Behaviour change: Introduction to synopsis

1.1 Background

In April 2005, NICE was asked by the Department of Health to develop guidance for primary care and other settings on:
'The most appropriate generic and specific interventions to support attitude and behaviour change at population and community levels'

The scope for this public health programme is available from the NICE website: www.nice.org.uk/page.aspx?o=524171

This is a synopsis of the evidence collated by NICE so far. This will be used by the Institute's Programme Development Group (PDG) on behaviour change, as part of the basis for making its recommendations. It comprises summaries of a series of reviews of the literature and reviews of effectiveness plus an economic appraisal of cost effectiveness.

The full reviews and other background material are available on the NICE website. Any material submitted by stakeholders during this consultation will be assessed for its relevance using standard NICE criteria, as set out in the 'Methods for development of NICE public health guidance'. Additional material will, where relevant, be included in a supplementary report presented to the PDG.

The PDG will issue draft guidance on behaviour change for consultation in April 2007.

1.2 Commentary

This commentary aims to highlight some of the main issues underpinning development of the behaviour change programme guidance. It focuses, in particular, on theories of behaviour change. Traditional public health approaches have frequently tended to assume that improving an individual's knowledge about – and attitude towards – a particular behaviour automatically leads to a change in that behaviour. Over recent decades, it has become clear that knowledge and attitude change may be necessary precursors of

behaviour change (or at least for the kinds of change in behaviour which public health professionals aim to encourage). But in isolation, they do not necessarily have any direct impact on the individual's behaviour.

Indeed, although the relationship between knowledge, attitudes and subsequent behaviour may appear to be a straightforward causal chain, the supporting evidence is equivocal. Commentators suggest that the importance of knowledge and attitudes has been overemphasised (Williams 1995). In an analysis of the 'Health and lifestyle survey' (HALS), Blaxter (1990) attempted to estimate the relative impact of circumstances and attitudes on behaviour. She found that attitudes did appear to exert some influence on behaviour, but when social class and income were taken into account, their effects largely disappeared.

Williams (1995) has noted that approaches to behaviour change may be divided into two camps:
'…those which, traditionally, have tended to focus on the significance of health beliefs in explaining patterns of health-related behaviour, and those which concentrate on the relationship between health-related behaviour and broader socio-economic circumstances.'

Many people have to deal with a range of competing pressures and challenges before they can consider making changes to improve their health. This is especially true of those whose lives are particularly chaotic – arguably, the group who could most benefit from effective support to improve their health. For such groups, the most effective behaviour change approaches are those that take into account the social and economic factors that impact on their health. These include, for example, community engagement and development (Popay 2001), social capital (Cattell 2001) and healthy settings (de Leeuw and Skovgard 2005).

Broader public health programmes advocate behaviour change at a population level, pointing to clear links between social context and behaviour. Currently, this is reinforced by an emphasis on the links between health inequalities and a range of socio-economic determinants of health. However,

in spite of these trends, many public health activities still focus on individual health beliefs, attitudes and behaviours.

1.3 Reviews

Most traditional methods of behaviour change have limited success when it comes to improving people's health. NICE commissioned reviews focused on behaviour change methods used in a broad range of settings: from the NHS through to commercial marketing. These six reviews helped to identify and isolate areas of promising practice at individual, community and population levels.

The six reviews are:

- '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 behaviours'. This review was carried out by the Cancer Care Research Centre, University of Stirling.
- 'A review of the use of the health belief model (HBM), the theory of reasoned action (TRA), the theory of planned behaviour (TPB), and the trans-theoretical model (TTM) to study and predict health related behaviour change'. This review was carried out by the London School of Pharmacy, University of London.
- 'A review of the influence of social and cultural context on the effectiveness of health behaviour change interventions in relation to diet, exercise and smoking cessation'. This review was carried out by the London School of Pharmacy, University of London.
- 'A review of the effectiveness of interventions aimed at changing knowledge, attitudes and behaviour in road safety, environmental behaviour and marketing'. This review was carried out by the Institute for Social Marketing, University of Stirling.
- 'A review of the literature on resilience, coping and salutogenic approaches to maintaining and generating health'. This review was carried out by Cardiff Institute of Society Health and Ethics (CISHE), Cardiff University.

- The cost effectiveness of behaviour change interventions designed to reduce coronary heart disease: A thorough review of existing literature. This review was carried out by the Health Economics Research Group, Brunel University.

These reviews were conducted following the procedures set out in 'Methods for the development of public health guidance' at: www.nice.org.uk/page.aspx?o=299970. A summary of each review is appended to this document.

1.4 Limits to the review methodology

The standard NICE process for producing reviews has generated a large volume of important and relevant material. However, members of the behaviour change PDG have decided to broaden the criteria used to determine what is considered relevant. The PDG welcomes examples of other evidence which may inform their deliberations and which is based on these broader criteria.

1.5 References

Blaxter M (1990) *Health and lifestyles*. London: Routledge.

Cattell V (2001) Poor people, poor places, and poor health: the mediating role of social networks and social capital. *Social Science and Medicine* 52 (10) 1501 – 1516.

de Leeuw E, Skovgaard T (2005) Utility-driven evidence for healthy cities: problems with evidence generation and application. *Social Science & Medicine* 61 (6) 1331 – 41.

Marks DF (2002) Freedom, responsibility and power: contrasting approaches to health psychology. *Journal of health psychology* 7 (1) 5 – 19.

Popay J (editor) (2001) *Regeneration and health: a preliminary review of the literature*. London: Kings Fund

Williams SJ (1995) Theorising class, health and lifestyles: can Bourdieu help us? *Sociology of Health and Illness* 17 (5) 577.

Appendix 1

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

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?

2. Summary of findings

2.1 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)?

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.

2.1.1 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 focussed 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.

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 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), that shows that some school based interventions (e.g. social influence and educational interventions) show a mixed effect 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.

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 interventions 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.

2.1.2 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.

2.1.3 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.

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 (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 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 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.

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 good quality (1&2+, A), directly relevant to the UK populations, 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.

2.1.4 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 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 (also from the above review) 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.

2.1.5 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

2.1.6 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. However 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

2.2 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)?

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 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.

2.3 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, 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.

2.4 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.

2.5. 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.

2.6. 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 groups[1]. 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.

2.7 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 outwith 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

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

[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.

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.

Appendix 2

A Review of the use of the Health Belief Model (HBM), the Theory of Reasoned Action (TRA), the Theory of Planned Behaviour (TPB) and the Trans-Theoretical Model (TTM) to study and predict health related behaviour change

The aim of this review is to examine the use of the Health Belief Model (HBM), the Theory of Reasoned Action (TRA), the Theory of Planned Behaviour (TPB) and the Trans-Theoretical Model (TTM, often also referred to as the Stages of Change – SoC –model) to study and predict health related behaviour change measured in terms of shifts knowledge, attitude, intention and behaviour. It in addition it considers the extent to which social, environmental and economic factors have been included in the models identified.

The five research questions addressed are as follows:

1. What concepts and constructs does each of the selected models contain?
2. To what extent is each model able to incorporate social, economic and/or environmental factors, particularly in relation to the occurrence of health inequalities?
3. In which areas has each model been used?
4. How effective has each model been shown to be at predicting changes in knowledge, attitudes and/or behaviour in these areas?
5. Have any changes in knowledge/attitudes/behaviours brought about in relation to use of these models been shown to effect health outcomes, expressed in terms of (population) morbidity and mortality?

