatest reductions were to be achieved in the first 3 years of the campaigns, with decreasing reductions over time thereafter.</p> <p>Mass-media campaigns directed at youth. Two youth-orientated state-wide campaigns were associated with reductions in smoking rates (Arizona PCC declined by 8% but no baseline rates were reported; Florida net reduction estimated as 5%). These appeared to be more successful than smaller community- level programmes. Community-level programmes that reduced smoking tended to be longer and more intensive than campaigns having less effect.</p>	
Garrison 2003	<p>Systematic review (RCT + non-RCT)</p> <p>Level: 1+2</p> <p>Review quality: -</p> <p><i>No. studies:</i> 6</p>	Adolescent smokers	To conduct a systematic review of controlled trials for adolescent smoking cessation.	<p>Included were three school-based studies, a study in pregnant adolescent girls, a hospital-based study, and a trial of laser acupuncture. None of the studies had follow-up times of >5.2 months. While the school-based studies demonstrated a positive short-term impact, the brevity of the follow-up time does not permit the assessment of long-term effectiveness. All three of the school-based studies reported significant impacts on cessation rates, although only one of these was a randomised trial. In this school-based study, the intervention group received eight classroom sessions over a 6-week period, while the control group received an informational brochure. At 4 weeks post-intervention, this study found that 52% of students reported that they were smoke-free for the previous 5 days by self-report, compared to 20% in the control group (relative risk [RR]=2.51; 95% CI: , 1.25–5.03). While this study extended follow-up to 20 weeks after the intervention, the subjects in the control group also received the intervention after the 4-week follow-up; thus, the results after this time could not be evaluated. In one of the other school-based studies at 3 months post-programme, the 30-day abstinence rates were 17% in the treatment arm and 8% in the control arm, for an odds ratio of 2.36 (95% CI: not reported). In a subanalysis, the odds ratios were highest for the subjects with the</p>	<p><i>Study countries:</i> One of the studies was conducted in Singapore, while the others were conducted in the United States.</p> <p><i>Relevance score:</i> C</p>

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Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
				<p>lowest "addiction quotients" (i.e., the less addicted to nicotine the subjects were, the more they benefited from the intervention). Another school-based study was unique in that it utilized gender-specific groups, with gender-matched adult leaders. In a stratified analysis, cessation rates were significantly different between treatment and control groups for females (29.6% vs 8.9%, respectively) but not for males (14.4% vs 15.9%, respectively).</p> <p>An additional study demonstrated a decrease in daily cigarette consumption and exhaled carbon monoxide levels, but not in actual cessation rates. The study of pregnant adolescents had three treatment arms: it was found that at 4 to 6 weeks post-intervention, 3 of 10 subjects in one treatment arm had "quit" smoking, compared to 5 of 30 subjects in the other two groups combined, a nonsignificant difference (RR=1.80; 95% CI: 0.52–6.22). The remaining two studies showed no difference between intervention and control groups in smoking outcomes.</p>	
Hajek 2005	<p>Systematic review (RCT + non-RCT)</p> <p>Level: 1+2</p> <p>Review quality: +</p> <p><i>No. studies:</i> 40</p>	<p>Military recruits; pregnant & postpartum women; hospital inpatients; others recruited from the community of assisted and unassisted abstainers</p>	<p>To assess whether specific interventions for relapse prevention reduce the proportion of recent quitters who return to smoking.</p>	<p>Forty studies met inclusion criteria, but were heterogeneous in terms of populations and interventions. The authors considered studies that randomised abstainers separately from studies that randomised participants prior to their quit date. The authors detected no benefit of brief and 'skills-based' relapse prevention interventions for women who had quit smoking due to pregnancy, or for smokers undergoing a period of enforced abstinence. The authors also failed to detect significant effects in trials in other smokers who had quit on their own or with a formal programme. Amongst trials recruiting smokers and evaluating the effect of additional relapse prevention components the authors also found no evidence of benefit in any subgroup. The authors did not find that providing training in skills thought to be needed for relapse avoidance reduced relapse, but most studies did not use experimental designs best suited to the task.</p>	<p><i>Study countries:</i> Mostly USA and also other countries including UK, Germany, Spain, Canada etc</p> <p><i>Relevance score:</i> A</p>
Hajek 2001	<p>Systematic review (RCT)</p> <p>Level: 1</p> <p>Review quality: +</p>	<p>All smokers</p>	<p>To determine the efficacy of rapid smoking and other aversive methods in helping smokers to stop smoking</p>	<p>For trials of rapid smoking, the pooled odds ratio (OR) of 12 studies included in the analysis is 1.98 with 95% confidence intervals of 1.36 to 2.90, suggesting that rapid smoking is effective in aiding smoking cessation. However the single study fulfilling current criteria for methodological adequacy yielded only a non-significant trend, while methodologically less adequate small studies tended to report better results. Other aversive methods did not differ significantly</p>	<p><i>Study countries:</i> Not stated</p> <p><i>Relevance score:</i> B</p>

Reviews of prevention of tobacco use, smoking cessation and reduction					
Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
	<i>No. studies: 25</i>			from control procedures (OR 1.15, 95% CI: 0.73 to 1.82), and there was a borderline 'dose response' to the severity of aversive stimulation (OR 1.66, 95% CI: 1.00 to 2.78).	
Hey 2005a	Systematic review (RCT + non-RCT) Level: 1+2 Review quality: + <i>No. studies: 4</i>	Individuals or communities	To determine whether quit and win contests can deliver higher long-term quit rates than baseline community quit rates.	To assess the impact of such programmes, the authors considered both the quit rates achieved by participants, and the population impact, which takes into account the proportion of the target population entering the contest. Four studies met the inclusion criteria. Three demonstrated significantly higher quit rates (8% to 20%) for the quit and win group than for the control group at the 12-month assessment. However, the population impact measure, where available, suggests that the effect of contests on community prevalence of smoking is small, with fewer than one in 500 smokers quitting because of the contest. Levels of deception, where they could be quantified, were high. Although surveys suggest that international quit and win contests may be effective, especially in developing countries, the lack of controlled studies precludes any firm conclusions from this review.	<i>Study countries:</i> USA, Canada and Russia <i>Relevance score:</i> C
Hey 2005b	Systematic review (RCT + non-RCT) Level: 1+2 Review quality: + <i>No. studies: 15</i>	Adults in workplaces, community and newspaper readers	To determine whether competitions and incentives lead to higher long-term quit rates. The authors also set out to examine the relationship between incentives and participation rates.	Fifteen studies met the inclusion criteria. None of the studies demonstrated significantly higher quit rates for the incentives group than for the control group beyond the six-month assessment. There was no clear evidence that participants who committed their own money to the programme did better than those who did not, or that different types of incentives were more or less effective. There is some evidence that although cessation rates have not been shown to differ significantly, recruitment rates can be improved by rewarding participation, which may be expected to deliver higher absolute numbers of successful quitters. Cost effectiveness analysis is not appropriate to this review, since the efficacy of the intervention has not been demonstrated.	<i>Study countries:</i> Most in USA, UK (3), Australia (1), and one in USA and Canada. <i>Relevance score:</i> A
Hopkins 2001	Systematic review (non-RCT) Level: 2 Review quality: - <i>No. studies:</i> Not	Users of tobacco products & people exposed, or at risk of exposure to environmental tobacco smoke.	The assessment of the effectiveness of population-based interventions to reduce tobacco use and exposure to environmental tobacco smoke. Applicability,	<i>Strategies to reduce exposure.</i> Based on evidence from 10 studies, smoking bans and restrictions were shown to reduce exposure to environmental tobacco smoke in the workplace. Evidence from one study was insufficient to determine the effectiveness of community education in reducing exposure to environmental tobacco smoke in the home. <i>Strategies to reduce initiation.</i> Based on 8 studies, increasing the price of tobacco products was shown to reduce the prevalence of	<i>Study countries:</i> The review only included studies conducted in industrialised countries. <i>Relevance score:</i> B

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Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
	stated & could not be figured out from report.		cost and barriers to use were also assessed, but are not summarised in this abstract.	<p>tobacco use and consumption among adolescents and young adults. Based on 11 studies, mass media campaigns combined with other interventions (e.g. education programmes) were shown to be effective in reducing tobacco use among adolescents, but the contribution of individual components was unclear.</p> <p><i>Strategies to increase cessation.</i> Based on 17 studies, increasing the price of tobacco products increased cessation and reduced consumption.</p> <p>Based on evidence from 15 studies, mass media campaigns combined with other interventions (e.g. self-help information) reduced tobacco consumption. There was insufficient evidence to assess mass media cessation series or cessation contests. There was insufficient evidence to assess the effect of health care provider education alone on tobacco use cessation among patients. As a minimum, provider education together with a provider reminder system increased delivery of advice by providers and cessation of tobacco use among patients, based on 31 studies of multi-component systems. There was insufficient evidence to assess the effect of feedback to motivate providers.</p> <p>Based on evidence from 5 studies, reducing the cost of cessation therapy to patients was shown to increase the use of therapy and to increase cessation. Evidence from 32 studies showed that including telephone support with other interventions (e.g. education and clinical therapy) increased cessation.</p>	
Lancaster 2004	Systematic review (RCT) <i>Level: 1</i> <i>Review quality: +</i> <i>No. studies: 39</i>	Smokers	The aims of this review were to assess the effectiveness of advice from physicians in promoting smoking cessation; to compare minimal interventions by physicians with more intensive interventions; to assess the effectiveness of various aids to advice in promoting smoking	Pooled data from 17 trials of brief advice versus no advice (or usual care) revealed a small but significant increase in the odds of quitting (odds ratio 1.74, 95% CI: 1.48 to 2.05). This equates to an absolute difference in the cessation rate of about 2.5%. There was insufficient evidence, from indirect comparisons, to establish a significant difference in the effectiveness of physician advice according to the intensity of the intervention, the amount of follow up provided, and whether or not various aids were used at the time of the consultation in addition to providing advice. Direct comparison of intensive versus minimal advice showed a small advantage of intensive advice (odds ratio 1.44, 95% CI: 1.24 to 1.67). Direct comparison also suggested a small benefit of follow-up visits. Only one study determined the effect of smoking advice on mortality. It found no statistically	<i>Study countries:</i> Widely international sample of studies including UK, USA, Japan, Norway etc <i>Relevance score:</i> A

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Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
			cessation and to determine the effect of anti-smoking advice on disease-specific and all-cause mortality.	significant differences in death rates at 20 years follow up.	
Lancaster 2005	Systematic review (RCT) Level: 1 Review quality: + <i>No. studies:</i> 60	Smokers	The aims of this review were to determine the effectiveness of different forms of self-help materials, compared with no treatment and with other minimal contact strategies; the effectiveness of adjuncts to self help, such as computer-generated feedback, telephone hotlines and pharmacotherapy; and the effectiveness of approaches tailored to the individual compared with non-tailored materials.	The authors identified sixty trials. Thirty-three compared self-help materials to no intervention or tested materials used in addition to advice. In 11 trials in which self help was compared to no intervention there was a pooled effect that just reached statistical significance (N = 13,733; odds ratio [OR] 1.24, 95% CI: 1.07 to 1.45). This analysis excluded two trials with strongly positive outcomes that introduced significant heterogeneity. Four further trials in which the control group received alternative written materials did not show evidence for an effect of the smoking self-help materials. The authors failed to find evidence of benefit from adding self-help materials to face-to-face advice, or to nicotine replacement therapy. There were seventeen trials using materials tailored for the characteristics of individual smokers, where meta-analysis supported a small benefit of tailored materials (N = 20,414; OR 1.42, 95% CI: 1.26 to 1.61). The evidence is strongest for tailored materials compared to no intervention, but also supports tailored materials as more helpful than standard materials. Part of this effect could be due to the additional contact or assessment required to obtain individual data. A small number of other trials failed to detect benefits from using additional materials or targeted materials, or to find differences between different self-help programmes.	<i>Study countries:</i> Widely international sample of studies including UK, USA, Spain etc <i>Relevance score:</i> A
Lumley 2004	Systematic review (RCT) Level: 1 Review quality: + <i>No. studies:</i> 64	Pregnant smokers	The primary objective was to identify whether continued smoking during pregnancy can be reduced by information about the risks of continued smoking, advice to quit, more intensive advice or individual counselling, group	This review included 64 trials. Fifty-one randomised controlled trials (20,931 women) and six cluster-randomised trials (over 7500 women) provided data on smoking cessation and/or perinatal outcomes. Despite substantial variation in the intensity of the intervention and the extent of reminders and reinforcement through pregnancy, there was an increase in the median intensity of both 'usual care' and interventions over time. There was a significant reduction in smoking in the intervention groups of the 48 trials included: (relative risk (RR) 0.94, 95% CI: 0.93 to 0.95), an absolute difference of six in 100 women continuing	<i>Study countries:</i> Range of countries including UK, USA, Argentina, Brazil, Cuba, Mexico etc <i>Relevance score:</i> A

Reviews of prevention of tobacco use, smoking cessation and reduction					
Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
			counselling, feedback on patho-physiological effects of smoking on the mother or fetus, the provision of nicotine replacement therapy, more detailed information/pictures of the fetus, the supplementation of information and advice with self-help manuals/videos or computer aided messages on strategies for quitting, rewards or incentives, peer support or additional social support.	to smoke. The 36 trials with validated smoking cessation had a similar reduction (RR 0.94, 95% CI: 0.92 to 0.95). Smoking cessation interventions reduced low birthweight (RR 0.81, 95% CI: 0.70 to 0.94) and preterm birth (RR 0.84, 95% CI: 0.72 to 0.98), and there was a 33 g (95% CI: 11 g to 55 g) increase in mean birthweight. There were no statistically significant differences in very low birthweight, stillbirths, perinatal or neonatal mortality but these analyses had very limited power. One intervention strategy, rewards plus social support (two trials), resulted in a significantly greater smoking reduction than other strategies (RR 0.77, 95% CI: 0.72 to 0.82). Five trials of smoking relapse prevention (over 800 women) showed no statistically significant reduction in relapse.	
May 2000	Systematic review (RCT) Level: 1 Review quality: - <i>No. studies:</i> 10	Smokers who wanted to stop.	The objective was 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.	Of the 10 studies included in the review, 9 were clinic based, 8 used a group format, and 9 used buddies from smokers' existing relationships. Two of the 10 included studies showed a significant effect of the intervention on smoking cessation: one showed a significant difference between 'social support' and 'discussion' groups at each follow-up (P<0.05), while the other showed a significant difference (P<0.01) in abstinence at the end of treatment between 'buddy' pairs and 'solo' group in a nurse-led smokers clinic.	<i>Study countries:</i> Not stated <i>Relevance score:</i> C
McClure 2002	Systematic review (RCT) Level: 1	Studies of adults only	To review the literature to determine the effectiveness of using biomarker feedback to motivate and enable	The results of this review were mixed, but suggest that biological information conveying harm exposure, disease risk or impaired physical functioning may increase motivation to change. Subsequent behaviour change is also affected by the availability and intensity of concomitant treatment. Studies that failed to find a significant	<i>Study countries:</i> Not stated <i>Relevance score:</i> B

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Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
	Review quality: - <i>No. studies:</i> 8		health behaviour change	behaviour effect used only a single biomarker (CO level, cholesterol, or an index of physical fitness) and provided feedback on a single occasion. Three of the eight trials found evidence of behaviour change, which implies an effect on motivation. Each successful trial offered counselling in person and relevant treatment materials.	
Moher 2005	Systematic review (RCT + non-RCT) Level: 1+2 Review quality: + <i>No. studies:</i> 61	Adults over 18 years of age, in employment, who smoked.	To categorize workplace interventions for smoking cessation tested in controlled studies and to determine the extent to which they help workers to stop smoking or to reduce tobacco consumption.	Workplace interventions aimed at helping individuals to stop smoking included ten studies of group therapy, seven studies of individual counselling, nine studies of self-help materials and five studies of nicotine replacement therapy. The results were consistent with those found in other settings. Group programmes, individual counselling and nicotine replacement therapy increased cessation rates in comparison to no treatment or minimal intervention controls. Self-help materials were less effective. Workplace interventions aimed at the workforce as a whole included 14 studies of tobacco bans, two studies of social support, four studies of environmental support, five studies of incentives, and eight studies of comprehensive (multi-component) programmes. Tobacco bans decreased cigarette consumption during the working day but their effect on total consumption was less certain. The authors failed to detect an increase in quit rates from adding social and environmental support to these programmes. There was a lack of evidence that comprehensive programmes reduced the prevalence of smoking. Competitions and incentives increased attempts to stop smoking, though there was less evidence that they increased the rate of actual quitting.	<i>Study countries:</i> USA, some UK and other European countries, Japan etc <i>Relevance score:</i> A
Murphy-Hoefer 2005	Systematic review (RCT + non-RCT) Level: 1+2 Review quality: + <i>No. studies:</i> 14	Students attending colleges and universities	To provide a comprehensive summary of individual and policy interventions that have been implemented, evaluated, and peer reviewed since 1980	Fourteen studies were identified; only five received a “satisfactory” rating based on evaluation criteria. Most studies were based on convenience samples, and were conducted in 4-year institutions. Seven studies used comparison groups, and three were multiinstitutional. Individual approaches included educational group sessions and/or individual counseling that were conducted on campus mostly by healthcare personnel. None used nicotine replacement or other medications for cessation. The quit rates for both smokeless tobacco and cigarette users varied, depending on definitions and duration of follow-up contact. Institutional interventions focused	<i>Study countries:</i> Most studies set in USA <i>Relevance score:</i> C

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Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
				mainly on campus smoking restrictions, smoke-free policies, antitobacco messages, and cigarette pricing. Results indicated that interventions can have a positive influence on student behaviour, specifically by reducing tobacco use (i.e., prevalence of cigarette smoking and use of smokeless products, amount smoked) among college students, and increasing acceptability of smoking policies and campus restrictions among both tobacco users and nonusers.	
Nishi 1998	Systematic review (RCT) Level: 1 Review quality: + <i>No. studies:</i> 5	Adult smokers. Participants who had suffered from chronic diseases such as cardiovascular diseases were excluded.	To assess the effect of group exercise programmes on smoking cessation.	The quality scores of the studies ranged from 7 to 9 points (out of a total of 13), with a mean of 8. Thus no study was excluded from further analysis and no stratification was performed on the basis of quality score. No heterogeneity was present. The summary odds ratio of the three studies which primarily aimed at smoking cessation was 2.35 (95% CI: 0.75, 7.31). When the two other studies were added, the summary odds ratio dropped to 1.85 (95% CI: 0.65, 5.24).	<i>Study countries:</i> Not stated <i>Relevance score:</i> B
Park 2004	Systematic review (RCT) Level: 1 Review quality: + <i>No. studies:</i> 9	Smokers of any age, marital status, pregnant or otherwise; any level of nicotine dependence.	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.	Only eight articles (nine studies) met the inclusion criteria. The definition of partner varied among the studies. All studies included data on self reported smoking cessation rates, but there was limited biochemical validation of abstinence rates. The odds ratio for self-reported abstinence at 6-9 months was 1.08 (95% CI: 0.81 -1.44); and at 12 months post-treatment was 1.0 (95% CI: 0.75 - 1.34). Of the six studies that measured partner support at follow-up, only two studies reported significant increase in partner support in the intervention groups.	<i>Study countries:</i> Not stated <i>Relevance score:</i> C
Rice 2004	Systematic review (RCT) Level: 1 Review quality: + <i>No. studies:</i> 29	Adult smokers, 18 years and older, of either gender recruited in any type of healthcare setting.	To determine the effectiveness of nursing-delivered smoking cessation interventions.	Twenty studies comparing a nursing intervention to a control or to usual care found the intervention to significantly increase the odds of quitting (Peto Odds Ratio 1.47, 95% CI: 1.29 to 1.68). There was heterogeneity among the study results, but pooling using a random effects model did not alter the estimate of a statistically significant effect. There was limited evidence that interventions were more effective for hospital inpatients with cardiovascular disease than for inpatients with other conditions. Interventions in non-hospitalized patients also showed evidence of benefit. Five studies comparing different nurse-delivered interventions failed to detect significant benefit from using additional components. Five studies of nurse	<i>Study countries:</i> Twelve in USA, eight in UK (one each in Scotland and Wales) and one each in Netherlands, Sweden, Canada, Australia, Spain, Japan and Denmark.

Reviews of prevention of tobacco use, smoking cessation and reduction					
Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
				counselling on smoking cessation during a screening health check, or as part of multifactorial secondary prevention in general practice (not included in the main meta-analysis) found the nursing intervention to have less effect under these conditions.	<i>Relevance score:</i> A
Riemsma 2003	Systematic review (RCT) <i>Level:</i> 1 <i>Review quality:</i> - <i>No. studies:</i> 23	No restrictions were applied to participants other than they had to be smokers	To evaluate the effectiveness of interventions using a stage based approach in bringing about positive changes in smoking behaviour	Eight trials reported effects in favour of stage based interventions, three trials showed mixed results, and 12 trials found no statistically significant differences between a stage based intervention and a non-stage based intervention or no intervention. Eleven trials compared a stage based intervention with a non-stage based intervention, and one reported statistically significant effects in favour of the stage based intervention. Two studies reported mixed effects, and eight trials reported no statistically significant differences between groups. The methodological quality of the trials was mixed, and few reported any validation of the instrument used to assess participants' stage of change. Overall, the evidence suggests that stage based interventions are no more effective than non-stage based interventions or no intervention in changing smoking behaviour.	<i>Study countries:</i> Not clear <i>Relevance score:</i> B
Secker-Walker 2002	Systematic review (RCT + non-RCT) <i>Level:</i> 1+2 <i>Review quality:</i> + <i>No. studies:</i> 32	Adults, 18 years or older.	To carry out a systematic review to assess the effectiveness of community interventions in reducing the prevalence of smoking.	Thirty two studies were included, of which seventeen included only one intervention and one comparison community. Only four studies used random assignment of communities to either the intervention or comparison group. The population size of the communities ranged from a few thousand to over 100,000 people. Change in smoking prevalence was measured using cross-sectional follow-up data in 27 studies. The estimated net decline ranged from -1.0% to 3.0% for men and women combined (10 studies). For women, the decline ranged from -0.2% to + 3.5% per year (n=11), and for men the decline ranged from -0.4% to +1.6% per year (n=12). Cigarette consumption and quit rates were only reported in a small number of studies. The two most rigorous studies showed limited evidence of an effect on prevalence. In the US COMMIT study there was no differential decline in prevalence between intervention and control communities, and there was no significant difference in the quit rates of heavier smokers who were the target intervention group. In the Australian CART study there was a significantly greater quit rate for men but not women.	<i>Study countries:</i> Studies took place in a range of countries including Europe, North America, South Africa and Australia and one in India. <i>Relevance score:</i> B

Reviews of prevention of tobacco use, smoking cessation and reduction					
Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
Serra C 2000	Systematic review (RCT + non-RCT) Level: 2 Review quality: + <i>No. studies:</i> 11	Users of public places where restrictions or bans on smoking were implemented.	The aim of this review was to determine the effectiveness of interventions aimed at reducing tobacco consumption in public places. The review did not set out to evaluate their effectiveness in encouraging individuals to quit smoking.	Eleven of 22 studies reporting information about interventions to reduce smoking in public places met all the inclusion criteria. All included studies were uncontrolled before and after studies. The most effective strategies used comprehensive, multicomponent approaches to implement policies banning smoking within institutions. Less comprehensive strategies, such as posted warnings and educational material had a moderate effect. Five studies showed that prompting individual smokers had an immediate effect, but such strategies are unlikely to be acceptable as a public health intervention.	<i>Study countries:</i> USA only <i>Relevance score:</i> B
Sinclair 2004	Systematic review (RCT) Level: 1 Review quality: + <i>No. studies:</i> 2	Community pharmacy clients who are smokers and who wish to stop.	To assess the effectiveness of interventions by community pharmacy personnel to assist clients to stop smoking.	The authors identified two trials which met the selection criteria. They included a total of 976 smokers. Both trials were set in the UK and involved a training intervention which included the Stages of Change Model; they then compared a support programme involving counselling and record keeping against a control receiving usual pharmacy support. In both studies a high proportion of intervention and control participants began using NRT. Both studies reported smoking cessation outcomes at three time points. However, the follow-up points were not identical (three, six and 12 months in one, and one, four and nine months in the other), and the trend in abstinence over time was not linear in either study, so the data could not be combined. One study showed a significant difference in self-reported cessation rates at 12 months: 14.3% versus 2.7% ($p < 0.001$); the other study showed a positive trend at each follow-up with 12.0% versus 7.4% ($p = 0.09$) at nine months.	<i>Study countries:</i> UK only <i>Relevance score:</i> A
Smeds-lund 2004	Systematic review (RCT + non-RCT) Level: 1+2 Review quality: - <i>No. studies:</i> 19	Workers. Most of the studies were set in workplaces with high smoking prevalence and white, heavy smokers.	To assess the effectiveness of recent worksite smoking cessation interventions and to compare findings with a meta-analysis published in 1990.	Several methodological inadequacies were noted in the included studies. Six of the 19 studies reported attrition during the intervention, while seven reported losses at follow-up. Potentially important moderating variables were inconsistently reported. The quit rate at 6 months ranged from 6.1 to 30.8% with the interventions and from 1.05 to 19.15% with the control. Workplace smoking cessation significantly increased quit rates at 6 months (OR 2.03, 95% CI: 1.42, 2.90) and 12 months (OR 1.56, 95% CI: 1.17, 2.07) compared with control. There was no statistically significant difference between interventions beyond 12 months (OR	<i>Study countries:</i> Not stated <i>Relevance score:</i> B

Reviews of prevention of tobacco use, smoking cessation and reduction					
Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
				1.33, 95% CI: 0.95, 1.87). No statistically significant heterogeneity was detected at 6 or 12 months (P=0.11 and P=0.13, respectively). Statistically significant heterogeneity was detected beyond 12 months (P=0.0004). The treatment effect at 6 months was greater and precision was less in non-randomised studies (2 non-randomised trials; OR 4.65, 95% CI: 1.92, 11.28) in comparison with RCTs (6 RCTs; OR 1.74, 95% CI: 1.26, 2.40). No statistically significant heterogeneity was detected (P=0.79 and P=0.23, respectively). The results were similar at 12 months. There was no statistically significant difference between the interventions beyond 12 months for RCTs or non-randomised studies. Statistically significant heterogeneity was detected for non-randomised studies (P=0.0003), but not for RCTs (P=0.10).	
Sowden 2003	Systematic review (RCT + non-RCT) Level: 1+2 Review quality: + <i>No. studies:</i> 17	Young people aged less than 25 years in chosen communities and areas. The age of participants ranged from 8 to 24 years across the different studies.	To assess the effectiveness of community interventions in preventing the uptake of smoking in young people.	All studies used a controlled trial design, with six using random allocation of schools or communities. Of thirteen studies which compared community interventions to no intervention controls, two, which were part of cardiovascular disease prevention programmes, reported lower smoking prevalence. Of three studies comparing community interventions to school-based programmes only, one found differences in reported smoking prevalence. One study reported a lower rate of increase in prevalence in a community receiving a multi-component intervention compared to a community exposed to a mass media campaign alone. One study reported a significant difference in smoking prevalence between a group receiving a media, school and homework intervention compared to a group receiving the media component only.	<i>Study countries:</i> 11 studies took place in USA, 3 in UK, 2 in Australia and 1 in Finland. <i>Relevance score:</i> A
Sowden 1998	Systematic review (RCT + non-RCT) Level: 1+2 Review quality: + <i>No. studies:</i> 6	Young people aged less than 25 year	To determine the effectiveness of mass media campaigns in preventing the uptake of smoking in young people.	Six studies reporting the effectiveness of mass media campaigns met the inclusion criteria for this review, two of which were associated with reductions in smoking behaviour. One found that a mass media campaign was effective in influencing smoking behaviour compared with no intervention. One found that a mass media campaign combined with a schools-based programme was more effective than a schools-based programme alone. Both of these studies also found statistically significant differences between the intervention and control groups on intermediate outcomes, such as attitudes towards smoking, smoking norms and intentions to smoke in the future.	<i>Study countries:</i> Five studies in USA and one in Norway. <i>Relevance score:</i> B

Reviews of prevention of tobacco use, smoking cessation and reduction					
Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
Stead 2003	Systematic review (RCT + non-RCT) Level: 1+2 Review quality: + <i>No. studies:</i> 27	Smokers or recent quitters. The definition of recent quitters was that used by the trial recruitment protocols, or by the participants themselves.	To evaluate the effect of proactive and reactive telephone support to help smokers quit.	Thirteen trials compared proactive counselling to a minimal intervention control. There was statistical heterogeneity, with five trials showing a significant benefit, and eight showing non significant differences. The heterogeneity was associated with trials that provided tailored self-help materials to the control group. Meta-analysis using all less intensive intervention arms as the control removed the heterogeneity and suggests that telephone counselling compared to less intensive intervention increases quit rates (OR 1.56, 1.38 - 1.77). Four trials adding telephone support to a face to face intervention control failed to detect a significant effect on long term quit rates. Four trials failed to detect an additional effect of telephone support in users of nicotine replacement therapy. Providing access to a hotline showed a significant benefit in one trial and no significant difference in two. No differences in outcome were detected in trials that compared different types of telephone counselling.	<i>Study countries:</i> Majority in USA, two in Australia, one in Canada and Spain. <i>Relevance score:</i> C
Stead 2005a	Systematic review (RCT) Level: 1 Review quality: + <i>No. studies:</i> 55	Smokers of either gender irrespective of their initial level of nicotine dependency, recruited from any setting.	To determine the effects of smoking cessation programmes delivered in a group format compared to self-help materials, or to no intervention; to compare the effectiveness of group therapy and individual counselling; and to determine the effect of adding group therapy to advice from a health professional or to nicotine replacement.	A total of 55 trials met inclusion criteria for one or more of the comparisons in the review. Sixteen studies compared a group programme with a self-help programme. There was an increase in cessation with the use of a group programme (N = 4395, odds ratio (OR) 2.04, 95% CI: 1.60 to 2.60). Group programmes were more effective than no intervention controls (seven trials, N = 815, OR 2.17, 95% CI: 1.37 to 3.45). There was no evidence that group therapy was more effective than a similar intensity of individual counselling. There was limited evidence that the addition of group therapy to other forms of treatment, such as advice from a health professional or nicotine replacement, produced extra benefit. There was variation in the extent to which those offered group therapy accepted the treatment. There was limited evidence that programmes which included components for increasing cognitive and behavioural skills and avoiding relapse were more effective than same length or shorter programmes without these components. This analysis was sensitive to the way in which one study with multiple conditions was included. The authors did not find an effect of manipulating the social interactions between participants in a group programme on outcome.	<i>Study countries:</i> Mainly USA and also Germany, Spain, Canada, Jamaica, Hong Kong, France and Norway. <i>Relevance score:</i> C
Stead 2005b	Systematic review (RCT + non-RCT)	Tobacco retailers and young people	To assess the effects of interventions to reduce underage access to	The authors identified 34 studies of which 14 had data from a control group for at least one outcome. Giving retailers information was less effective in reducing illegal sales than active enforcement or	<i>Study countries:</i> USA

Reviews of prevention of tobacco use, smoking cessation and reduction					
Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
	<p>Level: 1+2</p> <p>Review quality: +</p> <p><i>No. studies:</i> 34</p>		tobacco by deterring shopkeepers from making illegal sales.	multicomponent educational strategies, or both. No strategy achieved complete, sustained compliance. In three controlled trials, there was little effect of intervention on youth perceptions of access or prevalence of smoking.	<i>Relevance score:</i> C
Thomas 2002	<p>Systematic review (RCT)</p> <p>Level: 1</p> <p>Review quality: +</p> <p><i>No. studies:</i> 76</p>	Children (aged 5 to12) and adolescents (aged 13 to18) in school settings.	To assess the effectiveness of school-based programmes in preventing children and adolescents from starting smoking.	Of the 76 RCTs identified, the authors classified 16 as category one (most valid). There were no category one studies of information giving alone. There were fifteen category one studies of social influences interventions. Of these, eight showed some positive effect of intervention on smoking prevalence, and seven failed to detect an effect on smoking prevalence. The largest and most rigorous study, found no long-term effect of an intensive 8-year programme on smoking behaviour. There was a lack of high quality evidence about the effectiveness of combinations of social influences and social competence approaches. There was limited evidence about the effectiveness of multi-modal approaches	<p><i>Study countries:</i> USA, Canada, Australia, Germany, Italy and the Netherlands, Norway, UK, Mexico and Spain.</p> <p><i>Relevance score:</i> A</p>
Ussher 2005	<p>Systematic review (RCT)</p> <p>Level: 1</p> <p>Review quality: +</p> <p><i>No. studies:</i> 11</p>	Smokers wishing to quit or recent quitters	To establish whether exercise-based interventions alone, or combined with a smoking cessation programme, are more effective than a smoking cessation intervention alone.	The authors identified 11 trials, six of which had fewer than 25 people in each treatment arm. They varied in the timing and intensity of the smoking cessation and exercise programmes. Three studies showed significantly higher abstinence rates in a physically active group versus a control group at end of treatment. One of these studies also showed a significant benefit for exercise versus control on abstinence at the three-month follow up and a benefit for exercise of borderline significance (P = 0.05) at the 12-month follow up. One study showed significantly higher abstinence rates for the exercise group versus a control group at the three-month follow up but not at the end of treatment or 12-month follow up. The other studies showed no significant effect for exercise on abstinence.	<p><i>Study countries:</i> Mainly USA also with one each in Canada, New Zealand and UK.</p> <p><i>Relevance score:</i> A</p>
Wiehe 2005	<p>Systematic review (RCT)</p> <p>Level: 1</p> <p>Review quality: -</p> <p><i>No. studies:</i> 8</p>	School children and leavers up to 18 yrs of age	To conduct a systematic review of rigorously evaluated interventions for school-based smoking prevention with long-term follow-up data.	The abstracts or full-text articles of 177 relevant studies were examined, of which 8 met the selection criteria. The 8 articles included studies differing in intervention intensity, presence of booster sessions, follow-up periods, and attrition rates. Only one study showed decreased smoking prevalence in the intervention group.	<p><i>Study countries:</i> Not stated</p> <p><i>Relevance score:</i> D</p>

4.1.2. Increasing or promoting the uptake of physical activity

Reviews of increasing or promoting the uptake of physical activity					
Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
Brunton 2003	Systematic review (RCT + non-RCT) <i>Level: 1+2</i> <i>Review quality: ++</i> <i>No. studies: 5</i>	children aged four to 10.	To address what is known about the barriers to, and facilitators of, physical activity amongst children aged four to 10. It aimed to bring together the findings from 'qualitative' as well as 'quantitative' research on these barriers and facilitators.	Only five interventions (all US based) met the inclusion criteria. Interventions shown to be effective in a least one rigorous study include: education and provision of equipment for monitoring TV or video-game use; engaging parents in supporting and encouraging their children's physical activity; and multi-component, multi-site interventions using a combination of school-based physical education and home-based activities. Five qualitative studies examined children's views about physical activity. The authors found that whilst children have clear views on the barriers to, and facilitators of, their participation in physical activity, their views are often ignored in the development of interventions. Gaps were most noticeable in relation to issues (identified by children), of restricted access to opportunities for physical activity (e.g. busy traffic, poor quality of playgrounds, and the need for local, easily accessible facilities). The authors concluded that whilst there has been a substantial amount of evaluation activity related to promoting children's physical activity, little of this has been conducted in the UK or amongst socially excluded children.	<i>Study countries:</i> UK and other countries <i>Relevance score: B</i>
Conn 2003	Systematic review (RCT) <i>Level: 1</i> <i>Review quality: -</i> <i>No. studies: 17</i>	Older adults (mean age 65 years or older)	To assess the effects of interventions aimed at increasing physical activity in older adults.	The methodological limitations of the studies included: small sample size; use of unvalidated outcome measures (8 RCTs); lack of a theoretical framework underlying the intervention (7 RCTs); and inadequate length of follow-up. Overall, 10 RCTs found the interventions increased physical activity or exercise compared with the control. One RCT reported greater physical activity in the control group. Focus of the intervention: 4 of the 6 RCTs that focused on walking found the intervention increased walking compared with the control. Sample size: 4 of the 5 small studies (n<60) found no difference in physical activity between the intervention and control. Population targeted: 6 of the 9 RCTs in people with health problems reported that the intervention increased physical activity compared with the control. Of the 8 RCTs in untargeted populations, four found the intervention increased activity compared with the control and four found no difference between the interventions.	<i>Study countries:</i> Not stated <i>Relevance score: C</i>