The methodology employed and terms used are described in section 2 of the main review report. Its findings are presented here as summaries of evidence relating to the research questions listed above.

What concepts and constructs does each of the selected models contain?

- The Health Belief Model (HBM), the Theory of Reasoned Action (TRA), the Theory of Planned Behaviour (TPB) and the Trans-Theoretical Model (TTM) are distinct models containing (in common with other psychological models of health behaviour change) a number of components. These are of various types, ranging from uni-dimensional variables to complex multi-dimensional constructs (Armitage and Conner 2000).

Each model has unique aspects. For example, the HBM's 'perceived threat' construct differs from all others contained in the TRA, the TPB and the TTM. Its specification also includes 'objective' demographic and other variables such as cues to action (including media information and personal or other behavioural reminders) not included in the other models' specifications (Rosenstock et al 1994).

While the HBM is health behaviour focused, the TRA and the TPB are framed at higher levels of generalisation (Ajzen 1998). They can thus be applied outside the health sphere. The TRA and the TRB share identical attitudinal and social norm related components (Fishbein and Ajzen 1975). In addition, the TPB contains constructs relating to control related beliefs and self-efficacy (Ajzen 2002). The TRA and the TPB are arguably mathematically better specified than the HBM and the TTM, and more parsimonious in design. That is, they have fewer, more precisely defined, components. This may enhance the efficiency and consistency of their use.

The TTM's SoC and process of change components are also important distinguishing elements (Prochaska and Velicer 1997, Burkholder and Nigg 2002). The TTM is the most complex of the models considered here, and the only one designed directly to facilitate behavioural change. This can be regarded as a fundamentally important structural and functional discriminator. In the context of the models' use in practice, further heterogeneity is derived from the fact that they are often only partially applied and/or adapted to meet

particular research or programme requirements. Yet there are also important structural commonalities.

The structure and content of models such as the HBM, the TRA, the TPB and the TTM can be understood at several levels. For example, Smedslund (2000) has offered a critical evaluation of health psychology models based on the fundamental descriptors 'can', 'try', 'want', 'expected utility' and 'belief in ability'. Smedslund concluded that the HBM lacks an 'intention to try' construct.

Noar and Zimmerman (2005) analysed the components of HBM, the TRA, the TPB and the TTM (and also Bandura's Social Cognition Theory – the SCT) in terms of structures appertaining to attitudinal beliefs; self-efficacy and behavioural control beliefs; normative beliefs; risk related beliefs and emotional responses; and intention, commitment and planning. Of the theories that are the subject of this review, these authors' analysis suggests that the TTM has the most comprehensive component set. They concluded that at present there is extensive plurality/heterogeneity in the body of research available, and that it is uncertain what theory or theories can best be used to predict (and ultimately to change) health behaviour. Noar and Zimmerman called for more integrative approaches. Their findings have important implications for the commissioning of research and theory and practice development in this public health field.

Evidence statement

Psychological models commonly employed to explain, predict and facilitate health behaviours contain a wide variety of components. Some are unique to particular models. But many share identical or overlapping characteristics, and have evolved from common roots as a result of an evolutionary process of development (Armitage and Christian 2003, Noar and Zimmerman 2005). There is evidence derived at the level of narrative review that the efficacy and effectiveness of interventions to

promote health behaviour change could, to the extent that these depend on the use of models like the TPB and the TTM, be further enhanced through better disciplined and directed future approaches to component and model development (Armitage and Conner 2000, Weinstein and Rothman 2005). This should be aimed directly at achieving improved health outcomes.

To what extent is each model able to incorporate social, economic and/or environmental factors, particularly in relation to the occurrence of health inequalities?

- None of the models examined in this review is specified adequately to incorporate and interpret the significance of social, economic and/or environmental factors as predictors and determinants of health behaviour. Many of the components and psychological constructs they contain relate to cognitions and perceptions that are a function of subjects' responses to their environments. But this alone cannot be relied upon to allow social and economic realties to be adequately appreciated (Kippax and Crawford 1993). Although descriptions of the HBM include demographic and socio-economic variables, the evidence identified during the process of this review indicates that in practice this model has not normally been used effectively to exploit this potential strength.
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- This finding also has important implications for the commissioning of research and development in this public health field. It is relevant to issues such as the future integration of sociological and psychological approaches to understanding and changing health behaviours. At present apparent failings in this area imply that opportunities to understand cognitive dimensions of class and ethnicity related (and other) health inequalities are being lost.
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- The heterogeneity of health psychology studies and inconsistencies in the way that models are applied often renders it difficult or

impossible to apply techniques such as meta-analysis in order to derive data on their predictive power and the effectiveness of alternative public health interventions. (See, for instance, Yarbrough and Braden 2001 **2-B,** Sutton 1998; for an explanation of levels of evidence, quality scores and UK applicability ratings see Table S1 below). Such failings may on occasions cause cost effective opportunities for interventions aimed at changing environmental and organisational determinants of health related behaviour to be ignored, while less productive attempts to change beliefs, attitudes and outcomes are pursued. In health improvement terms this may favour relatively advantaged groups, in as much as they are best placed to change relevant beliefs and attitudes.

Table S1. Levels of evidence, quality scores and UK applicability ratings

Levels of Evidence

Level of evidence	Type of evidence
1	Meta-analyses or systematic reviews of RCTs
2	Meta-analyses or systematic reviews of non-randomised controlled trials, case–control studies, cohort studies, controlled before-and-after (CBA), interrupted time series (ITS), correlation studies
3	Non-analytic studies (for example, case reports, case series)
4	Expert opinion, formal consensus

Quality scores

Criteria	++	+
1. Was there a focused aim or research question?	Yes	Yes
2. Explicit inclusion / exclusion criteria	Yes	Yes
3. More than one 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 10 criterion indicated above
+ must *at least* meet 7 criterion indicated above
- 4 or less criteria

UK applicability ratings

Applicability to the UK setting was graded according to the NICE criteria (A-D):

A. Includes UK studies
B. Non-UK studies of interventions that would be most likely to equally apply to UK settings
C. Non-UK studies that may have some application to UK settings but should be interpreted with caution. There may be strong cultural, ethnic, religious, climatic or institutional differences that would have impact on the effectiveness of the intervention if applied in the UK
D. Non-UK studies that are clearly irrelevant to UK settings

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Evidence statement

- **None of the psychological models evaluated during this review are adequately specified to analyse the significance of social, economic and/or environmental factors as predictors and/or determinants of health behaviour. When such models are used there are often failures to record information relevant to such factors. There is indirect evidence that this could cause relatively cost effective opportunities for interventions aimed at changing the environmental and organisational determinants of health behaviour to be neglected (Ferguson 1996 2-A). In some circumstance this could increase health inequalities.**

In which areas has each model been used?