Reviews of increasing or promoting the uptake of physical activity					
Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
				<p>Length of follow-up: 4 of the 9 RCTs assessing outcomes less than 6 months after the intervention found that interventions significantly increased exercise, while 5 of the 7 RCTs assessing outcomes more than 6 months after the intervention found that interventions increased activity.</p> <p>Presence of supervision: 3 of the 5 RCTs of supervised exercise found that the interventions increased physical activity. Seven of the 12 RCTs without supervised exercise reported that the interventions increased exercise. Content of intervention: the results were inconsistent. No intervention with the same content used in 4 or more studies was shown to have a consistently positive or negative effect on physical activity or exercise. Four of the 6 RCTs that individualised the content reported that the interventions increased exercise.</p> <p>Intervention location and delivery: 3 of the 5 RCTs conducted in the participants' homes reported that the interventions increased physical activity. All 4 RCTs conducted in aggregated community settings reported that the interventions increased exercise. Six of the 11 RCTs conducted among researcher formed groups reported positive findings, while the other 5 RCTs reported negative findings. Four of the 5 RCTs that delivered motivational sessions over the phone reported that the interventions increased physical activity compared with the control.</p>	
Dobbins 2001	<p>Systematic review (RCT + non-RCT)</p> <p>Level: 1+2</p> <p>Review quality: +</p> <p><i>No. studies:</i> 19</p>	<p>Children and young people; schools based. Mix of ethnicities and urban or rural settings</p>	<p>To summarize the effectiveness of school-based interventions in promoting physical activity and fitness in children and adolescents.</p>	<p>There is limited, but good evidence that school-based physical activity interventions are effective in increasing physical activity rates in children and adolescents, and in increasing duration of physical activity among children. There is also very limited but good evidence that grade-school-aged children exposed to physical activity promotion programmes lead more active lives as adults. The evidence demonstrates, however, that these interventions are not effective in altering most physical health status indicators. At a minimum, printed educational materials and changes to the school curriculum that promote physical activity are effective.</p>	<p><i>Study countries:</i> USA (13), Australia, Greece, Norway, and the United Kingdom</p> <p><i>Relevance score:</i> A</p>

Reviews of increasing or promoting the uptake of physical activity

Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
Dunn 2001	Systematic review (RCT) <i>Level:</i> 1 <i>Review quality:</i> - <i>No. studies:</i> 29	Not stated	To examine the effectiveness of brief behavioural interventions adapting the principles and techniques of motivational interviewing (MI) in relation to substance abuse, smoking, HIV risk and diet/exercise.	Diet/exercise studies (5 studies): three of the studies had significant ESs, ranging from 0.36 (95% CI: 0.07, 0.66) to 2.17 (95% CI: 0.93, 3.41). The regression analysis found no significant decline in ESs across the studies as a function of follow-up time (p=0.84). Within studies (using 5 studies with significant ESs and more than one follow-up period) the results were mixed.	<i>Study countries:</i> Not stated <i>Relevance score:</i> A
Eden 2002	Systematic review (RCT + non-RCT) <i>Level:</i> 1+2 <i>Review quality:</i> + <i>No. studies:</i> 10	General primary care patients. The included studies were of sedentary or minimally active adult or senior men and women.	To determine whether counselling adults in primary care settings improves and maintains activity levels.	Interventions compared with a usual care control (5 RCTs and 1 non-randomised controlled trial). The results were mixed. Only one of the 3 trials reporting short-term (less than 6 months) outcomes found that the intervention significantly increased activity in comparison with usual care. Neither of the studies reported a significant interaction. Two of the 6 trials reporting long-term (greater than 6 months) outcomes found that the intervention significantly increased activity in comparison with usual care. None of the other 4 studies found any association. Interventions compared with each other (3 RCTs). One RCT found that advice plus agreeing a goal plus written prescription significantly increased activity at 6 weeks, compared with advice alone. One RCT found that specific goal setting significantly increased activity at 6 weeks in comparison with no specifically set goals. One RCT that compared advice, advice plus educational materials and both combined plus counselling found no significant difference in energy expenditure or fitness for men, but found that the combined intervention significantly increased self-reported physical activity in women at 6 months compared with advice plus educational materials. One study (148 healthy adolescents, 74% met recommendations for vigorous exercise at baseline) found that behavioural-change counselling for diet and exercise, which incorporated goal setting, increased the number of days on which moderate exercise was performed from 3.09 days per week at baseline to 4.52 days per week at 4 months' follow-up.	<i>Study countries:</i> Not stated <i>Relevance score:</i> C

Reviews of increasing or promoting the uptake of physical activity

Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
Finlay 2005	Systematic review (non-RCT) <i>Level:</i> 2 <i>Review quality:</i> - <i>No. studies:</i> 8	General population	To update a previous review investigating the effectiveness of physical activity interventions using mass media, and to assess identified studies for evidence of an understanding of the inception, transmission and reception of mass media interventions.	Overall, the eight studies showed that mass media interventions influenced short-term recall of physical activity messages. Changes in knowledge were noted in certain demographic groups. Six studies investigated changes in physical activity, and all but one found an increase in physical activity post intervention. The increases in physical activity tended to be in small subgroups, or for specific behaviours such as walking.	<i>Study countries:</i> USA, Australia, UK <i>Relevance score:</i> A
Hillsdon 2005	Systematic review (RCT) <i>Level:</i> 1 <i>Review quality:</i> ++ <i>No. studies:</i> 17	Adults in primary health care, workplaces, university and the community	To assess the effects of interventions for promoting physical activity in adults aged 16 years and older, not living in an institution.	The effect of interventions on self reported physical activity (11 studies; 3940 participants) was positive and moderate, with a pooled standardised mean difference of 0.31 (95% CI: 0.12 to 0.50), as was the effect on cardio-respiratory fitness (7 studies; 1406 participants) pooled SMD 0.4 (95% CI: 0.09 to 0.70). The effect of interventions in achieving a predetermined threshold of physical activity (6 studies; 2313 participants) was not significant with an odds ratio of 1.30 (95% CI: 0.87 to 1.95). There was significant heterogeneity in the reported effects as well as heterogeneity in characteristics of the interventions. The heterogeneity in reported effects was reduced in higher quality studies, when physical activity was self-directed with some professional guidance and when there was on-going professional support.	<i>Study countries:</i> Not stated <i>Relevance score:</i> A
Holtzman 2004	Systematic review (RCT + non-RCT) <i>Level:</i> 1+2 <i>Review quality:</i> + <i>No. studies:</i> 71	General population	To examine the evidence that physical activity interventions, alone or combined with diet modification or smoking cessation, are effective in helping individuals sustainably increase their aerobic physical activity or maintain adequate aerobic physical	The range of populations, interventions, and outcomes in the included studies, as well as inadequate information provided, did not allow pooling of studies. Results were examined semi-quantitatively using whether a study was positive, significant, and, when possible, its effect size. Forty-five percent of the studies had at least one statistically significant outcome; 5.9 percent had an effect size greater than .8 and 5.9 percent were between .5 and .8. There were no clear patterns in results by setting, intensity, interventions using theory, combined interventions, and those that addressed accessibility, possibly due to the small number of studies. It was not possible to draw conclusions about mediators and moderators. Physical activity interventions in the cancer survivor populations were found to have	<i>Study countries:</i> Not stated <i>Relevance score:</i> A

Reviews of increasing or promoting the uptake of physical activity					
Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
			activity.	multiple beneficial effects. The most consistent and strong findings were positive effects on vigor/vitality, cardiorespiratory fitness, quality of life, depression, anxiety, and fatigue.	
Jackson 2005a	Systematic review (non-RCT) <i>Level: 2</i> <i>Review quality: ++</i> <i>No. studies: 0</i>	People of all ages	To review all controlled evaluation studies of interventions organised through sporting settings to increase participation in physical activity.	No rigorous studies were identified which tested the effects of interventions organised through sporting organisations to increase participation in sport.	<i>Study countries:</i> No studies identified <i>Relevance score:</i> A
Jackson 2005b	Systematic review (RCT + non-RCT) <i>Level: 2</i> <i>Review quality: +</i> <i>No. studies: 0</i>	People of all ages	To review all controlled evaluation studies of policy interventions organised through sporting settings to increase healthy behaviour (related to smoking, alcohol, healthy eating, sun protection, discrimination, safety and access).	No rigorous studies were located to test the effectiveness of policy interventions organised through sporting organisations to increase healthy behaviours, attitudes, knowledge or inclusion of health oriented policies within the organisations	<i>Study countries:</i> Not applicable <i>Relevance score:</i> A
Jago 2004	Systematic review (RCT + non-RCT) <i>Level: 1+2</i> <i>Review quality: -</i> <i>No. studies: 9</i>	Children and adolescents aged 5 to 18 years.	To assess the effectiveness of non-curricular interventions for increasing physical activity in children and adolescents.	Physical activity during school breaks (5 studies). Three studies found that interventions during school breaks (painting school playgrounds, playground supervisors implementing a games curriculum, and taught playground games or introduced equipment) could increase physical activity by 17 to 60%. One study found that an increased number of physical activity sessions during the day significantly increased activity among boys, but not girls. One study found that structured break periods significantly increased self-reported physical activity in boys and girls. Active travel to school (1 study). One study found that travel coordinators had no significant effect on self-reported school travel patterns. Extracurricular activities (1 study). One study found that after school resistance training had no significant effect on energy expenditure in 12 obese	<i>Study countries:</i> Not stated <i>Relevance score: B</i>

Reviews of increasing or promoting the uptake of physical activity					
Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
				girls. Summer schools or camps (2 studies). Two studies found no consistent significant increase in physical activity. One study found that a summer day camp did not significantly increase physical activity measured by the CSA, but it did increase self-reported usual activity. The other study found that an after school 'activity club' plus summer day camp did not significantly change self-reported habitual blocks of moderate to vigorous activity.	
McLure 2002	Systematic review (RCT) Level: 1 Review quality: - <i>No. studies:</i> 8	Studies of adults only	To review the literature to determine the effectiveness of using biomarker feedback to motivate and enable health behaviour change	The results of this review were mixed, but suggest that biological information conveying harm exposure, disease risk or impaired physical functioning may increase motivation to change. Subsequent behaviour change is also affected by the availability and intensity of concomitant treatment. Studies that failed to find a significant behaviour effect used only a single biomarker (CO level, cholesterol, or an index of physical fitness) and provided feedback on a single occasion. Three of the eight trials found evidence of behaviour change, which implies an effect on motivation. Each successful trial offered counselling in person and relevant treatment materials.	<i>Study countries:</i> Not stated <i>Relevance score:</i> B
Ogilvie 2004	Systematic review (RCT + non-RCT) Level: 1+2 Review quality: ++ <i>No. studies:</i> 22	Urban populations	To assess what interventions are effective in promoting a population shift from using cars towards walking and cycling and to assess the health effects of such interventions.	22 studies met the inclusion criteria. The authors found some evidence that targeted behaviour change programmes can change the behaviour of motivated subgroups, resulting (in the largest study) in a shift of around 5% of all trips at a population level. Single studies of commuter subsidies and a new railway station also showed positive effects. The balance of best available evidence about publicity campaigns, engineering measures, and other interventions suggests that they have not been effective. Participants in trials of active commuting experienced short term improvements in certain measures of health and fitness, but the authors found no good evidence on effects on health of any effective intervention at population level.	<i>Study countries:</i> Range of countries including UK, Denmark, USA, Australia <i>Relevance score:</i> A
Proper 2003	Systematic review (RCT + non-RCT) Level: 1+2 Review quality: + <i>No. studies:</i> 26	Healthy working people. The participants in the included studies were blue or white-collar workers, home care	To assess the effectiveness of worksite physical activity programmes on improving physical activity, physical fitness and health.	There was strong evidence from two high-quality RCTs that worksite physical activity programmes increased physical activity levels. The evidence for any improvement in cardiorespiratory fitness was inconclusive. One high-quality RCT showed a significant increase in maximum oxygen consumption; however, this was not supported by the results of a second high-quality RCT. Three high-quality RCTs found a positive effect of the intervention on back or neck pain, or incidence of back pain. Limited evidence from two low-quality RCTs	<i>Study countries:</i> Not stated <i>Relevance score:</i> B

Reviews of increasing or promoting the uptake of physical activity

Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
		workers, fire-fighters, nurses, police or military personnel.		showed a reduction in fatigue in the treatment groups. There was no evidence of any effect of the intervention on serum lipid levels or blood-pressure. There was inconclusive evidence for changes in muscle flexibility, muscle strength, body weight, body composition and general health with the intervention.	
Rees 2001	Systematic review (RCT + non-RCT) <i>Level:</i> 1&2 <i>Review quality:</i> + <i>No. studies:</i> 28	Young people 11-16 years	To provide practitioners, policy-makers and researchers with a summary of evidence to help them develop, implement and evaluate interventions for promoting physical activity amongst young people. The authors had a particular focus on young people from socially excluded groups and upon interventions targeting structural or environmental (e.g. access to facilities) barriers to physical activity.	Two types of study were included: international studies evaluating the effectiveness of interventions, and UK studies examining young peoples own views about physical activity and how it might be promoted. A total of 28 studies met the inclusion criteria: 16 examined young peoples views and 12 were potentially rigorous evaluations of the effectiveness of interventions. Many of the interventions were evaluated in schools, some of which also extended activities into the home and the community through seeking parental involvement. Peer influence was also explored. Reliable evidence on the effectiveness of these efforts was, however, scarce. When positive effects were detected these were restricted to young women. In terms of young peoples views, the vast majority saw physical activity as beneficial for both health and social reasons. Young women particularly valued the role of physical activity in maintaining weight and a toned figure, but unlike young men, they found that physical activity did not fit in well with their leisure time. Ideas for promoting physical activity included: increasing or modifying practical and material resources, such as creating more cycle lanes, making activities more affordable, increasing access to clubs for dancing, and combining sports with leisure facilities; and more 'non-traditional' activities to choose from in school PE. A comparison across study types suggest major gaps for research and development. The effectiveness of interventions that address or build on young peoples ideas have yet to be sufficiently evaluated. This is the case for the need for less traditional school-based activities including dance and aerobics, for modifications to PE organisation and teaching, for additional community and personal resources or materials.	<i>Study countries:</i> USA and UK <i>Relevance score:</i> A

Reviews of increasing or promoting the uptake of physical activity					
Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
Van Sluijs 2004	Systematic review (RCT) Level: 1 Review quality: ++ <i>No. studies:</i> 29	Adults over 18 yrs.	To systematically review the literature concerning the effect of stages-of-change-based interventions in primary care on smoking, physical activity, and dietary behaviour.	A total of 29 trials were selected for inclusion. Thirteen studies included a physical activity intervention, 14 aimed at smoking cessation, and five included a dietary intervention. Overall methodologic quality was good. No evidence was found for an effect on stages of change and actual levels of physical activity. Based on the strength of the evidence, limited to no evidence was found for an effect on stages of change for smoking and smoking quit rates. Odds ratios for quitting smoking showed a positive trend. Strong evidence was found for an effect on fat intake at short- and long-term follow-up. Limited evidence was found for an effect on stages of change for fat intake at short-term follow-up.	<i>Study countries:</i> Not stated <i>Relevance score:</i> C
Van-der-Bij 2002	Systematic review (RCT) Level: 1 Review quality: ++ <i>No. studies:</i> 38	Older adults (mean age; 51-88) from general community settings; living in nursing/residential home or using primary healthcare facilities.	To evaluate the effectiveness of physical activity interventions among older adults.	<i>Home-based physical intervention studies (n=9):</i> the mean participation rate was 90% (range: 86 to 93) for the short-term interventions and lower (range: 49 to 68%; mean not reported) for the long-term interventions. Of the 2 studies reporting the outcome change in physical activity, one was a short-term intervention and the other was long-term. The short-term intervention study reported a decline in exercise activity 18 months after the intervention ended: 3.6 days/week versus 2.8 days/week. The long-term intervention study reported a decline in physical activity in both the intervention and control groups, with the decline being significantly larger in the control group. <i>Group-based physical intervention studies (n=38):</i> the mean participation rate was 84% (range: 55 to 100) for the short-term interventions and 75% (range: 63 to 84) for the long-term interventions. Four studies (2 short-term and 2 long-term interventions) comparing baseline and follow-up physical activity levels for the intervention group reported outcome levels that were significantly higher than baseline. Five studies (3 short-term and 2 long-term interventions) comparing control groups reported significantly higher physical activity levels in the intervention groups; 4 of these were the same studies reported for baseline to follow-up activity levels in the intervention group. Three studies (2 short-term and one long-term intervention) compared activity levels at the end of the intervention with levels after 12, 18 or 120 months. Only one of these studies reported significantly higher physical	<i>Study countries:</i> Not stated. <i>Relevance score:</i> A

Reviews of increasing or promoting the uptake of physical activity					
Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
				activity levels in the intervention group than in the control group. <i>Educational physical activity interventions (n=10):</i> All of the studies reported on the outcome change in physical activity. The 6 short-term intervention studies reported a significant increase in physical activity in the intervention group than in the control group. Three of the 9 long-term interventions resulted in a significant improvement in physical activity levels.	