The evidence available indicates that the HBM has most frequently been employed in the context of health service uptake issues such as immunisation acceptance, and compliance with medical treatment (Becker 1974, Rosenstock 1974, Janz and Becker 1984, Harrison et al 1992 **2-B**). The more general theoretical frameworks offered by the TRA and the TPB have allowed them to be applied in the analysis of virtually all significant health behaviours (Kashima and Gallois 1993, Ajzen 1998) and, to a lesser extent, in predictive investigations and the design of health interventions (Hardeman et al 2002 **2-A**). Key areas of TRA and TPB application identified during the process of this review were:

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- exercise intentions and behaviours (Ajzen and Driver 1991, Godin 1993, Blue 1995 **2-B**, Hausenblas et al 1997 **2-B**, Hagger et al 2002 **2-B**, Downs and Hausenblas 2005 **2-B**);
- weight gain prevention and eating behaviour (Godin and Kok 1996 **2-B**, Baranowski et al 2003);

- addiction related behaviours such as smoking and alcohol abuse (Godin and Kok 1996 **2-B**); and
- HIV prevention and condom use (Sheeran and Taylor 1999 **2-A**, Albarracin et al 2001 **2-B**).

- Other areas of TRA and TPB use relevant to health included the maintenance of oral hygiene, clinical screening programmes and driving behaviour analysis. The use of the TPB in particular has been more extensive than that of the HBM, and less strongly focused on tobacco addiction than that of the Trans-Theoretical Model. In this review four of the systematic and meta-analytical reviews identified as relevant to the TTM were wholly or in part concerned with smoking cessation and prevention (Spencer et al 2002 **2+A**, Riemsma et al 2002 **1++A**, Riemsma et al 2003 **1-B**, van Sluijs et al 2004 **2++B**). The other principle areas covered in the TTM studies identified were:

- dietary change (Riemsma et al 2002 **1++A**, van Sluijs et al 2004 **2++B**);
- exercise and activity promotion (Marshall and Biddle 2001 **2-A**, Riemsma et al 2002 **1++A**, Adams and White 2003 **2-A**, van Sluijs et al 2004 **2++B**);
- sexually transmitted disease and pregnancy prevention (Horowitz 2003 **2-B**);
- breast cancer screening (Riemsma et al 2002 **1++A**);
- alcohol use control (Riemsma et al 2002 **1++A**); and
- treatment adherence (Riemsma et al, 2002 **1++A**).

Evidence statement

- **The HBM, the TRA, the TPB and the TTM are all widely used. Of these four models, the TPB and the TTM appear to be the most extensively employed. In the literature identified the four main areas investigated via the use of the social cognition models under evaluation**

were: *smoking cessation* (Spencer et al 2002 2+A, Riemsma et al 2002 1++A, Riemsma et al 2003 1-B, and van Sluijs et al 2004 2++B); *exercise and activity promotion* (Blue 1995 2-B, Hausenblas et al 1997 2-B, Marshall and Biddle 2001 2-A, Hagger et al 2002 2-B, Riemsma et al 2002 1++A, Adams and White 2003 2-A, van Sluijs et al 2004 2++B, and Downs and Hausenblas 2005 2-B); *HIV transmission prevention* (Sheeran and Taylor 1999 2-A, Albarracin et al 2001 2-B, and Horowitz 2003 2-B); and *dietary change* (Godin and Kok 1996 2-B, Riemsma et al 2002 1++A, van Sluijs et al 2004 2++B).

How effective has each model been shown to be at predicting changes in knowledge, attitudes and/or behaviour in these areas?

The HBM

The available evidence indicates that the HBM has a relatively weak predictive power. This is in part a result of poor construct definition, a lack of combinatorial rules and weaknesses in the predictive validity of the HBM's core psychological components (Armitage and Conner 2000, Harrison et al 1992 **2-B**). Zimmerman and Vernberg conducted a critical comparative meta-analysis of models of preventive health behaviour (1994 **2+B)**. They found that that the Theory of Reasoned Action (see below) was a substantially better predictor of health behaviours than the HBM. The TRA was able to explain just over 34 per cent of observed health behavioural variance, as compared to 24 per cent in the case of the HBM. The authors concluded that the HBM is in essence a list of variables rather than a theory based on adequately specified relationships between its core components.

The TRA and the TPB

- There is meta-analytical and systematic review evidence that the predictive performance of both the TRA and the TPB is superior to that of the HBM, and also that the additional constructs contained in the TPB allow it to predict a greater percentage of overall behavioural variance than the TRA.

The available evidence indicates that, as it is presently specified, the use of the TPB can in countries such as the US and the UK typically account (notwithstanding possible over-estimates because of factors such as publication bias) for between 20 and 30 per cent of the observed variance in reported adult (although not necessarily child, adolescent and young adult) health behaviours (Godin and Kok 1996 **2-B**, Armitage and Conner 2001 **2-A**, Hagger et al 2002 **2-B**, Sutton 1998). Its capacity to predict behavioural intentions is significantly higher. But in practical health outcome terms this point is, presently at least, only of academic interest.

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- There is also evidence derived from both narrative and systematic reviews on the limitations of the TRA and the TPB and their applications in practice. For example, Hardeman et al (2002 **2-A**) concluded that the TPB is rarely used pro-actively to develop health promotion and other interventions. Even when it is so employed these authors found that the effect sizes were generally small: intervention effectiveness was unrelated to the use of the theory at the development stage. Like the HBM, the TRA and TPB cannot themselves be used to address questions relating to how beliefs and attitudes underpinning behavioural intentions can be changed, and what strategies for this are likely to prove most (cost) effective.

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- *The TTM*

- Although the potential of the TTM to improve public health appears on occasions to have been seriously overstated, it is well known to and positively valued by many professionals actively involved in health promotion (Davidson 1998, Jones and Donovan 2004). This fact has practical implications in that, for example, it might influence their motivation. In areas such as dietary change the application of stage-of-change based models such as the TTM may have advantages over alternative approaches (van Sluijs et al 2004 **2++B**). However, the available data indicates that TTM/SoC based approaches as normally applied in areas such as smoking cessation and exercise promotion are no more likely to be effective than alternative (rationally designed) interventions in achieving desired behavioural change

outcomes (Adams and White 2003 **2-A**, Riemsma et al 2002 **1++A**, Riemsma et al 2003 **1-B**, van Sluijs et al 2004 **2++B**).

- Some commentators argue that the use of the TTM may have detrimental effects, associated with the acceptance of 'soft' intermediate stage change based outcomes. Such views are predicated on the conclusion that staged models of health behaviour change (although heuristically and didactically useful) do not reflect cognitive reality, and concerns that the successful 'marketing' of the TTM may have excluded the use of potentially more productive health behaviour change promotion approaches (Whitelaw et al 2000, West & Hardy 2006, West & Sohal 2006). However, the evidence on the internal validity and effectiveness in use identified for the purposes of this review can neither confirm nor refute these hypotheses. It does not show use of the TTM to be any less effective in practice than any other specific alternative.

- *Additional observations relating to health behaviour change effectiveness*

- No evidence relating to the importance of delivery mode was revealed as a result of the searches carried out for this review. Evidence was similarly lacking in a range of other areas considered, relating to factors such as intervener status, communication setting and the significance (as health behaviour determinants) of individual, family and group socio-economic status. However, this is not to say that such factors are unimportant or irrelevant. For instance, the HBM may be taken to suggest that behavioural cues such as media advertisements and written or personal reminders may have a fundamentally different function from communications aimed at changing beliefs and attitudes. If this is so failures to understand the significance of such variables might on occasions undermine the cost effectiveness of health behaviour change interventions.

- **Evidence statement**

- **The Theory of Reasoned Action and the Theory of Planned Behaviour can both predict health related behaviour with greater effect than the Health Belief Model (Zimmerman and Vernberg 1994 2+B). The predictive power of the TPB exceeds that of the TRA (Hausenblas et al 1997 2-B). Across a wide range of health behaviours the TPB can explain 20 per cent or more of observed behavioural variance (Godin and Kok 1996 2-B, Armitage and Conner 2001 2-A, Sheeran and Taylor 1999 2-A, Albarracin et al 2001 2-B, Ajzen and Driver 1991, Godin 1993, Blue 1995 2-B, Hagger et al 2002 2-B, Downs and Hausenblas 2005 2-B).**
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- **However, there is evidence that TPB based research is infrequently used to inform behavioural change intervention design, and when this has been the case the additional health benefits gained have been very limited (Hardeman et al 2002 2-A). The body of evidence relating to the relative effectiveness of TTM based health behaviour change interventions is also mixed. In behavioural outcome terms the application of TTM/SoC based approaches in areas such as smoking cessation and exercise promotion is no more likely to be effective in achieving desired outcomes than the use of alternative interventions (Adams and White 2003 2-A, Riemsma et al 2002 1++A, Riemsma et al 2003 1-B, van Sluijs et al 2004 2++B).**
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Have any changes in knowledge/attitudes/behaviours brought about in relation to use of these models been shown to effect health outcomes, expressed in terms of (population) morbidity and mortality?

Major changes in morbidity and mortality have taken place in countries like the US and the UK since the start of the 1950s. In Western Europe and North America the demographic, epidemiological and health care transitions of the second half of the twentieth century were primarily driven by fundamental shifts in living conditions, survival expectations and medical technologies (Taylor and Bury, in press). Population level secular trends cannot logically be ascribed to changes in individual health behaviour intentions formed in

isolation from their social contexts, or to health promotion interventions seen as (independent causal) determinants.

This review identified no evidence as to the extent to which the use of the HBM, the TRA, the TPB or the TTM has been responsible for (as distinct from being temporally associated with) major shifts in key fields such as cardio-vascular disease mortality and morbidity. Some investigators have questioned the impact of health behaviour change interventions in such contexts (Ebrahim and Davey Smith 1997). Further, despite claims made about the importance of theory in developing effective public health interventions, the evidence analysed during this review does not show that approaches utilising social cognition models outperform others, such as 'social marketing' programmes based more on outcome feedbacks than theoretical analyses.

However, it would be unwise to take an unduly simplistic, reductionist, approach towards 'what works in public health'. There can be little serious doubt that changes in health knowledge and consequently health attitudes do contribute to not only individual but also population behaviour changes over time (Fishbein 1995), even if the principle effect of health promotion interventions *per se* is only to accelerate, rather than to initiate, such changes.

- Evaluated at this level, many studies provide evidence that interventions in fields such as smoking cessation, exercise, diet and HIV risk reduction have served to reduce mortality and morbidity from conditions such as lung cancer, chronic obstructive pulmonary disease (COPD), cardiovascular disease (CVD) and acquired-immune deficiency syndrome (AIDS). (See, for example, Godin and Kok 1996 **2-B**, Sheeran and Taylor 1999 **2-A**, Albarracin et al 2001 **2-B**, Spencer et al 2002 **2+A**, Riemsma et al 2002 **1++A**, van Sluijs et al 2004 **2++B**). The extent to which the use of either the HBM, the TRA, the TPB or the TTM can be considered responsible for such gains is uncertain. But this does not mean that the potential of value of further work aimed, for instance, at increasing the power of public health interventions to effect behavioural changes through the development of well

specified psychological, social and economic health behaviour change instruments should be ignored.

Evidence statement

Even if not fundamentally causal, changes in health knowledge and attitudes can contribute to individual and population behaviour changes over time (Fishbein 1995). There is evidence that health-behaviour change (HBC) interventions in fields such as smoking cessation, exercise, diet and HIV risk control have reduced mortality and morbidity from conditions such as lung cancer, chronic obstructive pulmonary disease (COPD), cardiovascular disease (CVD) and acquired-immune deficiency syndrome (AIDS) (Godin and Kok 1996 2-B, **Sheeran and Taylor 1999 2-A**, **Albarracin et al 2001 2-B**, **Spencer et al 2002 2+A**, **Riemsma et al 2002 1++A**, **van Sluijs et al 2004 2++B). But the specific part played by psychological model use in achieving such health outcomes is uncertain.**

Conclusion

- Since the end of the Second World War much academic and health service effort has been devoted to developing and applying social cognition theory based models of health behaviour change. There is evidence that these can successfully predict a substantial degree of observed variance in behavioural intentions in adult populations, and to a lesser extent health behaviours. The extent to which the use of such models has in practice led to health gains that would not otherwise have been achieved is uncertain. But they have probably been of positive utility, and can almost certainly be employed to greater future effect.
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- There is evidence that the Theory of Planned Behaviour has a greater predictive power than the Health Belief Model or the Theory of Reasoned Action. But neither the TPB nor the TRA or the HBM is specified to

offer insight into how health behavioural change can most effectively be facilitated. In this respect the Trans-Theoretical Model (which embodies both ‘stage-of-change’ and ‘process of change’ constructs) is fundamentally different in terms of its structure, and how it can be used to define and manage the delivery of health behaviour change interventions. It bridges a divide between social cognition theory based models of health behaviour and other, more practice focused, health promotion programme management instruments.

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- As a result, evaluations of the TTM have often been oriented towards assessing health outcomes achieved, rather than the percentages of observed or reported behavioural variance explained. This emphasis on the delivery of desired outcomes – rather than the formation of more theoretically relevant information – is to be welcomed. However, there is little unequivocal evidence that the use of TTM based health behaviour change strategies are better at promoting health behaviour change than other reasonably constituted approaches.

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- Such observations suggest a number of conclusions. First, it would be desirable from a public health improvement perspective if all investigations of health promotion models and interventions could be encouraged to use measures of effect size that relate directly to health gain achievement, such as life years saved or well defined volumes of disability avoided. Even if cost utility analysis constructs such as quality adjusted life years (QALYs) cannot be routinely used, moves in this direction should still facilitate advances in areas such as assessing the comparative value of alternative public health investments. In circumstances where it is not possible to offer estimates of health gains achievable, explanations of why this is so could promote greater clarity of thought in relation to distinguishing between descriptive theories and potentially effective health promotion interventions. This might in turn enable public health research and delivery programmes to become more focused on the delivery of tangible consumer benefit, as distinct from the pursuit of academic excellence or other ends.