4.1.3. Reducing alcohol misuse or postponing alcohol use

Review of reducing alcohol misuse or postponing alcohol use					
Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
Bertholet 2005	Systematic review (RCT) <i>Level: 1</i> <i>Review quality: ++</i> <i>No. studies: 19</i>	Patients attending primary care	To evaluate the evidence of efficacy of brief alcohol interventions aimed at reducing long-term alcohol use and related harm in individuals attending primary care facilities but not seeking help for alcohol-related problems.	The authors examined 19 trials that included 5639 individuals. Seventeen trials reported a measure of alcohol consumption, of which 8 reported a significant effect of intervention. The adjusted intention-to-treat analysis showed a mean pooled difference of -38 g of ethanol (approximately 4 drinks) per week (95% confidence interval, -51 to -24g/wk) in favor of the brief alcohol intervention group. Evidence of other outcome measures was inconclusive.	<i>Study countries:</i> USA, Europe, Africa, Australia. <i>Relevance score: C</i>
Ditter 2005	Systematic review (non-RCT) <i>Level: 2</i> <i>Review quality: +</i> <i>No. studies: 7</i>	Total population and people in 'drinking establishments'	To assess the evidence of effectiveness of designated driver programmes for reducing alcohol-impaired driving and alcohol-related crashes.	A single study of a population based designated driver promotion campaign was identified. Survey results indicated a 13 percentage point increase in respondents "always" selecting a designated driver, but no significant change in self-reported alcohol-impaired driving or riding with an alcoholimpaired driver. Eight studies of incentive programmes at drinking establishments met inclusion criteria. Seven of these evaluated the number of patrons who identified themselves as designated drivers before and after programmes were implemented, with a mean increase of 0.9 designated drivers per night (interquartile range: 0.3 to 3.2 designated drivers per night). The eighth study reported a 6 percentage point decrease (p 0.01) in self-reported driving or riding in a car with an intoxicated driver among respondents exposed to an incentive programme.	<i>Study countries:</i> USA & Australia <i>Relevance score: B</i>
Doggett 2005	Systematic review (RCT) <i>Level: 1</i> <i>Review quality: ++</i> <i>No. studies: 6</i>	Women with an alcohol problem were defined as those who self reported a problem or women who 'risk drank' on average in excess of 80	To determine the effects of home visits during pregnancy and/or after birth for pregnant women with a drug or alcohol problem.	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, pediatric 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 (2 studies, 248 women; relative risk (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 (2 studies, 211 women; RR 0.45 95% CI: 0.10 to 1.94). There was no	<i>Study countries:</i> USA and Australis <i>Relevance score: C</i>

Review of reducing alcohol misuse or postponing alcohol use					
Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
		g/day or binge drinking.		significant difference in the Bayley MDI (3 studies, 199 infants; weighted mean difference 2.89, 95% CI: -1.17 to 6.95) or Psychomotor Index (WMD 3.14, 95% CI: -0.03 to 6.32). Other outcomes reported by one study only included breastfeeding at six months (RR 1.00, 95% CI: 0.81 to 1.23), incomplete six-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 postpartum 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).	
Elder 2004	Systematic review (non-RCT) Level: 2 Review quality: - <i>No. studies:</i> 8	General Population	To assess whether, and under what conditions, mass media campaigns are helpful in preventing AID and alcohol-related crashes.	The median decrease in crashes across all studies and all levels of crash severity was 13% (interquartile range [IQR]: 6% to 14%). The median decrease in injury-producing crashes, the most common crash outcome, was 10% (IQR: 6% to 15%). The two studies that used roadside BAC test results as outcome measures showed net decreases of 158% and 30% in the proportion of drivers with BAC levels that suggest alcohol impairment (0.05 g/dL and 0.08 g/dL, respectively). There was no clear difference in the effectiveness of campaigns that used legal deterrence messages and those that used social and health consequences messages.	<i>Study countries:</i> Australia, New Zealand, USA <i>Relevance score:</i> B
Elder 2005	Systematic review (RCT + non-RCT) Level: 1+2 Review quality: + <i>No. studies:</i> 13	Children in schools-based, and peer organisations	To assess the effectiveness of school-based programmes for reducing drinking and driving and riding with drinking drivers	For instructional programmes, the median estimated change measured in the five studies evaluating self-reported drinking and driving was 0.10 standard deviations (SDs) (range: 0.22 to 0.04 SD). The median estimated change in the four studies evaluating the effects of such programmes on self-reported riding with drinking drivers was 0.18 SD (range: 0.72 to 0.10 SD). The instructional program varied widely with respect to several variables identified in previous research as being potentially important to programme effectiveness, including exposure time, programme content, and degree of interaction with students. Nonetheless, nearly all programmes had some interactive component, rather than being purely didactic in their approach.	<i>Study countries:</i> USA, Australia, NZ, and UK <i>Relevance score:</i> A
Foxcroft 2002	Systematic review (RCT + non-RCT) Level: 1+2 Review quality: +	Adults and children in schools, colleges and community-based	To identify and summarise rigorous evaluations of psychosocial and educational interventions aimed at the primary prevention	20 of the 56 studies included showed evidence of ineffectiveness. No firm conclusions about the effectiveness of prevention interventions in the short- and medium-term were possible. Over the longer-term, the Strengthening Families Programme (SFP) showed promise as an effective prevention intervention. The Number Needed to Treat (NNT) for the SFP over 4 years for three alcohol initiation behaviours (alcohol use, alcohol use without permission and first drunkenness) was 9 (for all	<i>Study countries:</i> USA, UK, Canada, Sweden, Norway, Australia & one international <i>Relevance score:</i>

Review of reducing alcohol misuse or postponing alcohol use					
Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
	<i>No. studies:</i> 56		of alcohol misuse by young people	three behaviours). One study also highlighted the potential value of culturally focused skills training over the longer-term (NNT=17 over three-and-a-half years for 4+ drinks in the last week).	A
Wagenaar 2002	Systematic review (non-RCT) <i>Level:</i> 2 <i>Review quality:</i> - <i>No. studies:</i> A total of 241 analyses drawn from 132 papers.	Majority of participants were under 21 years old, and many were college students.	To determine the effectiveness of a policy of a minimum legal drinking age (MLDA) of 21 years in reducing the consumption of alcohol by the under-21s and the occurrence of alcohol-related harm.	<p>Forty-eight studies with 78 analyses examining the effect of a MLDA on alcohol consumption were found. In 27 analyses there was a statistically-significant inverse relationship between the MLDA and alcohol consumption, while in 5 analyses there was a statistically-significant positive relationship. Of the 33 analyses judged to be of higher quality, 11 showed a statistically-significant inverse relationship between the MLDA and alcohol consumption and one showed a statistically-significant positive relationship. Of the 24 analyses of college students, 3 reported a statistically-significant inverse relationship and 3 reported a significant positive relationship. The 3 high-quality studies showed no relationship.</p> <p>Fifty-seven studies with 102 analyses of drink-driving and traffic accidents were found. Of these, 52 analyses showed a statistically-significant inverse relationship between the MLDA and accident-related incidents, while 2 showed a statistically-significant positive relationship. Of the 79 studies judged to be of higher quality, 46 showed a statistically-significant inverse relationship between the MLDA and traffic accidents; none found a statistically-significant positive relationship. There were 6 analyses of college students, of which 2 reported an inverse relationship and one a positive relationship. None of the high-quality studies were in college students.</p> <p>Twenty-four studies with 61 analyses of health and social problems (excluding traffic crashes) were found. Ten of these analyses reported a statistically-significant inverse relationship between the MLDA and accident-related incidents, with 4 reporting a positive correlation. Of the 23 studies judged to be of higher quality, 8 showed a statistically-significant inverse relationship between the MLDA and outcome measures; none found a statistically-significant positive relationship. Thirty-four analyses of college students were found, of which 2 showed a statistically-significant inverse relationship and 3 showed a statistically-significant positive relationship. The 2 high-quality studies showed no significant relationship.</p>	<p><i>Study countries:</i> USA and Canada.</p> <p><i>Relevance score:</i> C</p>

Review of reducing alcohol misuse or postponing alcohol use					
Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
Walters 2000	Systematic review (RCT) Level: 1 Review quality: - <i>No. studies:</i> 17	All problem drinkers	To test the overall effectiveness of behavioural self-control training for problem drinking.	There was no statistically-significant heterogeneity across the included studies. The fixed-effect model yielded a combined effect size for the entire sample of 0.33 (standard error 0.08), which was of sufficient magnitude to reject the null hypothesis of no relationship between behavioural self-control training and outcome ($Z > 1.96$). Behavioural self-control training was superior to no intervention or alternative non-abstinence-orientated interventions, but was not statistically significantly better than abstinence-programmes. Additional analyses found behavioural self-control training to be equally effective for use with alcohol-dependent and problem-drinking individuals, and for follow-ups spanning several months to several years.	<i>Study countries:</i> Not stated <i>Relevance score:</i> B
Wells-Parker 1995	Systematic review (RCT + non-RCT) Level: 1+2 Review quality: - <i>No. studies:</i> 194	Drink-driving offenders	To assess the efficacy of interventions to reduce recidivism among drink-driving offenders.	The effect sizes given here exclude those derived from studies that were non-randomised, and in which intervention and comparison groups were not clearly comparable. Educational interventions (48 studies): mean effect size 0.08 (standard error, SE 0.02); median effect size 0.07; 15 studies had a negative effect size. Education alone (24 studies): mean effect size 0.04 (SE 0.03); median effect size 0.02; 8 studies had a negative effect size. Education with another intervention (21 studies): mean effect size 0.12 (SE 0.03); median effect size 0.09; 5 studies had a negative effect size. Psychotherapy or counselling (25 studies): mean effect size 0.07 (SE 0.04); median effect size 0.09; 7 studies had a negative effect size. Psychotherapy or counselling with education (19 studies): mean effect size 0.13 (SE 0.03); median effect size 0.09; 4 studies had a negative effect size. Probation (16 studies): mean effect size 0.01 (SE 0.02); median effect size 0.03; 7 studies had a negative effect size. Alcoholics Anonymous (3 studies): mean effect size -0.12 (SE 0.20); median effect size -0.15; 2 studies had a negative effect size. Antabuse (5 studies): mean effect size 0.08 (SE 0.06); median effect size 0.06; 1 study had a negative effect size. Effects on number of alcohol-related crashes (10 studies): mean effect size 0.07 (SE 0.03).	<i>Study countries:</i> Not stated <i>Relevance score:</i> C
Whitlock 2004	Systematic review (RCT + non-RCT) Level: 1&2 Review quality: +	Non-dependent drinkers 12 years of age or older	To systematically review evidence for the efficacy of brief behavioural counseling interventions in primary care settings to reduce risky and harmful	Six to 12 months after good-quality, brief, multicontact behavioural counseling interventions (those with up to 15 minutes of initial contact and at least 1 follow-up), participants reduced the average number of drinks per week by 13% to 34% more than controls did, and the proportion of participants drinking at moderate or safe levels was 10% to 19% greater compared with controls. One study reported maintenance of improved drinking patterns for 48 months.	<i>Study countries:</i> Australia, New Zealand, UK <i>Relevance score:</i> A

Review of reducing alcohol misuse or postponing alcohol use					
Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
	<i>No. studies:</i> 12		alcohol consumption		
Willis 2004	Systematic review (RCT + non-RCT) Level: 1+2 Review quality: ++ <i>No. studies:</i> 14	Drivers who have been convicted of drink driving.	To systematically assess the effectiveness of ignition interlock programmes on recidivism rates of drink drivers, by examining rates of recidivism while the ignition interlock device was installed in the vehicle and after removal of the device.	The RCT showed that the interlock programme was effective while the device was installed in the vehicle; relative risk 0.36 (95% CI: 0.21 to 0.63). Controlled trials support this conclusion, with a general trend in both first-time and repeat offenders towards lower recidivism rates when the interlock device is installed. Neither the RCT nor the controlled trials provide evidence for any effectiveness of the programmes continuing once the device has been removed.	<i>Study countries:</i> Canada, USA, Australia and Sweden <i>Relevance score:</i> C
Zwerling 1999	Systematic review (non-RCT) Level: 2 Review quality: - <i>No. studies:</i> 6	Younger drivers subject to relevant laws	To evaluate the effectiveness of low blood alcohol concentration laws for younger drivers	Included studies were heterogeneous in terms of types of interventions, participants and outcome measures. However, all 6 studies showed a reduction in injuries or crashes after the implementation of the law, although, for 3 studies, these reductions were not statistically significant. The study with the smallest reduction in injuries had a power of 70% to detect a 10% decline in serious injuries. Reductions in outcome in the other studies ranged from 11% to 33% with a cluster of parameter estimates just under 20%. One study evaluated laws with different levels of BAC and found a dose-response effect. The greatest reduction (22%) was reported for night-time, single vehicle fatalities in those states with zero BAC laws. In states with 0.02% BAC laws, the reduction average 17% and in states with 0.04 to 0.06% BAC laws, the reduction was 7%.	<i>Study countries:</i> USA and other countries <i>Relevance score:</i> D

4.1.4. Promoting healthy eating

Reviews of promoting healthy eating					
Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
Ammerman 2002	Systematic review (RCT) Level: 1 Review quality: + <i>No. studies:</i> 29	Studies conducted in populations similar to those encountered in primary care	To examine the effectiveness of counselling in the primary care setting to promote a healthy diet. This review question was one of seven questions investigating the relationship between health and diet and the effects of dietary change interventions.	There were 17 studies of dietary fat, 10 of fruit and vegetable intake, 7 of dietary fibre, and 12 of more than one nutrient or food group. All the studies were of good or fair quality. Effect of counselling on dietary fat intake: 6 studies reported large effects, 5 had medium effects and 6 had small effects. Effect of counselling on fruit and vegetable intake: 2 studies reported large effects, 5 had medium effects and 3 had small effects. Effect of counselling on dietary fibre intake: 4 had medium effects and 3 had small effects. The dietary counselling interventions tended to be more effective in high-risk status populations and high-intensity interventions were more effective: the interventions used in high-risk populations tended to be of a higher intensity and, hence, were more effective. Interventions employing more of the effective counselling elements produced larger changes in behaviour. Insufficient studies were found to determine the individual effect of specific counselling techniques. There were no studies of the adverse effects of counselling to alter dietary habits.	<i>Study countries:</i> Not stated. <i>Relevance score:</i> C
Ciliska 1999	Systematic review (RCT + non-RCT) Level: 1+2 Review quality: + <i>No. studies:</i> 15	Participants over 4 years old	To examine the effectiveness of community interventions to increase fruit and vegetable consumption in people aged 4 years and older.	<i>Interventions with parents of young children (4 studies).</i> Two of the 4 studies were independent evaluations of the Expanded Food and Nutrition Education Programme (EFNEP). The results of the first study indicated that the intervention group experienced a significant increase in their fruit and vegetable consumption at the end of the 6-month programme, from 2.6 to 3.7 servings/day ($P < 0.001$), with no significant change in the control group. A statistical comparison of the post-test intervention with the post-test control was not given. The results of the second study (RCT) showed that, at the end of the 6 months, the experimental group had a statistically-significant increase over the usual EFNEP intervention in their daily intake of fruits (from 1.5 to 2.6 servings/day, $P < 0.002$) and vegetables (from 0.9 to 1.6 servings/day, $P < 0.05$). A further multicentre cohort analytic study was conducted on mothers whose children were in a 'Head Start' programme. The results indicated that there were no significant differences in groups in total vegetable servings per day, nor in fruit intake for three of the five groups studied. Two of the intervention groups had an increase in fruit	<i>Study countries:</i> Not stated <i>Relevance score:</i> B

Reviews of promoting healthy eating

Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
				<p>consumption, from 1.9 to 2.7 servings/day (P<0.05); they also experienced a significant increase in vitamin C-rich fruits (from 0.3 to 0.67 servings/day, P<0.05) and dark green vegetables (from 0.27 to 0.58 servings/day, P<0.05). The last controlled study assessed a special supplemental nutrition programme for women, infants and children. Both groups increased their fruit and vegetable intake, but the intervention group experienced a statistically-significant greater increase in intake than the control group (P=0.002). The results of the last school intervention that was based on the PRECEDE model showed that at post-test (1 year after completion of the 3-year programme), the intervention group had a significant increase in fruit and vegetable servings/day from 2.63 to 3.0 (P<0.05).</p> <p><i>Interventions with adults - non-worksites (3 studies).</i> In one trial, in which the participants received either tailored or non-tailored information regarding dietary change, there were no differences between the groups observed at follow-up 4 months post-intervention. Both groups decreased their fruit and vegetable intake by 0.25 servings/day. The second randomised trial which was conducted on women who were at risk of breast cancer, aimed to reduce total calorie intake, increase complex carbohydrates, and ensure adequate intake of vitamins and minerals without supplements. The results showed at 12 and 24 months' follow-up, fruit and vegetable intake significantly increased (P<0.001) in the intervention group more than in the control, from a baseline of 15.9% of total kcal/day to 22% at 12 months and 23.1% at 24 months (P<0.001). The total energy intake decreased in the intervention group by 25% and they experienced a mean weight loss of 3.1 kg. The results of the final study, which assessed the effectiveness of having a Healthy Heart Coalition, showed that there was no change in the proportion of people who consumed at least five servings of fruits and vegetables per day, whether or not they were from a community that had an active coalition.</p> <p><i>Interventions with adults - worksites (2 studies).</i> The results of the first trial indicated that the intake of fruits and vegetables increased from 2.6 to 2.8 servings/day in the intervention group, compared with 2.58 to 2.6 servings/day in the control group (P<0.001). The results of the second</p>	

Reviews of promoting healthy eating					
Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
				trial showed that there was no post-test difference in the mean servings per month of fruit.	
Fletcher 1998	Systematic review (RCT + non-RCT) Level: 1+2 Review quality: + <i>No. studies:</i> 23	Free living (i.e. not institutionalised) elderly people above the age of 65 years.	To establish which interventions are effective in promoting healthy eating among elderly people living in the community.	<i>Nutrition interventions in elderly people in the community meal setting:</i> Only one study out of three found short-term benefits of the programme. Success was related to focusing on high-risk individuals, use of a motivational group-led model, and the emphasis on improving vitamin, protein and mineral intakes. <i>Nutrition interventions in elderly people in communal settings:</i> None of the studies demonstrated adequate evidence for a benefit of intervention, although conversely, none provided adequate evidence for no benefit. Nutrition interventions in the elderly population living in the community: evidence for the effect of nutrition interventions targeting elderly people in the general community was poor. <i>Nutrition interventions as part of health promotion interventions:</i> the results of three RCTs suggest that a feedback/goal-setting type intervention may lead to improved eating behaviours in elderly people.	<i>Study countries:</i> Only studies from developed countries were included in the review - the only country specifically mentioned is USA. <i>Relevance score:</i> B
Roe 1997	Systematic review (RCT + non-RCT) Level: 1+2 Review quality: + <i>No. studies:</i> 76	Adults and children in different settings	1. To summarise recent evaluations of 'Healthy Eating Interventions', and to critically assess the reliability of evidence on effectiveness and implications for future practice.	Most good quality studies, which reporting a dietary outcome measure, showed a benefit of intervention (15 studies out of 25). Long-term interventions in the population achieved reductions in dietary fat of 1 to 4% of energy intake. Blood cholesterol was measured in less than half of the studies. The majority (7 out of 10) of good quality studies in the settings of schools, workplaces and primary care, showed a reduction in blood cholesterol ranging from 2 to 3% among adults in the general population and from 2 to 10% among children and adolescents. The majority (5 out of 6) of good quality studies of community-based interventions showed no effect on blood cholesterol. The greatest magnitude in change in diet was seen in studies with highly motivated volunteers in intensive programmes. A substantial number of studies showed no effect of the intervention on the main outcomes measured, compared with controls. This was seen particularly in the community setting, where a significant change in the intervention group was often equalled in the long term by a secular change in the control group. The majority of interventions in the supermarket and catering settings showed an effect on food purchases in the short term, i.e. while the intervention was in place. Passive manipulation of food composition decreased the fat content of catered meals. The characteristics of	<i>Study countries:</i> Not specifically stated but implies UK is included. <i>Relevance score:</i> A

Reviews of promoting healthy eating					
Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
				effective and less effective interventions were also reported.	
Shepherd 2002	Systematic review (RCT + non-RCT) <i>Level:</i> 1&2 <i>Review quality:</i> + <i>No. studies:</i> 22	Young people 11-16 years	To provide practitioners, policy-makers and researchers with a summary of evidence to help them develop, implement and evaluate interventions for promoting healthy diet amongst young people.	Several multi-component interventions complementing classroom activities with school wide initiatives as well as involving parents were found to have positive effects. There is stronger evidence for effectiveness amongst young women compared to young men. Although attitudes towards healthy eating were generally positive, personal preferences for fast foods on grounds of taste tended to dominate food choice. Young people particularly valued the ability to choose what they eat. Healthy foods were predominantly associated with parents/adults and the home, whilst fast food was associated with pleasure, friendship and social environments. Factors inhibiting their ability to eat healthily included poor availability of healthy meals at school, healthy foods sometimes being expensive, and wide availability of, and personal preferences for, fast foods. Ideas for promoting nutrition included the provision of information on nutritional content of school meals (for young women particularly), and better food labelling.	<i>Study countries:</i> USA and UK <i>Relevance score:</i> A
Tedstone 1998	Systematic review (RCT + non-RCT) <i>Level:</i> 1+2 <i>Review quality:</i> + <i>No. studies:</i> 14	Children aged roughly 1 to 5, their parents, other family members, and other carers e.g nurseries or nursery staff.	To review interventions promoting healthy diets in children aged 1 to 5 years, with the aim of identifying the most effective methods to bring about dietary changes, in line with dietary goals.	Most studies demonstrated some positive effect on nutrition knowledge. However, the impact on eating behaviour was less frequently assessed and the outcome was variable. There were no data to evaluate the long-term effectiveness on knowledge or behaviour. Interventions targeting children. Traditional, video or computer-based teaching methods were successful at increasing nutrition knowledge, and their effectiveness was enhanced by including parents. A single study showed the same intervention to be more effective when delivered in a pre-school setting by teachers than in a home setting by parents. The studies that assessed food consumption only measured snack selection as an outcome measure, and these showed variable results. The two studies that presented healthy and unhealthy snacks together appeared to show a less positive effect than those where only healthy snacks were offered to the children for evaluation purposes. Behavioural modification techniques using repeated exposure to initially novel foods were successful at increasing willingness to consume the foods, but only if tasting was used as part of the exposure. One study showed that the use of a reward to encourage consumption of	<i>Study countries:</i> Not stated - objectives and conclusions of review in relation to UK only, with the indication that interventions from other countries such as USA were included. <i>Relevance score:</i> A

Reviews of promoting healthy eating

Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
				<p>foods was unsuccessful once the reward had been removed. Interventions targeting carers. One-to-one diet counselling which was needs focused was successful at bringing about improvements in diet quality and food-related organisational skills in UK mothers. Similarly, haemoglobin concentrations were improved in children whose parents additionally received vouchers to purchase food as part of a welfare programme based in the USA. Nutrition education workshop and a related newsletter were shown to have differential positive effects on children's diets (based on parental questionnaire) when implemented in two different geographical locations. A nutrition education workshop had no effect on the menus offered by school meal providers in day-care centres.</p>	
Thomas 2003	<p>Systematic review (RCT + non-RCT)</p> <p>Level: 1&2</p> <p>Review quality: +</p> <p><i>No. studies:</i> 33</p>	Children aged 4 - 10	To survey what is known about the barriers to, and facilitators of, healthy eating amongst children aged four to 10 years old. It focuses in particular on barriers and facilitators in relation to fruit and vegetables.	<p>Of the 41 included studies, 33 were outcome evaluations and eight were studies of children's views or the views of their parents/carers. Three of the 33 outcome evaluations studied interventions to encourage children to try unfamiliar fruit and vegetables. Of the 30 which studied interventions to increase children's consumption of any fruit and vegetables, 19 were entered into a statistical meta-analysis (11 were excluded on the grounds that methodological problems meant that their findings could not be relied on). The types of interventions evaluated by these studies were largely school-based, and often combined learning about the health benefits of fruit and vegetables with 'hands-on' experience in the form of food preparation and taste-testing. The majority targeted parents and/or involved them in intervention delivery alongside teachers and health promotion practitioners. Some included environmental modification involving, for example, changes to the foods provided at school. Some interventions targeted more than one outcome (for example, fruit and vegetable consumption, fat intake, knowledge, self-efficacy, Body Mass Index (BMI) and physical activity). The results of the meta-analysis revealed that these kinds of interventions have a small, but significant positive effect. Pooled estimates from the nineteen studies suggest that implementation of these interventions will, on average, increase children's fruit intake by one-fifth of a portion per day and their vegetable intake by a little less than one-fifth of a portion per day. These are averages though, and different</p>	<p><i>Study countries:</i> USA and UK</p> <p><i>Relevance score:</i> A</p>

Reviews of promoting healthy eating

Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
				<p>interventions produced different effects. Bigger effects are associated with targeted interventions for parents with risk factors for cardiovascular disease (increasing fruit and vegetable intake by almost two portions) and with those interventions which do not 'dilute' their focus on fruit and vegetables by trying to promote physical activity or other forms of healthy eating (for example, reduced intake of sodium and fat) in the same intervention (effects sizes were three times higher in these studies). Single component interventions, such as classroom lessons alone or providing fruit only tuck shops, were not effective. Two main messages emerged from the findings of studies that conducted integral process evaluations: promoting healthy eating can be an integral and acceptable component of the school curriculum; and effective implementation in schools requires skills, time and support from a wide range of people. The results of the meta-analysis suggest that it is easier to increase children's consumption of fruit than vegetables. Three outcome evaluations studied interventions that attempted to address children's apparent greater dislike for vegetables by 'exposing them' to new or previously disliked vegetables. Their results revealed that it is possible to get children to try these vegetables (although allowing them a choice appears to be more effective than enforcing or rewarding this behaviour), but it is unclear whether such strategies would lead to increases in children's everyday consumption of vegetables.</p>	
<p>Van Teijlingen 1998</p>	<p>Systematic review (RCT + non-RCT)</p> <p>Level: 1+2</p> <p>Review quality: +</p> <p><i>No. studies:</i> 9</p>	<p>Pregnant women and women of childbearing age. Childbearing-age participants were aged 15-45 or thereabouts.</p>	<p>To assess the effectiveness of specific interventions on changes in pregnant womens' dietary knowledge, attitudes and/or behaviour; to determine the extent of such changes; and to determine the characteristics of effective interventions.</p>	<p>In the five studies of women of childbearing age, results showed that participants could improve their knowledge and dietary intake and that the changes were statistically significantly greater in groups receiving an intervention compared with the controls. In the 4 studies of pregnant women, only one study provided specific outcome data in relation to a healthy diet and that study had adequate statistical power and demonstrated small improvements in both control and intervention groups, with a greater, but statistically non-significant, improvement in the intervention group. This study also evaluated changes in knowledge and attitudes and demonstrated small changes in the desired direction in control and intervention groups; the difference in knowledge scores between the groups reached statistical significance but the magnitude of the difference is unlikely to represent an improvement which is worthwhile in practice. The other three studies suggested that pregnant</p>	<p><i>Study countries:</i> Not stated</p> <p><i>Relevance score:</i> A</p>

Reviews of promoting healthy eating					
Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
				women appear to improve their intake of energy and possibly protein in response to interventions designed to improve pregnancy outcomes, but they did not provide data on other components of a healthy diet or on knowledge or attitudes.	

4.1.5. Preventing illicit drug use

Reviews of preventing illicit drug use					
Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
Faggiano 2005	Systematic review (RCT + non-RCT) Level: 1&2 Review quality: ++ <i>No. studies:</i> 32	Primary or secondary school pupils formed the target population. Studies targeting special populations were excluded	To evaluate the effectiveness of school-based interventions in improving knowledge, developing skills, promoting change, and preventing or reducing drug use versus usual curricular activities or a different school-based intervention .	(1) Knowledge versus usual curricula Knowledge focused programmes improve drug knowledge (standardised mean difference (SMD) 0.91; 95% CI: 0.42 to 1.39). (2) Skills versus usual curricula Skills based interventions increase drug knowledge (weighted mean difference (WMD) 2.60; 95% CI: 1.17 to 4.03), decision making skills (SMD 0.78; CI 95%: 0.46 to 1.09), self-esteem (SMD 0.22; CI 95% 0.03 to 0.40), peer pressure resistance (relative risk (RR) 2.05; CI 95%: 1.24 to 3.42), drug use (RR 0.81; CI 95% 0.64 to 1.02), marijuana use (RR 0.82; CI 95% 0.73 to 0.92) and hard drug use (RR 0.45; CI 95% 0.24 to 0.85). (3) Skills versus knowledge: no differences are evident. (4) Skills versus affective Skills-based interventions are only better than affective ones in self-efficacy (WMD 1.90; CI 95%: 0.25 to 3.55).	<i>Study countries:</i> USA, Canada< Mexico and UK (1 only) <i>Relevance score:</i> A
Gates 2006	Systematic review (RCT) Level: 1 Review quality: ++ <i>No. studies:</i> 17	Young people under 25 years of age	(1) - To summarise the current evidence about the effectiveness of interventions delivered in non-school settings intended to prevent or reduce drug use by young people under 25;	Many studies had methodological drawbacks, especially high levels of loss to follow-up. There were too few studies for firm conclusions. One study of motivational interviewing suggested that this intervention was beneficial on cannabis use. Three family interventions (Focus on Families, Iowa Strengthening Families Programme and Preparing for the Drug-Free Years), each evaluated in only one study, suggested that they may be beneficial in preventing cannabis use. The studies of multi component community interventions did not find any strong effects on drug use outcomes, and the two studies of education and skills training did not find any differences between the intervention and control groups.	<i>Study countries:</i> USA, China and UK (1 only) <i>Relevance score:</i> A
Roe 2005	Systematic review (RCT + non-RCT) Level: 1+2 Review quality: - <i>No. studies:</i> 16	Children and young people who are vulnerable (leaving care, mental health problems, prostitutes etc)	The aim of this study was to carry out a comprehensive and systematic review of the literature on drug-use prevention with vulnerable young people.	The most common setting for these evaluations was in schools, where life-skills training interventions showed positive results in reducing drug use (at least in the short term). In the community an intensive multi-component intervention (the Children at Risk programme) was the most effective.	<i>Study countries:</i> USA <i>Relevance score:</i> D

Reviews of preventing illicit drug use

Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
Werch 2002	Systematic review (non-RCT) <i>Level: 2</i> <i>Review quality: -</i> <i>No. studies: 17</i>	Youths or young adults, especially those in grades 4 to 12 (U.S. education system, and/or equivalent) and college students, were eligible.		<p>The programmes described in the studies were drug prevention programmes (n=9) and alcohol prevention programmes (n=8); both types of programme included tobacco use. In the 17 evaluation studies included in the review, some 43 negative outcomes were reported. The most common negative outcomes resulting from prevention programmes were behavioural effects; these consisted primarily of increases in consumption, especially alcohol use.</p> <p>Drug prevention programmes resulted in 24 harmful effects, which included increases in alcohol use, cigarette use, marijuana use and multiple drug use. These effects were greater than those reported for alcohol prevention programmes. The majority of negative effects were behavioural measures, resulting in increased consumption. The nonbehavioural measures included less self-efficacy to resist alcohol use, greater perceived benefits of drinking and increased drug-use offers.</p> <p>The alcohol prevention programmes resulted in 19 harmful effects. The majority (58%) were nonbehavioural measures, with the most found in alcohol use, followed by cigarettes and marijuana. These nonbehavioural measures included increased estimates of alcohol, cigarette and marijuana offers, pro-alcohol attitudes and increased expectations about drinking in the future. The behavioural measures all resulted in increased alcohol use or related problems.</p>	<i>Study countries:</i> Of the 17 studies, 12 were undertaken in the US, 2 in Australia, 2 in Canada, and one in multiple countries (countries not stated) <i>Relevance score: B</i>

4.1.6. Preventing sexual risk taking in young people

Reviews of preventing sexual risk taking in young people					
Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
Bennett 2005	Systematic review (RCT) <i>Level: 1</i> <i>Review quality: -</i> <i>No. studies: 16</i>	Teenagers under 18.	The authors compared school-based abstinence-only programmes with those including contraceptive information (abstinence-plus) to determine which has the greatest impact on teen pregnancy.	The results of this systematic review show that some abstinence-only and abstinence-plus programmes can change teens' sexual behaviours, although the effects are relatively modest and may last only short term. Delay in initiation of sexual activity was shown in one abstinence-only programme and two abstinence-plus programmes. Three programmes examined whether sexually inexperienced teens exposed to the abstinence-only programmes were less likely to become sexually active than controls. One of these studies did find a statistically significant delay in sexual initiation: 77% of teens in the intervention group remained abstinent at the 6-month follow-up compared with 50% of control teens, $p = .05$. None of the programmes resulted in decreased numbers of partners in sexually experienced teens. Contrary to concerns that abstinence-plus programmes may increase sexual activity, all except one of the 11 programmes including contraceptive information failed to show an increase in sexual activity or a decline in the age at first intercourse for participating teens. Four abstinence-plus studies found that all teens in the intervention group had decreased frequency of sexual activity compared with controls. The results of these studies call into question the notion that teaching students about contraception in addition to abstinence encourages sexual activity. Although neither abstinence-only nor abstinence-plus programmes had sweeping effects on teens' sexual activity, programmes that offered contraceptive education significantly influenced students' knowledge and use of contraception. Over 80% of abstinence-plus programmes measuring contraceptive knowledge showed an increase at follow-up. In the study that compared an abstinence-only, an abstinence-plus and a control group, the abstinence-plus group reported significantly more condom use than the control groups at all follow-ups with a statistically significant odds ratio of 3.38 at 3 months (95% CI: -9.16) The one study comparing an abstinence-only to an abstinence-plus programme found that teens in the abstinence-only group scored lower on questions about correct contraceptive use. Seven of the 10 programmes that evaluated contraceptive use noted an improvement in the number of teens using contraception. Several	<i>Study countries:</i> USA only <i>Relevance score: C</i>

Reviews of preventing sexual risk taking in young people					
Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
				factors make a direct comparison of teen pregnancy prevention programmes difficult to do. The diversity in the subject populations is one challenge. Even by limiting studies to those conducted in the United States, the variation in teenage culture seen in these studies, affected by such factors as age, degree of urbanization, minority representation, and class, makes it difficult to meaningfully compare the appropriateness of one intervention over another. Variability in the particular pregnancy prevention programme is another challenge, as each had its own intervention curriculum. Finally, small sample sizes limit the generalizability of many studies, and short follow-up times from a few weeks to a couple months do not allow for adequate evaluation of the long-term impact of a programme.	
DiCenso 2002	Systematic review (RCT) Level: 1 Review quality: ++ <i>No. studies:</i> 26	Adolescents aged 11 to 18 years. Most of the participants were African-American or Hispanic, and were from low socioeconomic groups.	The authors' objective was to determine how effective prevention programmes are at delaying intercourse, increasing the use of contraceptives and reducing unplanned pregnancy among adolescents.	<p>Only 8 of the included studies scored more than two points on the quality assessment scale.</p> <p>The intervention did not reduce pregnancy rates among young women in the programmes (12 trials; OR 1.04, 95% CI: 0.78, 1.40). There was no evidence of statistically-significant heterogeneity among the studies (chi-squared 14.0, d.f.=11, P=0.23).</p> <p>There was evidence to suggest that the intervention increased the rate of pregnancy among the partners of young men in the programme (4 of the 5 studies were abstinence programmes) (OR 1.54, 95% CI: 1.03, 2.29). There was no evidence of statistically-significant heterogeneity among the studies (chi-squared 2.9, d.f.=4, P=0.58).</p> <p>The intervention did not delay the initiation of sexual intercourse among either young women (13 trials; OR 1.12, 95% CI: 0.96, 1.30) or young men (11 trials; OR 0.99, 95% CI: 0.84, 1.16). There was no evidence of statistically-significant heterogeneity among these studies (chi-squared 3.34, d.f.=12, P=0.99 and chi-squared 12.1, d.f.=10, P=0.28, respectively).</p> <p>The intervention did not increase the use of contraception at every intercourse among either young women (8 trials; OR 0.95, 95% CI: 0.69, 1.30) or young men (3 trials; OR 0.90, 95% CI: 0.70, 1.16). There was evidence of statistically-significant heterogeneity among</p>	<p><i>Study countries:</i> The included studies were carried out in North America, Australia, New Zealand or Western Europe.</p> <p><i>Relevance score:</i> C</p>

Reviews of preventing sexual risk taking in young people					
Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
				<p>the studies of young women (chi-squared 12.8, d.f.=7, P=0.08), which was not explained by the authors' a priori hypotheses. Statistically-significant heterogeneity was not evident among the studies of young men (chi-squared 0.07, d.f.=2, P=0.97).</p> <p>The intervention did not increase the use of contraception at last intercourse among either young women (5 trials; OR 1.05, 95% CI: 0.50, 2.19) or young men (4 trials; OR 1.25, 95% CI: 0.99, 1.59). There was evidence of statistically-significant heterogeneity among the studies of young women (chi-squared 14.2, d.f.=4, P=0.007), which was not explained by any of the sensitivity analyses. Statistically-significant heterogeneity was not evident among the studies of young men (chi-squared 0.1, d.f.=3, P=0.99).</p>	
Moos 2003	<p>Systematic review (RCT + non-RCT)</p> <p>Level: 1+2</p> <p>Review quality: -</p> <p><i>No. studies:</i> 4</p>	<p>Pregnant teenagers aged 12-19 years, males aged 15-18 years, women under 20 years who were attending a FPC for contraception and females under 18 years who were attending a FPC, from white, african american and hispanic backgrounds. Clinical setting.</p>	<p>The authors' objective was to assess the effect of counselling in a clinical setting in the USA to prevent unintended pregnancy in adults and adolescents, and to make recommendations for research.</p>	<p>There was no good-quality evidence available to assess the effectiveness of counselling. The four studies were not well designed and had poor internal and external validity. The interventions were diverse and could not be compared.</p> <p>One RCT (1,449 teenage boys) showed no significant difference in the proportion who were sexually active 1 year post- intervention, but showed that the intervention significantly increased contraceptive use and knowledge about STDs. Methodological flaws included the potential for selection bias (high rates of refusal to participate), a nonrepresentative population (higher income white males) and the lack of intention-to-treat analysis.</p> <p>One cohort study (79 pregnant teenagers) showed that at 6 months the programme significantly increased contraceptive use and knowledge between teenagers with and with no repeat pregnancy, but found no significant difference at 2 years. The number of participants followed up at 2 years was small. Methodological flaws included the small sample size, an unvalidated questionnaire and a high drop-out rate.</p> <p>One longitudinal study (823 women attending a FPC) showed no significant difference between enhanced contingency planning and conventional family planning in continuing the use of contraception at 1 year. Methodological flaws included the potential for selection</p>	<p><i>Study countries:</i> USA only</p> <p><i>Relevance score:</i> C</p>