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- Second, with specific regard to recent criticisms of the TTM, it appears very likely that in time superior models based on new approaches to combining socio-economic and psychological data and linking behavioural predictions to more effective change support interventions, will emerge. Yet recognition of this should not be allowed to undermine existing service level attempts to apply the TTM as productively as possible. Rather, awareness of the TTM's possible weaknesses should lead to its better informed employment, while at the same time renewed effort is made to develop and trial effective innovations.
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- A third, final, conclusion relates to public health research and development commissioning. This in the past may often have lacked the focused sense of purpose and direction more typically found in biomedical fields. To some extent, this might be a desirable reflection of the nature of the scientific and ethical challenges inherent in seeking to understand and, where it is judged appropriate, change individual and community health related choices. However, the extreme degree of heterogeneity across much of the research reported in this review, and the lack of systematically directed effort aimed at finding more effective instruments for understanding and facilitating more beneficial health behaviours that this implies, is unlikely to have been in the public's best interests.
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- A high priority task for all those seeking to promote future excellence in public health in the UK and elsewhere will be to build on the heritage offered by models such as the TPB and the TTM in integrated ways which extend existing capacities to predict and moderate the impacts of social, economic and psychological determinants of health behaviour. This will require sophisticated public health research and development commissioning skills, alongside further enhanced capacities to evaluate the efficacy and (cost) effectiveness of health behaviour change interventions.

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Appendix 3

The influence of social and cultural context on the effectiveness of health behaviour change interventions in relation to diet, exercise and smoking cessation .

Behaviour change has often been conceptualised in social science based investigations related to the promotion of better health in essentially individual terms. But there is today increasing understanding of the influence that broader social and economic factors have on the operation of individual and family choice. This review sought to identify and evaluate evidence relating to how the social and cultural context in which people live influences the effectiveness of interventions to change health knowledge, attitudes, intensions and behaviours.

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- Relevant background factors relate to trends in health inequalities and the limitations of the data available on health behaviour change (HBC) interventions other than those relating to smoking prevention and cessation to impact upon population health. The average life expectancy for men and women living in England rose from about 50 years in 1900 to about 75 years for men and 80 for women in 2000. As against a national infant mortality rate of about 150 per 1000 in 1900, today's figure is 5 per 1,000. Even the most disadvantaged groups in what is now a more diverse population than ever before are unlikely to experience infant mortality rates of over 10 per 1,000. Such illustrative figures indicate that improvements in public health have benefited the whole of society. In absolute terms people in less advantaged social positions have gained more from such mortality reductions than professionals, and men and women in other more affluent and well-educated groups (Oliver et al 2002).

However, in relative terms the scale of health inequalities between social groups in this country (as defined, for example, via NS-SEC, the National Statistics Socio-Economic Classification, and the previously used Registrar General system based on occupation) has widened in recent decades, in respect to both mortality and morbidity (Drever and Whitehead,1997; *The*

Acheson Report, 1998). Chronic illnesses and long term disability amongst older people are also more prevalent than ever before.

The reason why it is relatively easy to identify the cost effectiveness of interventions aimed at smoking prevention and cessation is because the effects of tobacco use on health have been robustly delineated, and because smoking is a relatively simple form of behaviour change. The effects of relevant interventions can therefore be expressed in what are from a public health perspective are highly meaningful dimensions, such as premature deaths avoided or years of disability saved. This allows the value realised for the money invested to be calculated in ways that are useful to high level policy makers.

But in fields like exercise promotion and diet there is more uncertainty about the extent to which changes in behaviour will endure, and in time lead to desired health gains. For instance, in relation to eating increased amounts of fruit and vegetables there are no robust controlled intervention studies of the latter's effects. Hence the size and nature of any significant contribution to population health remains uncertain (Contributors to the Cochrane Collaboration and the Campbell Collaboration 2000, **2+A –** for review grading schema see Section 2 of the main report.)

Review aims and structure

Against this background, and the policy environment described in documents such as the White Paper *Choosing Health: Making Healthier Choices Easier* (DH 2004) and the Prime Minister's recent statements on healthy living and the responsibilities of the government, the public and other stakeholders have in protecting and promoting better health (Blair 2006), the research question that the School of Pharmacy team was asked by NICE to address was: '*How does the social and cultural context in which people live influence the effectiveness of interventions to change (health) knowledge, intentions and behaviour?'*

The team was requested to use examples from the fields of smoking, physical activity and healthy eating, and specifically to consider the relevance of:

- *life course;*
- *gender;*
- *income and allied social positioning;*
- *ethnicity;*
- *place; and*
- *other variables highlighted by the literature.*

Findings

As already described, this review of review's findings are presented first in the context of life stage, followed by sub-sections on gender, income and socio-economic positioning, ethnicity, place and other contextual variables not already addressed.

1. Life stages

1.1 Children

This sub-section is focused on the impacts that health behaviour change interventions have in children aged over one year.

1.1.1 Diet

There is uncertainty as to what patterns of food consumption are most beneficial during childhood, and the extent to which eating patterns acquired then are in reality significant determinants of healthy or unhealthy eating patterns in subsequent life stages (Tedstone et al 1998, **2+A**; Hider 2001, **2+B**). It should not be assumed that reducing fat or total calorific consumption is always beneficial for children. This means that the cost effectiveness of behaviour change interventions in children in relation to health outcomes is in many instances impossible to calculate.

However, Tedstone et al (1998, **2+A**) concluded that the evidence available (derived mainly from American studies) indicates that the nutritional

knowledge of young children can be increased by pre-school inputs, and that involving parents (the key figures in most young children's environments) augments this effect. However, these authors did not find evidence demonstrating that such increases in knowledge have a significant impact on patterns of food consumption in such children. Other contextually related findings from this study included:

- if young children have opportunities experimentally to taste novel foods they are more likely subsequently to accept them;

- giving rewards for consuming items such as 'healthy' drinks may be counter-productive;
- knowledge gains from interventions made in the pre-school setting tend to be greater than those derived from interventions delivered in home settings; and

- supporting less advantaged mothers can effectively enable them to improve their children's diets and change associated behaviours.

A study more specifically focused on the effectiveness of interventions aimed at increasing fruit and vegetable consumption, found (on the basis of US data) that those involving parents of young children can prove effective in increasing the fruit and vegetable intake of the latter, reportedly by between 0.5 and 3 (50 gm) servings a day (Ciliska et al 2000, **2++B**). Ammerman et al, in two related studies (Ammerman et al 2001, **1+B**; Ammerman et al 2002, **2+B**), noted that children are (unlike adults) more likely to increase their fruit as opposed to their vegetable intake, and are also likely to reduce their total fat as opposed to selectively their saturated fat consumption.

An extensive review of reviews undertaken by contributors to the Cochrane Collaboration and the Campbell Collaboration (2000, **2+A**) also found that interactive school interventions are more effective at changing behaviour than

non-interactive ones. With regard to (US) school children aged between eight and ten years a meta-analysis published in the late 1990s found evidence of a small to moderate positive effect (d = 0.24) for 'heart healthy' eating (McArthur 1998, **2+C**). Roe et al (1997, **2++A**) also observed that parental involvement is a component of many more effective school interventions to improve diet.

Shepherd et al (2001, **3+A**), in a systematic review of barriers to and facilitators of healthy eating in children and young adults, concluded that schools can provide an appropriate environment for the effective promotion of healthy eating, especially amongst young females. Their findings support 'whole School' contextual approaches, aimed in part at increasing access to 'healthy foods' and teaching skills relevant to preparing foods and resisting environmental pressures to eat unhealthily.