Reviews of preventing sexual risk taking in young people					
Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
				<p>bias, few details of the participants and a high drop-out rate.</p> <p>One longitudinal study (1,256 teenagers attending a FPC) showed that clinics using experimental counselling significantly increased continued use of contraception and had fewer problems with the chosen method than nonexperimental clinics. Methodological flaws included the potential for selection bias, the potential for non-comparable treatment groups and a high drop-out rate.</p> <p>No experimental studies that analysed harms were identified.</p>	
Morrison-Beedy 2004	<p>Systematic review (RCT)</p> <p>Level: 1</p> <p>Review quality: -</p> <p><i>No. studies:</i> 6</p>	Adolescent females; under 19 years old.	The authors' objective was to evaluate existing human immunodeficiency virus (HIV) prevention interventions targeted at adolescent females.	<p>Four of the six studies reported a significant effect of the intervention on an outcome measure. Two reported an increase in condom use, two a decrease in the number of sexual partners, and two a decrease in risky sex. The study reporting an increase in condom use and a decrease in risky sex was a community-based programme that gave information and improved motivation and behavioural skills. The study reporting a decrease in the number of sexual partners and risky sex was conducted in a school setting, and provided 2-hour interactive sessions with videos, skills-building exercises and role play. The study reporting an increase in condom use was set in a family planning clinic, and involved participants in a 10- to 20-minute discussion about STDs and condom use, and demonstration and role play. The study reporting a decrease in sexual partners was based in a children's hospital, and provided one 7-minute video and counselling, with booster sessions.</p>	<p><i>Study countries:</i> Not stated</p> <p><i>Relevance score:</i> C</p>
Mullen 1999	<p>Systematic review (RCT + non-RCT)</p> <p>Level: 1+2</p> <p>Review quality: -</p> <p><i>No. studies:</i> 20</p>	Participants aged 13 to 19 years.	To determine the effectiveness of behavioural and social interventions on the sexual risk behaviour of sexually experienced adolescents in the United States, and to assess factors associated with variations in outcome.	<p>Sex without condoms was less likely in the sexual risk reduction intervention group than the control/comparison group (13 studies): OR 0.66 (95% CI: 0.55, 0.79, p<0.001). Intervention also had a positive protective effect on the mixed behavioural risk index (2 studies) and the composite behavioural risk outcome (16 studies); the ORs were 0.66 (95% CI: 0.50, 0.88, p<0.01) and 0.65 (95% CI: 0.50, 0.85, p<0.01), respectively. Intervention was not associated with having fewer sexual partners in comparison with the control/comparison group (OR 0.89, 95% CI: 0.76, 1.05) or with reduced STD incidence (2 studies; OR 1.18, 95% CI: 0.48, 2.86).</p> <p>Statistically-significant heterogeneity was found for sex without</p>	<p><i>Study countries:</i> USA only.</p> <p><i>Relevance score:</i> C</p>

Reviews of preventing sexual risk taking in young people					
Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
				condoms and the composite behavioural risk outcome. Many of the subgroup analyses resulted in heterogeneous subgroups without significant differences between the subgroups. The formal tests for publication bias were not statistically significant, though the authors indicated there was graphical evidence of possible publication bias.	
Pedlow 2003	Systematic review (RCT) Level: 1 Review quality: + <i>No. studies:</i> 22	The participants were aged from 9 to 20 years from both general and high-risk populations. Only one study was conducted with homosexual teenagers.	The authors' objective was to provide a review and methodological critique of human immunodeficiency virus (HIV) risk reduction interventions for adolescents.	Sixteen studies evaluated group interventions, with the number of sessions ranging from 1 to 12. Seven evaluated individual interventions, six with a single session and one with five sessions. Of the 23 interventions, 13 achieved a statistically significant reduction in risk. Eight studies (4 individual, 4 group) reported on the contraction of STDs, which was reduced in 29% of the studies (1 individual, 1 group). Fifteen studies (5 individual, 10 group) reported on the number of partners, which was reduced in 27% of the studies (1 individual, 3 group). Fifteen studies (6 individual, 9 group) reported on condom use, which improved in 53% of the studies (2 individual, 6 group). Seven studies (1 individual, 7 group) reported on the frequency of unprotected sex, which was reduced in 75% of the studies (6 group). Seven studies (2 individual, 5 group) reported on abstinence, which increased by 14% in one study (a group intervention of 8 sessions). Four group intervention studies reported on delayed onset of sex, which increased in 50% of the studies. Twelve studies (intervention types unclear) reported on the frequency of sex, which was reduced by 42%.	<i>Study countries:</i> Not stated <i>Relevance score:</i> C
Robin 2004	Systematic review (RCT + non-RCT) Level: 1+2	Adolescents. Some studies included only African-	To review adolescent sexual risk-reduction programmes that were evaluated using quasi-	Among frequently measured behaviours, condom use (8 studies of 12) was affected most consistently, and delayed initiation of sexual intercourse (4 studies of 11) was affected least consistently. Among measures less commonly used, the most consistent impact was	<i>Study countries:</i> USA <i>Relevance score:</i> C

Reviews of preventing sexual risk taking in young people					
Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
	<p>Review quality: -</p> <p><i>No. studies:</i> 24</p>	American	experimental or experimental methods and published in the 1990s.	observed for whether participants became pregnant or impregnated their sexual partners. Three studies reported negative findings: (a) increased likelihood of males in the intervention group engaging in sex within the last month relative to the control group; (b) increased reports of pregnancy and STD ; (c) less contraceptive use at most recent sex among females who were sexually inexperienced at baseline; or (d) less contraceptive efficiency (i.e. an index measure combining the consistency of contraceptive use and effectiveness of the selected method of contraception) among females in the intervention group. It is worth noting that most studies did not test the treatment by subgroup interaction before conducting subgroup analyses. Programmes with positive effects most commonly employed interactive and participatory educational strategies. Although the authors that effective programmes emphasize skills that reduce specific behaviours, interventions more generally targeted toward increasing youth resiliency and competencies are emerging as promising approaches to reducing sexual risk behaviour.	
Yamada 1999	<p>Systematic review (RCT + non-RCT)</p> <p>Level: 1+2</p> <p>Review quality: ++</p> <p><i>No. studies:</i> 24</p>	Adolescents 10-19 yrs of age. Schools, clinics and community-based programmes.	To determine whether primary prevention programmes are effective in preventing sexually transmitted disease (STD) in adolescents aged 10 to 19 years.	<p>The validity of the studies was rated as 'moderate' for 4 studies (n=1,391) and 'weak' for the remaining 20 studies. One of the interventions examined by one of the 4 'moderate' studies was offered in a university setting (the participants included female undergraduates), while the other 3 were offered in the community (the participants included low-income African-American and Hispanic adolescents in the USA).</p> <p>Initiation of sexual intercourse or abstinence (11 studies): only one of the moderately rated studies measured this outcome and found non significant results. One weak study reported a statistically- significant improvement as a result of the intervention.</p> <p>Condom use (20 studies): 8 studies (3 rated as moderate) found a statistically-significant improvement in condom use.</p> <p>Number of sexual partners (12 studies): 4 studies (one rated as moderate) found a statistically-significant reduction in the number of sexual partners.</p> <p>Frequency of sexual intercourse (11 studies): 3 studies (one rated as moderate) demonstrated a reduction in the frequency of sexual partners.</p> <p>Frequency of unprotected sexual intercourse (7 studies): 5 studies (2</p>	<p><i>Study countries:</i></p> <p><i>Relevance score:</i> C</p>

Reviews of preventing sexual risk taking in young people					
Author and date	Review type and quality	Study population	Review objective	Main results	Applicability to UK
				rated as moderate) found a statistically-significant reduction in the frequency of unprotected sexual intercourse. Diagnosed cases of STDs (4 studies): none of the moderately rated studies measured diagnosed cases of STD.	

4.2 Evidence tables for question 2. What is the evidence for effectiveness of interventions to change *knowledge* related to the health behaviour, at what level (individual / community / population), and for which population groups (e.g. young people, pregnant women, elderly)?

Author and date	Behaviour	Review type and quality	Study population	Review objective	Main results	Applicability to UK
Bennett 2005	Sexual Risk Taking	<p>Systematic review (RCT)</p> <p>Level: 1</p> <p>Review quality: -</p> <p><i>No. studies:</i> 16</p>	<p>Teenagers under 18. Setting of the programmes varied from the suburbs to the inner city. The racial composition of the subjects was also highly variable; majority white or African-American. Five studies provided information on the socioeconomic status.</p>	<p>the authors compared school-based abstinence-only programmes with those including contraceptive information (abstinence-plus) to determine which has the greatest impact on teen pregnancy.</p>	<p>Over 80% of abstinence-plus programmes measuring contraceptive knowledge showed an increase at follow-up. In the study that compared an abstinence-only, an abstinence-plus and a control group, the abstinence-plus group reported significantly more condom use than the control groups at all follow-ups with a statistically significant odds ratio of 3.38 at 3 months (95% CI: -9.16)</p> <p>The one study comparing an abstinence-only to an abstinence-plus programme found that teens in the abstinence-only group scored lower on questions about correct contraceptive use. Seven of the 10 programmes that evaluated contraceptive use noted an improvement in the number of teens using contraception. Several factors make a direct comparison of teen pregnancy prevention programmes difficult to do. The diversity in the subject populations is one challenge. Even by limiting studies to those conducted in the United States, the variation in teenage culture seen in these studies, affected by such factors as age, degree of urbanization, minority representation, and class, makes it difficult to meaningfully compare the appropriateness of one intervention over another. Variability in the particular pregnancy prevention programme is another challenge, as each had its own intervention curriculum. Finally, small sample sizes limit the generalizability of many studies, and short follow-up times from a few weeks to a couple months do not allow for adequate evaluation of the long-term impact of a programme.</p>	<p>Study countries: USA only.</p> <p>Relevance score: C</p>

Author and date	Behaviour	Review type and quality	Study population	Review objective	Main results	Applicability to UK
Faggiano 2005	Drug misuse	Systematic review (RCT + non-RCT) Level: 1&2 Review quality: ++ <i>No. studies:</i> 32	Primary or secondary school pupils formed the target population. Studies targeting special populations were excluded	To evaluate the effectiveness of school-based interventions in improving knowledge, developing skills, promoting change, and preventing or reducing drug use versus usual curricular activities or a different school-based intervention .	(1) Knowledge versus usual curricula. Knowledge focused programmes improve drug knowledge (standardised mean difference (SMD) 0.91; 95% CI: 0.42 to 1.39). (2) Skills versus usual curricula. Skills based interventions increase drug knowledge (weighted mean difference (WMD) 2.60; 95% CI: 1.17 to 4.03), (3) Skills versus knowledge. No differences are evident.	<i>Study countries:</i> USA, Canada< Mexico and UK (1 only) <i>Relevance score:</i> A
Finlay 2005	Physical Activity	Systematic review (non-RCT) Level: 2 Review quality: - <i>No. studies:</i> 8	Communities:5 cities in central California; age 25 to 60 in New South Wales; age 16 to 74 in England; groups with a high prevalence of obesity in England; 4 cities in southern Ontario; age 50 to 65 in a West Virginia city; age 18 to 65 in an Arizona town.	The authors' objective was to update a previous review investigating the effectiveness of physical activity interventions using mass media, and to assess identified studies for evidence of an understanding of the inception, transmission and reception of mass media interventions. Only the first part of the objective is discussed in the abstract.	Overall, the eight studies showed that mass media interventions influenced short-term recall of physical activity messages. Changes in knowledge were noted in certain demographic groups. Six studies investigated changes in physical activity, and all but one found an increase in physical activity post intervention. The increases in physical activity tended to be in small subgroups, or for specific behaviours such as walking.	<i>Study countries:</i> 5 cities in central California, New South Wales, England, 4 cities in southern Ontario, a West Virginia city and an Arizona town. <i>Relevance score:</i> A
Moos 2003	Sexual Risk Taking	Systematic review (RCT + non-RCT) Level: 1+2 Review quality: -	Pregnant teenagers aged 12-19 years, males aged 15-18 years, women under 20 years who were	The authors' objective was to assess the effect of counselling in a clinical setting in the USA to prevent unintended pregnancy in adults and	One RCT (1,449 teenage boys) showed no significant difference in the proportion who were sexually active 1 year post- intervention, but showed that the intervention significantly increased contraceptive use and knowledge about STDs. One cohort study (79 pregnant teenagers) showed that at 6	<i>Study countries:</i> USA only <i>Relevance score:</i> C

Author and date	Behaviour	Review type and quality <i>No. studies:</i> 4	Study population	Review objective	Main results	Applicability to UK
Song 2000	Sexual Risk Taking	Systematic review (RCT + non-RCT) Level: 1+2 Review quality: - <i>No. studies:</i> 67	attending a FPC for contraception and females under 18 years who were attending a FPC Young people	adolescents, and to make recommendations for research. This study sought to analyze and synthesise findings from selected studies about effects of school-based sexuality education on adolescents' sexual knowledge from 1960 through 1997.	months the programme significantly increased contraceptive use and knowledge between teenagers with and with no repeat pregnancy, but found no significant difference at 2 years. The number of participants followed up at 2 years was small. Methodological flaws included the small sample size, an unvalidated questionnaire and a high drop-out rate. The 67 studies reported 72 outcomes regarding sexual knowledge, which were grouped into six independent variables related to knowledge about sexuality. A weighted effect size method developed by Hedges and Olkin was calculated using all studies. For all studies, 97% of weighted effect sizes were positive. The weighted average effect size on sexual knowledge across all studies of 0.41 was statistically significant, indicating a significant difference occurred between control and experimental groups' mastery of objectives related to sexual knowledge.	<i>Study countries:</i> USA <i>Relevance score:</i> D
Tedstone 1998	Diet	Systematic review (RCT + non-RCT) Level: 1+2 Review quality: + <i>No. studies:</i> 14	Children aged roughly 1 to 5, their parents, other family members, and other carers e.g nurseries or nursery staff.	This report reviewed interventions promoting healthy diets in children aged 1 to 5 years, with the aim of identifying the most effective methods to bring about dietary changes, in line with the dietary goals .	Most studies demonstrated some positive effect on nutrition knowledge. However, the impact on eating behaviour was less frequently assessed and the outcome was variable. There were no data to evaluate the long-term effectiveness on knowledge or behaviour. Interventions targeting children. Traditional, video or computer-based teaching methods were successful at increasing nutrition knowledge, and their effectiveness was enhanced by including parents.	<i>Study countries:</i> Not stated (but possibly UK) <i>Relevance score:</i> A
Van Teijlingen 1998	Diet	Systematic review (RCT + non-RCT) Level: 1+2 Review quality: + <i>No. studies:</i> 9	Pregnant women and women of childbearing age. Childbearing-age participants were aged 15-45 or thereabouts. Studies were community-based and clinic-based.	To assess the effectiveness of specific interventions on changes in pregnant womens' dietary knowledge, attitudes and/or behaviour; to determine the extent of such changes; and to determine the characteristics of effective interventions.	In the five studies of women of childbearing age, results showed that participants could improve their knowledge and dietary intake and that the changes were statistically significantly greater in groups receiving an intervention compared with the controls. One study also evaluated changes in knowledge and attitudes and demonstrated small changes in the desired direction in control and intervention groups; the difference in knowledge scores between the groups reached statistical significance but the magnitude of the difference is unlikely to represent an improvement which is worthwhile in practice. The other three studies suggested that pregnant women appear to	<i>Study countries:</i> Not stated <i>Relevance score:</i> A

Author and date	Behaviour	Review type and quality	Study population	Review objective	Main results	Applicability to UK
					improve their intake of energy and possibly protein in response to interventions designed to improve pregnancy outcomes, but they did not provide data on other components of a healthy diet or on knowledge or attitudes.	

4.3 Evidence tables for question 3. What is the evidence for effectiveness of interventions to change attitudes related to the health behaviour, at what level (individual / community / population), and for which population groups (e.g. young people, pregnant women, elderly)?

Author and date	Behaviour	Review type and quality	Study population	Review objective	Main results	Applicability to UK
Ciliska 1999	Diet	Systematic review (RCT + non-RCT) Level: 1+2 Review quality: + <i>No. studies:</i> 15	Participants over 4 years old: low-income mothers (n=4,106), grade 4 to 9 school children	To examine the effectiveness of community interventions to increase fruit and vegetable consumption in people aged 4 years and older.	Interventions with school children (6 studies). One study showed that there was a significant increase in consumption of broccoli, carrots, spinach salad (all at P<0.05) and green beans (P<0.01). The programme significantly improved the knowledge of students in kindergarten to grade 5, but not of those in grade 6. There was also a significant improvement in attitude towards eating nutritious foods and vegetables, but not towards eating new foods. A second study, which assessed a curriculum taught over grades 3, 4 and 5 on the experience of eating a variety of foods, indicated that there were no overall significant differences in the groups on food intake or attitude scores at post-test. An analysis of variance also showed no differences by site, gender or ethnicity.	<i>Study countries:</i> Not stated <i>Relevance score:</i> B
Sowden 1998	Smoking	Systematic review (RCT + non-RCT) Level: 1+2 Review quality: + <i>No. studies:</i> 6	Young people aged less than 25 year	To determine the effectiveness of mass media campaigns in preventing the uptake of smoking in young people.	Six studies reporting the effectiveness of mass media campaigns met the inclusion criteria for this review, two of which were associated with reductions in smoking behaviour. One found that a mass media campaign was effective in influencing smoking behaviour compared with no intervention. One found that a mass media campaign combined with a schools-based programme was more effective than a schools-based programme alone. Both of these studies also found statistically significant differences between the intervention and control groups on intermediate outcomes, such as attitudes towards smoking, smoking norms and intentions to smoke in the future.	<i>Study countries:</i> Five studies in USA and one in Norway. <i>Relevance score:</i> B
Van Teijlingen 1998	Diet	Systematic review (RCT + non-RCT) Level: 1+2	Pregnant women and women of childbearing age. Childbearing-	To assess the effectiveness of specific interventions on changes in pregnant womens' dietary	In the 4 studies of pregnant women, only one study provided specific outcome data in relation to a healthy diet and that study had adequate statistical power and demonstrated small improvements in both control and intervention groups, with a greater, but statistically non-	<i>Study countries:</i> Not stated <i>Relevance score:</i> A

Author and date	Behaviour	Review type and quality	Study population	Review objective	Main results	Applicability to UK
		Review quality: + <i>No. studies:</i> 9	age participants were aged 15-45 or thereabouts.	knowledge, attitudes and/or behaviour; to determine the extent of such changes; and to determine the characteristics of effective interventions.	significant, improvement in the intervention group. This study also evaluated changes in knowledge and attitudes and demonstrated small changes in the desired direction in control and intervention groups; the difference in knowledge scores between the groups reached statistical significance but the magnitude of the difference is unlikely to represent an improvement which is worthwhile in practice. The other three studies suggested that pregnant women appear to improve their intake of energy and possibly protein in response to interventions designed to improve pregnancy outcomes, but they did not provide data on other components of a healthy diet or on knowledge or attitudes.	

4.4 Evidence tables for question 5. What is the evidence for the effectiveness of different models / theoretical approaches in changing behaviour, attitudes or knowledge?

Author and date	Behaviour	Review type and quality	Study population	Review objective	Main results	Applicability to UK
Adams 2003	Physical Activity	Systematic review (RCT + non-RCT) <i>Level:</i> 1+2 <i>Review quality:</i> + <i>No. studies:</i> 16		The authors aimed to assess whether interventions based on the transtheoretical model (TTM) are more effective than other interventions in promoting physical activity.	There was substantial heterogeneity in the programmes reviewed in terms of the intervention design, recruitment methods, participants recruited, outcome measures, length of follow-up, and results; this made comparison difficult. Losses to follow-up were often high, ranging from 3 to 61%. In the short term (less than 6 months), most studies (11 out of 15) reported some significant benefit of TTM-based interventions over control conditions, in terms of either stage progression or activity levels. Only 6 studies showed a statistically- significant benefit in terms of increased activity. In one study, the control group (who were given 6 months' free gym membership, starting with 3 weeks of supervised exercise instruction) showed a statistically-significant increase in activity levels in comparison with TTM interventions. In the longer term (over 6 months), only 2 out of 7 studies reported some benefit of TTM-based programmes.	<i>Study countries:</i> UK & USA <i>Relevance score:</i> A
Andersen 1999	Smoking	Systematic review (RCT + non-RCT) <i>Level:</i> 1+2 <i>Review quality:</i> - <i>No. studies:</i> 16 but details of 22 presented in tabular format.	Different groups of smokers, including white female smokers & those with low readiness to change recruited via ads; from alcohol treatment centres; adolescents enrolled in smoking cessation programme; low-	To evaluate the use of the Transtheoretical Model (TTM) used in smoking cessation interventions and to discuss the efficacy of this theoretical framework interventions in smoking cessation interventions.	Across all the intervention studies both the treatment strength (the dose and amount of treatment) and integrity (discrimination between two treatments) was weak. Problems in primary studies included: no independent contribution for stages of change and indicators of addiction level; and the possibility that the intervention may not have been delivered as designed. Only results from the RCTs are reported below. One RCT allocated smokers with low readiness to change to three tailored letters, one tailored letter, self-help guide, or no materials and reported that at 6 months both tailored letters led to greater stage transition among immotives, and that three tailored letters led to significantly greater intention to quit.	<i>Study countries:</i> Not specifically stated but USA implied (e.g. African American participants in some studies). <i>Relevance score:</i> C

Author and date	Behaviour	Review type and quality	Study population	Review objective	Main results	Applicability to UK
			income pregnant women & African American church attender		<p>One RCT compared TTM and action oriented conditions in 135 adolescents enrolled on a two year smoking cessation programme and reported no statistically significant difference between conditions. One RCT allocated volunteer smokers recruited by newspaper ads to standardised self-help manuals (ALA) individualised manuals matched to stage (TTT), interactive expert systems computer reports (ITT), or personalised with four counsellor calls, stage manuals, and computer reports (PITT) and found that, at 18 months, ITT produced more significantly more prolonged abstinence, TTT group were significantly better than ALA, and ITT was significantly better than both ALA and TTT.</p> <p>One RCT allocated 521 low-income pregnant women to usual care or physician provided information, cessation pamphlet and advice to quit and found there to be no significant differences in stages of change between second and 36th week in either group.</p> <p>One RCT allocated 22 African American churches either to intensive culturally specific intervention or self-help and found that after 18 months there were no significant differences in quit rates between the groups, though there was significantly more progress along stages of changes and more awareness of and contact with cessation programmes in intervention groups.</p> <p>Further analysis was reported in the paper, including factors associated with stages of change.</p>	
Faggiano 2005	Drug misuse	Systematic review (RCT + non-RCT) <i>Level:</i> 1&2 <i>Review quality:</i> ++	Primary or secondary school pupils formed the target population. Studies targeting	To evaluate the effectiveness of school-based interventions in improving knowledge, developing skills, promoting change, and preventing or reducing	<p>In the review the three groups of prevention programmes (knowledge, skills and affective-focused (social competence) displayed different patterns of efficacy with regard to individual outcomes:</p> <ul style="list-style-type: none"> • knowledge focused programmes improve mediating variables (especially drug knowledge) compared with usual curricula, but are not more effective than skills based 	<p><i>Study countries:</i> USA, Canada< Mexico and UK (1 only)</p> <p><i>Relevance score:</i> A</p>

Author and date	Behaviour	Review type and quality	Study population	Review objective	Main results	Applicability to UK
		<i>No. studies:</i> 32	special populations were excluded	drug use versus usual curricular activities or a different school-based intervention .	<p>programmes. When final outcomes are considered (drug use), their effects are comparable to those of the usual curricula and the other two types of programmes;</p> <ul style="list-style-type: none"> • affective-focused (social competence) programmes improve decision making skills and drug knowledge compared to usual curricula and knowledge-focused interventions. Two low quality studies gave conflicting results: one showed a positive effect for drug use, whereas another showed an opposite effect for marijuana. • skills focused programmes have a positive effect on both mediating variables (drug knowledge, decision making, self-esteem and peer pressure resistance) and final outcomes, compared to usual curricula. The meta-analysis on drug (ns), hard drug and marijuana use (dichotomous variables) show a lower use in the intervention groups at the post test, even years after the intervention, with most of the RCTs included having a satisfactory methodological quality (mainly quality score = B). On the other hand the only difference stemming from the comparison of skills focused programmes with other kind of interventions relates to self-esteem improvement. <p>The findings have some limitations:</p> <ul style="list-style-type: none"> • none of the RCTs satisfied all the quality criteria used in the review and all were classed as B or C. Even so, all but one of the studies comprised in the meta-analyses had a B quality score; • many comparisons between interventions have never been studied: for example the authors found no comparisons of affective with other interventions with regard to drug behaviour. • most results are outcomes at post test and there are very few evidence long-term follow-ups; • many RCTs do not present effect measures but only statistical indicators (f, p...) or other heterogeneous effect measures so it was impossible to combine them in the meta-analysis 	

Author and date	Behaviour	Review type and quality	Study population	Review objective	Main results	Applicability to UK
Foxcroft 2002	Alcohol	Systematic review (RCT + non-RCT) <i>Level:</i> 1+2 <i>Review quality:</i> + <i>No. studies:</i> 56	Adults and children in schools, colleges and community-based	1. To identify and summarize rigorous evaluations of psychosocial and educational interventions aimed at the primary prevention of alcohol misuse by young people., 2. To assess the effectiveness of primary prevention interventions over the longer-term (> 3 years).	20 of the 56 studies included showed evidence of ineffectiveness. No firm conclusions about the effectiveness of prevention interventions in the short- and medium-term were possible. Over the longer-term, the Strengthening Families Programme (SFP) showed promise as an effective prevention intervention. The Number Needed to Treat (NNT) for the SFP over 4 years for three alcohol initiation behaviours (alcohol use, alcohol use without permission and first drunkenness) was 9 (for all three behaviours). One study also highlighted the potential value of culturally focused skills training over the longer-term (NNT=17 over three-and-a-half years for 4+ drinks in the last week). Whether interventions focused on alcohol alone, or alcohol as one of a number of drugs, appeared to have no effect on outcome in the studies reviewed. However, the majority of these studies were conducted in the U.S.A., where the goal of misuse prevention programmes tends to be abstinence from any substance use (including alcohol). This may not be the target outcome for drinking behaviour in other countries, where the emphasis tends to be sensible drinking rather than abstinence. Different philosophies underlie the two approaches so caution must be taken if the adoption of intervention programmes from the United States is contemplated. For example, in Britain different messages are given for alcohol compared with tobacco or illegal drugs - sensible age-related use for the former, abstinence for the latter. Furthermore, it is difficult to judge the relative merits of different interventions if evaluations report different outcomes and the public health relevance of these different outcomes is unknown.	<i>Study countries:</i> USA, UK, Canada, Sweden, Norway, Australia & one international <i>Relevance score:</i> A
Marshall 2001	Physical Activity	Systematic review (non-RCT)	The participants were men and women at	To summarise the findings from empirical applications of the	Across all constructs and stage transitions (n=56), 413 effect sizes were computed for physical activity (n=46), self-efficacy (n=67), pros (n=50), cons (n=50),	<i>Study countries:</i> USA, Canada, UK and Australia.

Author and date	Behaviour	Review type and quality	Study population	Review objective	Main results	Applicability to UK
		<p>Level: 2</p> <p>Review quality: -</p> <p><i>No. studies:</i> 71 published studies containing 91 samples.</p>	<p>varying stages on the scale of intending to exercise, who were in the age ranges less than 25, 25 to 39, 40 to 54, and 55 years and over.</p>	<p>transtheoretical model (TTM) of behaviour change in the domain of physical activity.</p>	<p>experimental processes of change (n=100), and behavioural processes of change (n=100). Across the total sample, 14% of the individuals were in precontemplation, 16% in contemplation, 23% in preparation, 11% in action and 36% in maintenance. The results on the moderator variables were tabulated in the paper. The stage of change and physical activity was consistent with the TTM; the level of physical activity increased as individuals moved to a higher stage of change. The largest effect was evident for preparation for action (d=0.85, 95% CI: 0.64, 1.07). Small to moderate increases in physical activity were also evident from precontemplation to contemplation (d=0.34, 95% CI: 0.14, 0.55; failsafe k=7), suggesting that transitions between inactive stages are associated with changes in physical activity.</p> <p>Self efficacy: the effect estimates across the stage transitions were all positive and significant, suggesting that confidence to be active increased with each stage of change, as proposed by the TTM.</p> <p>Decisional balance: all effect sizes for behavioural pros were positive and significant with the exception of contemplation to preparation, suggesting that perceived benefits of change increase for every forward stage transition. The largest and most robust effect size was evident from precontemplation to contemplation (d=0.97; failsafe k=50). Contemplation to preparation had the smallest and least robust effect estimate (d=0.01).</p> <p>Decisional balance: all effect sizes for behavioural cons were small to moderate, significant and negative, suggesting that the perceived disadvantages of becoming physically active decrease across the stages.</p> <p>Processes of change (findings tabulated in the paper): across all processes of change, the largest effects were evident from precontemplation to contemplation (d range: 0.55 to 1.18). For all five behavioural processes and three experiential processes, the smallest effects were evident from action to maintenance (d range: 0.03 to 0.07). Across all processes and stage transitions, the largest single effect</p>	<p>Relevance score: A</p>

Author and date	Behaviour	Review type and quality	Study population	Review objective	Main results	Applicability to UK
Robin 2004	Sexual Risk Taking	Systematic review (RCT + non-RCT) Level: 1+2 Review quality: - <i>No. studies:</i> 24	Some studies included only African-American	To review adolescent sexual risk-reduction programmes that were evaluated using quasi-experimental or experimental methods and published in the 1990s.	<p>size was for self-liberation from pre- contemplation to contemplation (d=1.18; failsafe k=25).</p> <p>Virtually no key study features or programme characteristics clearly distinguish studies with positive, null, and negative effects from each other. However, when the authors aggregate the studies, four implications for effective programmes become apparent: (a) they have focused on skills that reduce specific sexual risk behaviours; (b) the duration and intensity of a programme may play a role in its effectiveness; (c) the need for researchers and health educators to carefully determine what constitutes an entire programme; and (d) programme facilitators' training may be more important than whether facilitators' and participants' demographic characteristics match.</p> <p>The importance of emphasizing skills focusing on reducing specific sexual risk behaviours is underscored by the fact that, although most of the programmes contained skills-building activities (e.g., sexual communication, decision-making, problem solving), programmes reporting null and negative effects (with the exception of one study) appeared to emphasize skills that were less specific. The authors also found that many of these programmes were likely to have evaluations published in 1995 or before, and to be between 7 and 15 hours in duration. These findings are consistent with prior literature reviews. Programmes for which evaluations were published after 1995 were of longer duration, and longer programmes also contained more general types of skills and knowledge. This may reflect a shift toward multi-component interventions that target a variety of youth competencies. Such broad-based programmes may be appealing because community objections to them are less likely than objections to programmes focused specifically on sexuality and sexual</p>	<p><i>Study countries:</i> USA</p> <p><i>Relevance score:</i> C</p>

Author and date	Behaviour	Review type and quality	Study population	Review objective	Main results	Applicability to UK
Thomas 2002	Smoking	<p>Systematic review (RCT)</p> <p>Level: 1</p> <p>Review quality: +</p> <p><i>No. studies:</i> 76</p>	Children (aged 5 to12) and adolescents (aged 13 to18) in school settings.	To assess the effectiveness of school-based programmes in preventing children and adolescents from starting smoking.	<p>risk-reduction behaviours. However, more narrowly focused programmes have been more extensively evaluated and their effects are better understood. Consequently, health educators should exercise caution in depending solely on broad-based programmes to reduce sexual risk behaviours among youth.</p> <p>Of the 76 randomised controlled trials identified, the authors classified 16 as category one (most valid). There were no category one studies of information giving alone. There were fifteen category one studies of social influences interventions. Of these, eight showed some positive effect of intervention on smoking prevalence, and seven failed to detect an effect on smoking prevalence. The largest and most rigorous study, the Hutchinson Smoking Prevention Project, found no long-term effect of an intensive 8-year programme on smoking behaviour. There was a lack of high quality evidence about the effectiveness of combinations of social influences and social competence approaches. There was limited evidence about the effectiveness of multi-modal approaches</p>	<p><i>Study countries:</i> USA, Canada, Australia, Germany, Italy and the Netherlands, Norway, UK, Mexico and Spain.</p> <p><i>Relevance score:</i> A</p>

3. Appendices

Appendix 1: Background references

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Appendix 2: Search strategies

In order to minimise the number of references we have pursued the strategy of searching only within titles and keywords. This provides a more targeted search.

A. Cochrane Database of Systematic Reviews and DARE searches

CDSR & DARE: Alcohol Misuse

#	Search History	Results
1	(alcohol or alcohol abuse or alcohol misuse or intoxication or alcohol consumption or drinking or abstinence or temperance).ti, kw	83
2	(driving and drink).ti,kw or (driving and drunk).ti,kw	1
3	(binge or excessive or heavy).ti,kw.	25
4	drink\$.ti,kw	35
5	4 and 3	4
6	1 or 2 or 5	85

CDSR & DARE: Diet

#	Search History	Results
1	diet.ti,kw	121
2	weight loss.ti,kw	38
3	weight reduction.ti,kw	5
4	obesity.ti,kw	70
5	nutrition.ti,kw	93
6	or/1-5	264
7	(weight gain or weight control or weight maintenance or slim\$ or diet\$).ti,kw	262
8	6 or 7	381

CDSR & DARE: Physical Activity

#	Search History	Results
1	(activity promotion or physical fitness or physical exercise or physical activity or exercise or fitness).ti,kw	286
2	keep fit.ti,kw	0
3	exercis\$.ti,kw.	287
4	1 or 2 or 3	296

CDSR & DARE: Sexual Risk Taking in Young People

#	Search History	Results
1	(sexual health or sexual risk\$ or sex education or sexual behaviour\$ or sexual behavior\$ or HIV or Acquired immune deficiency syndrome or STD or sexually transmitted disease\$ or teenage pregnanc\$).ti,kw	154
2	sexually transmitted infection\$ or STI\$ or STD\$	174
3	(contraception or family planning or contraception or pregnan\$ or unwanted pregnan\$ or birth control or safe sex).ti,kw	609
4	1 or 2 or 3	888
5	(adolescen\$ or teenage\$ or young person or young people or young adult or schoolchild\$ or underage\$ or youth).ti,kw,ab	489
6	4 and 5	49

CDSR & DARE: Smoking

#	Search History	Results
1	(smok\$ or cig\$ or tobacco or nicotine).ti,kw	122
2	(smoking cessation or smoking prevention or nicotine addiction).ti,kw	88
3	1 or 2	122

CDSR & DARE: Substance Misuse

#	Search History	Results
1	(drug abuse or drug misuse or substance abuse or substance misuse or drug addiction\$ or illicit drug\$).ti,kw	22
2	(cannabis or marijuana or heroin or cocaine or crack cocaine).ti,kw	15
3	substance abuse prevention.ti,kw	1
4	(solvents or amphetamine\$ or ecstasy or ketamine or volatile substance abuse or LSD or magic mushroom\$ or GHB or poppers or VSA or anabolic steroids or MDMA or street drug\$).ti,kw	19
5	1 or 2 or 3 or 4	56

CDSR & DARE: Results Summary

Behaviour	Results
Alcohol misuse	85
Diet	381
Physical Activity	296
Sexual Risk Taking in Young People	49
Smoking	122
Substance Misuse	56
TOTAL	989