Evidence statements

- **There is evidence of good quality (Roe et al 1997, 2++A; Tedstone et al 1998, 2+A; Ciliska et al 2000, 2++B; Ammerman et al 2001, 1+B; Ammerman et al 2002, 2+B) that interventions aimed at supporting and involving the parents of children and programmes delivered in schools can increase children's fruit consumption, and have other desired diet related impacts.**
- **There is evidence of good quality (Shepherd et al 2001, 3+A) that sustained 'whole School' approaches to promoting healthy eating are most likely to be effective, particularly among girls.**
- **There is evidence of good quality (Contributors to the Cochrane Collaboration and the Campbell Collaboration 2000, 2+A) that changes in children's knowledge and attitudes towards healthy eating are not consistently linked to their behaviour.**
- **The duration of interventional effects and the quanta of health gain derived from 'healthy eating' in childhood are uncertain (Tedstone et al 1998, 2+A; Hider 2001, 2+B).**

1.1.2 Weight control and obesity prevention

Summerbell et al (2005, **2+A**) systematically reviewed ten long term (intervention duration one year plus) and twelve short term (< one year duration) studies of programmes aimed at preventing obesity in children. The majority were set in schools and combined exercise and dietary components. Interventions of this type were in the main found to be ineffective in reducing the numbers of overweight individuals, although one study reported a reduction in young female (but not male) rates. This analysis again indicated that changes in knowledge and attitude do not consistently relate to behavioural change sufficient to promote desired health outcomes.

McLean et al (2003, **2-B**) systematically reviewed literature on family involvement in weight control. They reported that targeting children and adults together can be beneficial for the former, in both the short and long term. They found that the greater the number of weight loss and control techniques taught to parents and children, the greater the likelihood of success.

Evidence statements

There is evidence of good quality (Summerbell et al 2005, 2+A) that programmes for child weight control and obesity prevention are of limited effectiveness, whether delivered in school or other settings.

There is evidence of mixed quality (Summerbell et al 2005, 2+A; McLean et al 2003, 2-B) that those aimed at promoting increased physical activity may have more effect than others aimed more broadly at dietary and exercise change. Involving parents and children together can also be beneficial.

1.1.3 Physical activity

Two reviews on the effectiveness of school based interventions for the promotion of physical exercise (Dobbins et al 2001, **2+A;** Brunton et al 2003, **2+B**) and the barriers and facilitators of physical activity in childhood were identified. Both offered limited, conflicting, evidence as to the value of school based interventions. Dobbins et al concluded that school based exercise interventions are generally ineffective in altering physical indicators of health status. They commented that there is very little high quality evidence showing that children exposed to school based interventions lead more active adult

lives. Brunton et al (2003, **2+B**) concluded that there is insufficient good quality research available on the effectiveness of interventions to promote childhood physical activity. But they emphasised that children have clear ideas regarding the barriers to and facilitators of physical activity that they experience and argued that more attention should be paid to the contextual determinants of children's physical activity patterns. These are of particular significant in children at high risk of social exclusion.

Evidence statements

There is good quality, though limited, evidence (Dobbins et al 2001, 2+A; Brunton et al 2003, 2+B) that appropriately designed schools based programmes can be effective in increasing physical activity levels. But there is little evidence that they have impacts of sufficient significance to alter health status in childhood or later life.

1.1.4 Smoking prevention in child populations

Christakis et al (2003, **1-A**) systematically reviewed four studies on health care provider led interventions aimed at preventing child smoking. Three of these reported negative findings. The other, which evaluated the impact of an intervention carried out in UK primary care/general practice in Oxfordshire showed a small impact, implying an NNT (number needed to treat) equivalent figure of 40-50.

In the schools context, Thomas (2002, **1+A**) conducted a systematic review of programmes intended to prevent smoking. This author found, in line with research in other health behaviour change fields, that the provision of information alone is less effective than interventions that combine information provision with support designed to facilitate behaviour change. One reported study indicated that a programme aimed at promoting social competence (in essence, enhanced behavioural skills) that did not contain a specific anti-smoking component was (at least in the short term) associated with reduced smoking rates in boys, but not girls. Thomas noted the findings of a meta-

analysis indicating that schools programmes aimed at children aged around eleven might typically reduce relative smoking rates by about 5 per cent.

Stead and Lancaster (2005a, **2-A**) systematically reviewed studies on the prevention of cigarette sales to minors. They found that simply giving information to retailers is not effective, and that interventions aimed at educating the latter need to be backed by other measures, such as community support and enforcement checks.

Evidence statements

There is evidence of good quality (Thomas 2002, 1+A) that programmes on smoking prevention delivered in schools can have a limited impact on relative rates of smoking in children.

There is evidence of weak quality (Stead and Lancaster 2005a, 2-A) that restrictions on children's access to tobacco may augment such effects, providing that high rates of compliance are achieved throughout localities. But the overall impact of such interventions is uncertain. There is very little evidence of health care provider led initiatives having an impact on child smoking rates, although in England GP communications may be effective.

1.2 Health behaviour change in adolescence and early adulthood

Failures to understand with sufficient sensitivity the challenges that occur in the context of adolescence can undermine the effectiveness of HBC interventions. There is, for example, evidence that although schools programmes aimed at promoting safe driving increase relevant knowledge they have paradoxical outcomes in males, essentially through increasing their desire to drive at an early age without significantly reducing the risk of their having accidents (Cochrane Injuries Group Driver Education Reviewers 2001).

1.2.1 Diet

Shepherd et al (2001, **3+A**) found evidence that school based interventions can be effective in promoting increased fruit and vegetable consumption amongst adolescents, and that a 'whole school' approach involving both an increased availability of foods regarded as being 'healthy' coupled with other activities (like teaching cooking skills) and interventions such as media campaigns may be of particular value. Their conclusions were in line with other reviews relating to this area (Ciliska et al 2000, **2++B**). Shepherd et al reported that successful dietary interventions at this life stage have been associated with small (< 5 per cent) falls in variables such as blood pressure. However, it is not possible to associate such results with long term health gains. The effects of school based interventions are likely to be greater in fifteen and sixteen year olds than in children, and are also more likely to be effective in young women than young men.

Evidence statements

- **There is limited evidence of good quality derived principally from US studies (Shepherd et al 2001, 3+A; Ciliska et al 2000, 2++B) that schools based programmes can promote behavioural changes such as increased fruit and (to a lesser degree) vegetable consumption more effectively in young adults than in children, and that young females may respond to such interventions more positively than males.**
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- **Young people believe that enhancing the provision of 'healthy' foods in environments they identify with would help promote dietary improvements.**

.1.2.2 Weight control and reduction in adolescent populations

Stuart et al (2005, **2+C**) conducted an integrative review that found that schools programmes can facilitate weight control and loss through exercise promoting interventions for adolescents. The most substantive results (in one case a mean reduction of 4.5 per cent in body mass index as against controls given a placebo) appeared to result from interventions that involved medicine use combined with diet and exercise change support. Stuart et al's overall conclusion was that, unlike the case with children and their families, parents and young adults should attend different groups in order to maximise the

outcomes of weight control interventions. McLean et al (2003, **2-B**) also concluded that obese adolescents 'targeted' separately from their parents were more likely to lose significant amounts of weight than those sharing an interventional environment.

Several authors have warned that weight control and reduction programmes aimed at older children and young adults can have the undesired effect of causing (or precipitating) eating disorders in some young women and men. But this risk has not been quantified. It is also unclear as to the extent to which US based findings can meaningfully be extrapolated to UK social and economic contexts.