B. OVID Databases: Additional searches

Ovid Databases: Alcohol Misuse

#	Search History	Results
1	(alcohol or alcohol abuse or alcohol misuse or intoxication or alcohol consumption or drink\$ or abstinence or temperance).ti,kw.	119272
2	((driving and drink) or (driving and drunk)).ti,kw.	430
3	(binge or excessive or heavy).ti,kw.	29524
4	drink\$.ti,kw.	28969
5	3 and 4	1965
6	1 or 2 or 5	119541
7	limit 6 to abstracts [Limit not valid in: ERIC; records were retained]	88889
8	limit 7 to english language	81534
9	limit 8 to yr="2004 - 2007"	12826
10	meta?analy\$.mp.	25994
11	meta analy\$.mp.	64485
12	(systematic and review\$).mp.	55556
13	10 or 11 or 12	107187
14	case report.ti.	136847
15	editorial.pt.	374913
16	letter.pt.	791142
17	14 or 15 or 16	1299765
18	13 not 17	102421
19	18 and 9	253
20	remove duplicates from 19	147
21	from 20 keep 1-147	147

OVID Databases: Diet

#	Search History	Results
1	meta?analy\$.mp.	25994
2	meta analy\$.mp.	64485
3	(systematic and review\$).mp.	55556
4	1 or 2 or 3	107187
5	case report.ti.	136847
6	editorial.pt.	374913
7	letter.pt.	791142
8	5 or 6 or 7	1299765
9	4 not 8	102421
10	Diet.ti,kw.	39744
11	Weight loss.ti,kw.	7869
12	Weight reduction.ti,kw.	1592
13	obes\$.ti,kw.	56062
14	nutrition.ti,kw.	49160
15	(weight gain or weight control or weight maintenance or slim\$ or diet\$).ti,kw.	126225
16	or/10-15	229815
17	9 and 16	1473
18	limit 17 to abstracts [Limit not valid in: ERIC; records were retained]	1309
19	limit 18 to english language	1227
20	limit 19 to yr="2004 - 2007"	498
21	remove duplicates from 20	347
22	from 21 keep 1-347	347

OVID Databases: Physical Activity

#	Search History	Results
1	meta?analy\$.mp.	25994
2	meta analy\$.mp.	64485
3	(systematic and review\$).mp.	55556
4	1 or 2 or 3	107187
5	case report.ti.	136847
6	editorial.pt.	374913
7	letter.pt.	791142
8	5 or 6 or 7	1299765
9	4 not 8	102421
10	(activity promotion or physical fitness or physical exercise or physical activity or exercise or fitness).ti,kw.	111449
11	keep fit.ti,kw.	20
12	exercis\$.ti,kw.	94648
13	or/10-12	119965
14	9 and 13	1100
15	limit 14 to abstracts [Limit not valid in: ERIC; records were retained]	974
16	limit 15 to english language	916
17	limit 16 to yr="2004 - 2007"	341
18	remove duplicates from 17	197
19	from 18 keep 1-197	197

OVID Databases: Sexual risk taking in young people

#	Search History	Results
1	meta?analy\$.mp.	25994
2	meta analy\$.mp.	64485
3	(systematic and review\$).mp.	55556
4	1 or 2 or 3	107187
5	case report.ti.	136847
6	editorial.pt.	374913
7	letter.pt.	791142
8	5 or 6 or 7	1299765
9	4 not 8	102421
10	(sexual health or sexual risk\$ or sex education or sexual behaviour\$ or sexual behavior\$ or HIV or Acquired immune deficiency syndrome or STD or sexually transmitted disease\$ or teenage pregnanc\$).ti,kw.	166901
11	(sexually transmitted infection\$ or STI\$ or STD\$).ti,kw.	295127
12	(contraception or family planning or contraception or pregnan\$ or unwanted pregnan\$ or birth control or safe sex).ti,kw.	198667
13	or/10-12	649300
14	(adolescenc\$ or teenage\$ or young person or young people or young adult or schoolchild\$ or underage\$ or youth).ti,kw,ab.	371209
15	13 and 14	18664
16	9 and 15	106
17	remove duplicates from 16	78
18	limit 17 to abstracts [Limit not valid in: ERIC; records were retained]	71
19	limit 18 to english language	66
20	limit 19 to yr="1995 - 2007"	58
21	from 20 keep 1-58	58

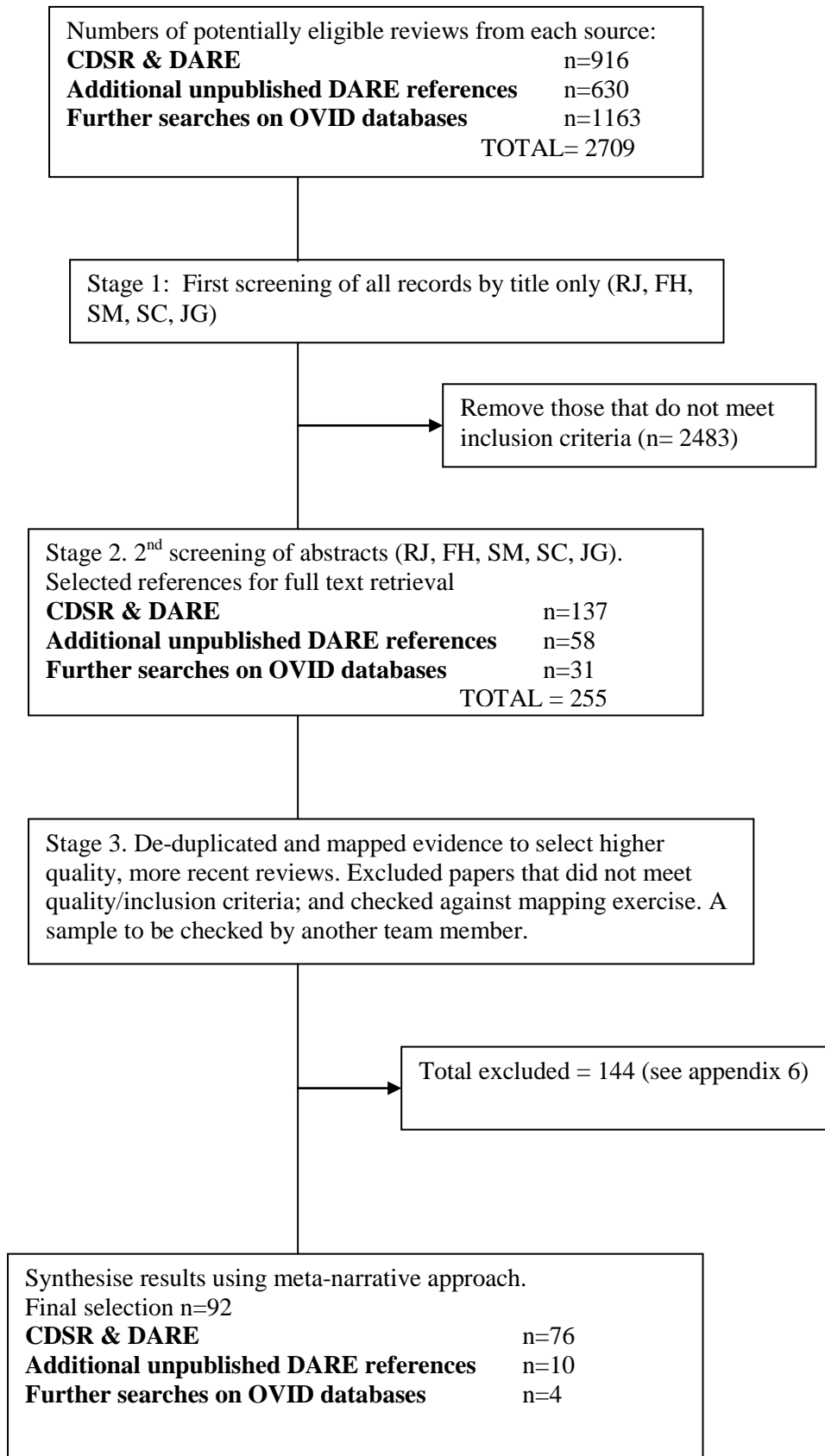
OVID Databases: Smoking

#	Search History	Results
1	meta?analy\$.mp.	25994
2	meta analy\$.mp.	64485
3	(systematic and review\$).mp.	55556
4	1 or 2 or 3	107187
5	case report.ti.	136847
6	editorial.pt.	374913
7	letter.pt.	791142
8	5 or 6 or 7	1299765
9	4 not 8	102421
10	(smok\$ or cig\$ or tobacco or nicotine).ti,kw.	103859
11	(smoking cessation or smoking prevention or nicotine addiction).ti,kw.	8794
12	10 or 11	103859
13	9 and 12	1142
14	limit 13 to abstracts [Limit not valid in: ERIC; records were retained]	1043
15	limit 14 to english language	963
16	limit 15 to yr="2004 - 2007"	317
17	remove duplicates from 16	205
18	from 17 keep 1-205	205

OVID Databases: Substance misuse

#	Search History	Results
1	meta?analy\$.mp.	25994
2	meta analy\$.mp.	64485
3	(systematic and review\$).mp.	55556
4	1 or 2 or 3	107187
5	case report.ti.	136847
6	editorial.pt.	374913
7	letter.pt.	791142
8	5 or 6 or 7	1299765
9	4 not 8	102421
10	(drug abuse or drug misuse or substance abuse or substance misuse or drug addiction\$ or illicit drug\$).ti,kw.	22861
11	(cannabis or marijuana or heroin or cocaine or crack cocaine).ti,kw.	38635
12	substance abuse prevention.ti,kw.	541
13	(solvents or amphetamine\$ or ecstasy or ketamine or volatile substance abuse or LSD or magic mushroom\$ or GHB or poppers or VSA or anabolic steroids or MDMA or street drug\$).ti,kw.	30708
14	or/10-13	90717
15	9 and 14	467
16	limit 15 to abstracts [Limit not valid in: ERIC; records were retained]	429
17	limit 16 to english language	399
18	limit 17 to yr="1995 - 2007"	340
19	remove duplicates from 18	209
20	from 19 keep 1-209	209

Appendix 3: Quorum statement



Appendix 4: Summary of search results & mapping exercise

Table 1: Smoking & tobacco use

	Total	Excluded	Included
Details			
Smoking cessation, reduction in tobacco use - individual level, adults	22	7	15
Health professional led smoking cessation – individual / community level	11	6	5
Pregnant women and smoking cessation	4	2	2
Workplace intervention	8	2	6
Community level interventions (not workplace)	3	1	2
Children & young people smoking cessation or prevention	10	7	3
Population level interventions – mass media, incentive-based and tobacco control interventions	12	5	7
Totals	70	30	40

Table 2: Physical Activity

	Total	Excluded	Included
Details			
Individual level, activity promotion with adults	22	16	6
Individual level, interventions with older people	4	2	2
Pregnant women / women and individual level interventions	2	1	1
Children & young people	11	6	5
Workplace intervention	4	3	1
Community level interventions (not workplace)	2	1	1
Population level interventions – mass media, environmental interventions etc	8	4	4
Totals	53	33	20

Table 3: Alcohol misuse

	Total	Excluded	Included
Details			
Pregnant drinkers	1	0	1
Interventions to reduce drink driving	3	1	2
Hazardous / problem drinkers, individual level interventions with all / adults	18	15	3
Alcohol prevention / reduction with young people	7	5	2
Mass media interventions	2	0	2
Young people and population level interventions – legislation	2	0	2
Totals	33	21	12

Table 4: Healthy eating / diet

	Total	Excluded	Included
Details			
Pregnant women / women and nutrition	3	2	1
Overweight / obese adults, individual level	14	10	4
Healthy eating and prevention of weight gain, all / adults – individual / community level	8	3	5
Children & young people – prevention of weight gain and obesity	12	7	5
Children & young people – treatment / control of weight gain and obesity	6	4	2
Children & young people – health promotion and healthy eating	5	3	2
Healthy eating / health promotion with older people	3	1	2
Health promotion / education at community / population level (all / adults)	5	1	4
Totals	47	31	16

Table 5: Illicit drug misuse

	Total	Excluded	Included
Details			
Pregnant women / women and individual level interventions	2	2	0
Prevention of drug misuse with adults, individual / community level	2	2	0
Children & young people – drugs misuse prevention	9	5	4
Totals	13	9	4

Table 6: Sexual risk taking in young people

	Total	Excluded	Included
Details			
Interventions to reduce / prevent HIV or other STI's	16	12	4
Sexual health education and interventions to reduce teenaged pregnancies	9	5	4
Totals	25	17	8

Table 7: Total references by health behaviour

Behaviour	Total	Excluded	Included
Smoking	70	30	40
Physical Activity	53	33	30
Alcohol misuse	33	21	12
Healthy eating /diet	47	31	16
Drug Misuse	13	9	4
Sexual Health / risk taking in adolescents	25	17	8

N.B columns could not be totalled as some reviews included more than one behaviour

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Structured Abstracts: Database of Abstracts of Reviews of Effects

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Appendix 6: References for excluded reviews

There were a number of reasons that the reviews listed below were excluded from this report. All reviews were examined at the full text retrieval stage and therefore appear in our database. Excluded reviews met one or more of the following:

- Review did not meet the inclusion / exclusion criteria
- Outcomes did not focus on knowledge, attitudes or behaviour change
- Participants were drawn from secondary care or were drawn from high risk groups (e.g. diabetics, surgical patients, people with heart disease)
- Reviews were not systematic; did not meet the minimum standards of quality and bias scoring
- Good quality, relevant reviews but covered by another more recent review
- Where the review was a published version of a Cochrane review, the original was selected

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Appendix 7: Sample data extraction form

<i>Author</i>	Bertholet,N.
<i>Year</i>	2005
<i>Title</i>	Reduction of alcohol consumption by brief alcohol intervention in primary care: systematic review and meta-analysis
<i>Status</i>	Completed
<i>Data extracted by ?</i>	FH
<i>Date of extraction</i>	30/03/2006
<i>Source</i>	DARE
<i>Behaviour</i>	Alcohol
<i>Combined behaviour -</i>	
<i>Relevance to topic?</i>	Yes
<i>Continue?</i>	Yes
<i>Explain why/why not</i>	Relevant and high quality review
<i>Clear focus?</i>	Yes
<i>Objectives</i>	To evaluate the evidence of efficacy of brief alcohol interventions aimed at reducing long-term alcohol use and related harm in individuals attending primary care facilities but not seeking help for alcohol-related problems.
<i>Report population?</i>	Yes
<i>Population - details</i>	Patients attending primary care
<i>Report interventions?</i>	Yes
<i>Intervention - describe</i>	Brief interventions for achieving alcohol reduction within primary care settings. (1) intervention delivered individually that focused on alcohol consumption with a face-to-face component during the initial session, and (2) intervention defined as "brief intervention" or "motivational intervention" or reporting the use of feedback or advice to reduce alcohol consumption. No restrictions were applied to repeated interventions or reinforcement sessions. The length of intervention ranged from 5 to 45 minutes.
<i>Comparators</i>	The control intervention in 6 studies consisted of up to 5 minutes of advice. The remaining 13 studies had no intervention or usual care as the control group.
<i>Model/approach of intervention</i>	Motivational interviews; cognitive-behavioural techniques
<i>Source of intervention</i>	Primary Care
<i>Level</i>	Individual
<i>Discuss outcomes?</i>	Yes
<i>Outcomes</i>	principal outcome measure was alcohol consumption
<i>Discuss types of studies?</i>	Yes
<i>Describe review</i>	Systematic review (RCT)
<i>Other review - describe</i>	
<i>Discuss inclusion & exclusion criteria?</i>	Yes
<i>Inclusion / selection</i>	Selected randomized controlled trials reporting at least 1 outcome related to alcohol consumption conducted in outpatients who were actively attending primary

Criteria	care centres or seeing providers. Interventions - brief interventions.
Exclusion criteria	Studies involving alcohol treatment-seeking patients were excluded. Studies conducted in a hospital ward or in an emergency department were not eligible. Studies that selected patients by means of registers or patient lists or that specifically convened individuals for alcohol screening were also excluded.
Setting (country / region)	9 conducted in North America, 7 in Europe, 2 in Africa, and 1 in Australia.
Details of databases?	Yes
Years searched?	Yes
List Databases & Years Searched	Cochrane Central Register of Controlled Trials, MEDLINE, PsycINFO, ISI Web of Science, ETOH database inception to 2003
Refs follow-up?	Yes
Experts consulted?	Not stated
Grey lit searched?	Yes
Specify search terms?	Yes
Adequate search strategy?	Yes
English only?	No
Quality assessed?	Yes
Rating system?	Yes
More than 1 assessor?	Yes
No Studies	19
No Participants	5639
Analysis	Both (meta-analysis & narrative synthesis)
Apt combination of results?	Yes
Were variations discussed?	Yes
How were variations investigated?	Between-studies heterogeneity in outcome was tested using the Cochran [chi] ² Q statistic. The measure proposed by Higgins et al was used to estimate the percentage of total variation in outcome that is due to heterogeneity rather than chance. The extent to which study-level variables explained heterogeneity in the effect size was explored by fitting metaregression models
Results clearly displayed?	Yes
Studies similar design?	Yes
Results	The authors examined 19 trials that included 5639 individuals. Seventeen trials reported a measure of alcohol consumption, of which 8 reported a significant effect of intervention. The adjusted intention-to-treat analysis showed a mean pooled difference of -38 g of ethanol (approximately 4 drinks) per week (95% confidence interval, -51 to -24g/wk) in favour of the brief alcohol intervention group. Evidence of other outcome measures was inconclusive.
Conclusions	Focusing on patients in primary care, our systematic review and meta-analysis indicated that brief alcohol intervention is effective in reducing alcohol consumption at 6 and 12
Sufficient data to support conclusions?	Yes

<i>UK relevance?</i>	C
<i>Why results generalisable to UK?</i>	Unsure if any studies in UK - but are psychosocial interventions.
<i>Differs in health care from UK?</i>	Some similar/same & others not
<i>Adverse effect of intervention</i>	no
<i>Discuss inequalities?</i>	No
<i>Recommendations</i>	The authors conclude that BAI aimed at reducing alcohol consumption is effective in primary care settings on the basis of studies that approximate usual practice and are similar in terms of patient context and statistical homogeneity. The typical effective BAI takes no more than 15 minutes, is accompanied by written material, and offers an opportunity for the patient to schedule a follow-up. Positive effects seem to be sustained beyond a year and can last for as long as 48 months. This finding should encourage further research aimed at determining more precisely the components of efficacy and the relationship of BAI to morbidity, mortality, and quality-of-life-related outcomes. Efforts should be sustained to continue the implementation and evaluation of BAI programs.
<i>Cost effectiveness data</i>	
<i>Policy & practice</i>	
<i>Total score</i>	11
<i>Bias score (for study)</i>	++
<i>Study type</i>	1
<i>Final score</i>	1++