Evidence statements

There is mixed evidence, derived mainly from US studies (Stuart et al 2005, 2+C; McLean et al 2003, 2-B), that schools based exercise and dietary change programmes can be effective in helping to control or marginally reduce adolescent weight related problems.

Parental involvement can contribute to the effectiveness of interventions in this field (Stuart et al 2005, 2+C; McLean et al 2003, 2-B), although these sources also suggest that adolescents should be addressed in settings separate from those that their parents attend.

1.2.3 Physical activity

Dobbins et al (2001, **2+A**) found conflicting evidence on whether or not school based interventions increase physical activity rates in adolescents. There is very limited evidence that activity duration is affected by interventions made during this life stage (although one study included in these authors' review found this to be the case in adolescent females) and practically no significant evidence relating such interventions to substantive changes in health status. However, contextual variables like social norms and safe access to sports facilities or parks and countryside can influence physical activity rates among youths/young adults.

Evidence statements

There is limited good quality evidence (Dobbins et al 2001, 2+A) that physical activity rates in adolescent populations can be enhanced by interventions such as schools based exercise promotion programmes.

1.2.4 Smoking prevention and cessation in adolescent populations

Sowden and Stead (2003, **2-A**) found limited evidence for the effectiveness of community interventions in preventing smoking in young people. Out of nine evaluations comparing intervention communities with no intervention control communities, only two reported significant outcomes. These authors concluded that community health behaviour change programmes must, to be successful, be targeted to reach their highest priority audiences, and be guided by both coherent theoretical frameworks and evidence based (local context sensitive, 'market tested') approaches to message design and delivery.

Thomas (2002, **1+A**) also found partially conflicting evidence on the effectiveness of schools programmes for preventing smoking amongst children and adolescents. This review described one British study (Nutbeam 1993) that indicated that an intervention requiring families to discuss and discourage smoking together appeared to reduce the probability of young people remaining non-smokers, as against members of a control and an alternative intervention group.

The Academic and Public Health Consortium (2005, **2+A**) found that there is insufficient evidence to determine the efficacy of brief smoking cessations interventions offered to groups such as students. However, McDonald et al (2003, **2-B**) concluded that promising methods of support for adolescent smoking cessation have been developed, based primarily on the application of cognitive behavioural (CB) principles.

These authors found evidence that – unlike the case with adults – NRT use in the context of adolescent smoking cessation is relatively ineffective. The reasons for this may largely relate to there being a lower level of physiological

addiction to nicotine in young as opposed to older smokers. Murphy-Hoefer et al (2005, **2+B**) systematically reviewed interventions to reduce tobacco use in colleges and universities. Interventions in student populations appear to be relatively effective in reducing smoking volumes and prevalence rates.

Harden et al (1999, **3+A**) and Posavac et al (1999, **2-B**) addressed the effectiveness of peer delivered health promotion interventions. In the youth smoking context Posavac et al reported small positive effects (d = 0.19 when controls received no alternative programme, and 0.02 when this was the case) while Harden et al found three positive outcome studies, one unclear and one that demonstrated that a peer led intervention was ineffective. Many young adults have a positive view of peer delivered health behaviour change initiatives. Harden et al found some evidence of greater effect in females, and that 'peer educators' are most likely to be high achieving young women.

Evidence statements

There is weak, yet limited, evidence (Sowden and Stead 2003, 2-A) that community interventions can in some circumstances reduce the number of adolescents taking up smoking.

There is good evidence (Thomas 2002, 1+A) that preventive school based programmes may be more effective, although the effect sizes reported are modest and some interventions aimed at reducing adolescent smoking have proven counter-productive.

There is limited evidence (McDonald et al 2003, 2-B) that with regard to enabling young smokers to quit, interventions based on cognitive behavioural principles are most effective.

There is mixed evidence (Murphy-Hoefer et al 2005, 2+B; Harden et al 1999, 3+A; Posavec et al 1999, 2-B) that interventions delivered in settings such as Universities and colleges, and that involve peer facilitation, can have higher success rates in promoting quitting and reductions in smoking frequency than interventions delivered to young adult populations via other routes.

1.3 Pregnancy and the beginning of parenthood

Variations in motivation for becoming pregnant and having a child may influence health related attitudes and behaviours during and after pregnancy (Cater and Coleman 2006). Issues relevant to pregnancy and health behaviour mentioned in the materials identified for this present analysis include women's nutrition (before and) during pregnancy; decision making relating to breast feeding; smoking during and after pregnancy; and the value of physical activity during pregnancy.

1.3.1 Nutritional advice and support

Contento et al (1995, **3-B**) concluded that individualised education and support is the most effective approach to facilitating nutritional improvement amongst women who might otherwise fail to make optimal behavioural choices. Kramer and Kakuma (2003, **1-A**) conducted a systematic review of the effects of advice and allied interventions on energy and protein intake in pregnancy. Advice alone was shown to increase protein and energy intake, but no consistent effect on outcomes was observed. This is compatible with the findings of van Teijlingen et al (1998, **2+A**). However, Kramer and Kakuma also found that modest increases in maternal weight gain and mean birth weight could be achieved by augmented advice. That is, by advice combined with the provision of supplementary nutrition. Yet balanced protein/energy supplementation was not found to be especially beneficial in disadvantaged populations with poor access to high quality diets.

Evidence statements

There is mixed evidence (van Teijlingen et al 1998, 2+A; Kramer and Kakuma 2003, 1-A) that pregnant women and others of childbearing age are responsive to advice about healthy eating. But this is generally (outside specific contexts such as increasing folate consumption) ineffective in changing health outcomes for mothers and their infants.

There is weak evidence (Kramer and Kakuma 2003, 1-A) that balanced protein/energy dietary supplementation can reduce numbers of small for gestational age births, stillbirths and neonatal deaths in both affluent and disadvantaged populations.

1.3.2 Breast feeding

Contento et al (1995, **3-B**) reported evidence that decisions to breast-feed are often taken early in, or before, pregnancy. Breast feeding rates appear to be strongly influenced by cultural and immediate contextual considerations. Such findings have significant implications for the timing and design of interventions intended to promote and support breast feeding.

Evidence statement

There is evidence (Contento et al 1995, 3-B) that decisions about breast feeding are taken early in, or before, pregnancy.

1.3.3 Smoking during and after pregnancy

The Academic and Public Health Consortium study (2005, **2+A**) found a body of level 1+ evidence showing that brief interventions delivered as part of routine care for pregnant smokers are not effective in increasing quit rates. Lumley et al (2004, **2+A**) systematically reviewed 64 studies of more intensive interventions designed to reduce smoking during pregnancy. They found a fall of 6 per cent in the number of women continuing to smoke. The data gathered indicate statistically significant reductions in pre-term and low birth weight births resulting from such interventions.

Edwards et al (2000, **2++B**) and Hajek et al (2005, **1-A**) reviewed the effectiveness of interventions aimed at preventing smoking relapse postpartum. The former concluded that evidence is emerging that multi-component strategies of sufficient intensity and duration may reduce relapse rates. But Hajek et al found no benefit associated with both brief and skills based relapse prevention interventions for any group. Such research indicates that developing more effective smoking cessation interventions for men and women with infants and young children is a potentially important priority.

Krummel et al (2001, **2-B**) reported a Head Start (the US predecessor of the British Sure Start project) randomised controlled trial that was successful in

doubling smoking abstinence rates in less advantaged black mothers with young children. This positive outcome was attributed to the combination of social support for the women involved coupled with the intervention's focus on child protection.

McBride et al (2003, **3-B)** argue that becoming aware of being pregnant represents for many women a 'teachable moment', or TMs. They argued that TMs provide a special contextual opportunity for health behaviour change interventions to be effective. However, the evidence base supporting this hypothesis is very limited.

Evidence statements

- **There is good evidence (Academic and Public Health Consortium study 2005, 2+A) that brief interventions delivered as part of routine care for pregnant smokers are not effective.**
-
- **Overall, interventions during pregnancy have been found to increase quit rates by six per cent (Lumley et al 2004, 2+A).**
- **There is no evidence (Hajek et al 2005, 1-A) that, despite high rates of postpartum relapse amongst women who quit during pregnancy, interventions designed to prevent this are effective.**
-
- **There is limited evidence (McBride et al 2003, 3-B) that becoming pregnant provides a context within which health behaviour change is facilitated.**

1.3.4 Physical activity in pregnancy

Kramer (2002) reviewed ten trials of interventions that involved advising pregnant women to take aerobic exercise (at least two or three sessions a week). This was found to increase fitness levels and body image. But it was not associated with any significant health risks or benefits for mothers or infants.

Evidence statement

There is no evidence (Kramer 2002) that taking regular aerobic exercise produces direct health benefits for pregnant women or their infants, although it may make pregnancy feel better for a proportion of women.

1.4 Healthy behaviour promotion in adulthood

1.4.1 Healthy eating and weight control in adulthood

Brunner et al (2005, **1++A**) conducted a systematic review that included 29 papers describing 23 experimental studies of dietary interventions amongst adults. The overall results showed modest improvements in factors such as cholesterol levels and blood pressure, typically involving falls in the order of 2 to 5 per cent. They calculated that their findings (assuming that such reductions can be maintained in the long term) are indicative of an 11 to 12 per cent reduction in stroke and coronary heart disease incidence respectively. Brunner et al noted that women were more likely than men to reduce their dietary fat intake and to increase that of fruit and vegetables.

Effect sizes among individuals who knew that they were at increased risk of colorectal cancer were larger than average, while this was not the case for those with known raised cardiovascular disease risks. The behaviour of 'blue collar' participants in the studies included was less likely to change than that of other groups in the population. These findings accord with those of other studies identified during this review of reviews. (See, for example, Ammerman et al 2001, **1+B**; Ammerman et al 2002, **2+B**; Ciliska et al 2000, **2++B**; Roe et al 1997, **2++A**; Hider 2001**, 2+B**). Other relevant observations derived from these analyses include the following:

A) Brunner et al found that dietary interventions delivered in workplace settings tended to have smaller effects than those in healthcare settings. Yet workplaces are important places for adult diet change related (and other) public health improvement programmes to focus on

(Contento et al 1995, **3-B**; Peersman et al 1998, **1+B**). This is in part because worksite interventions can combine structural and environmental modifications with individually oriented support (and also group and employment linked influences) aimed at facilitating behavioural change (Engbers et al 2005, **2++B**). For example, ingredients used in preparing food obtained in the workplace can be altered. Low cost structural/environmental modification can also be derived from programmes aimed at, for instance, changing extra-workplace restaurant menus and cooking practices (Hider 2001**, 2+B**).

B) Appropriate family/partner involvement may enhance the impact of dietary and allied weight control interventions aimed at adults. Evidence on the impact of interventions such as worksite programmes on adult Body Mass Index (BMI) reductions appears generally disappointing (Engbers et al 2005, **2++B**). However, McLean et al (2003, **2-B**) found mixed evidence that supporting spouses together in weight maintenance and control programmes can increase their effectiveness. Supportive domestic environments and relationships are more likely to positively augment the effects of HBC interventions than critical ones.

C) Ashenden et al (1997, **1+A**), in a systematic review covering ten dietary intervention trials in primary care, found very limited evidence of effectiveness. However, it is possible that the British primary care model offers relatively advantageous interventional opportunities in both the primary and secondary prevention contexts.

D) Interventions designed to be ethnically and culturally specific can promote enhanced outcomes within their target populations – see, for example, Ammerman et al (2001, **1+B**).

E) Evidence on the role of theoretical frameworks in enhancing the impact of dietary interventions in adults is conflicting. For example, Jepson (2000, **2+B**) concluded that dietary interventions based on theories of

behavioural change are more likely to be effective than others. Yet Ammerman et al (2001, **1+B**) found that interventions employing a theoretical framework were not consistently more likely to report significant effects.

Evidence statements

There is good evidence (Ammerman et al 2001, 1+B; Ammerman et al 2002, 2+B; Brunner et al 2005, 1++A; Ciliska et al 2000, 2++B; Hider 2001, 2+B; Roe et al 1997, 2++A) that interventions of various types aimed at promoting diet related behavioural change among adults can deliver modest alterations in factors such as salt, fat and fruit intakes and cholesterol and blood pressure levels.

There is good evidence (Brunner et al 2005, 1++A) that suggests if this is sustained, these would be sufficient to permit relatively large public health gains.

There is mixed evidence (Contento et al 1995, 3-B; Peersman et al 1998, 1+B; Engbers et al 2005, 2++B; McLean et al 2003, 2-B) that opportunities exist further to improve the effectiveness of structural and individually oriented interventions to promote dietary behavioural changes in adults in contexts such as workplace programmes, family support and primary care.

1.4.2 Promoting physical activity amongst adults

Physical activity can complement a healthy eating strategy in helping to control obesity and promote fitness. There is evidence that middle aged Americans have twice the rate of diagnosed type 2 diabetes than that of their British counterparts (Banks et al 2006). This may be linked to variations in physical activity rates, together with other social and behavioural factors (Alberti 2006). There may also be interactions between exercise and smoking rates. For example, Nishi et al (1998, **1+B**) undertook a meta-analysis of the effect of group exercise programmes on smoking cessation rates. Their results indicate that successful smoking cessation and taking exercise tend to be positively linked.

Hillsdon et al (1995, **1+B**) and Hillsdon and Thorogood (1996) systematically reviewed randomised controlled trials of exercise promotion. Their conclusion

was that exercise levels in adults can be increased and maintained by supportive interventions. The effectiveness of the latter is primarily associated with the promotion of increased physical activity rates in the context of home/normal daily living, rather than that of centre based activities. The promotion of moderate (brisk walking) as opposed to high intensity activities was found to be most likely to be successful. Enjoyability and convenience were also significant variables.

Blue and Conrad (1995, **2-B**) systematically reviewed 10 studies on worksite exercise adherence programmes. Overall, these were found to have a positive effect on exercise rates, although these authors noted a possible 'dropping off' in effectiveness over time.

Ashenden et al (1997, **1+A**), Lawlor and Hanratty (2001, **2++B**) and Petrella and Lattanzio (2002, **2-A**) all systematically reviewed sets of studies relating to the promotion of physical activity in general practice and other primary care settings, using brief advice and more intensive counselling techniques. They offer mixed evidence indicating that physician advice can increase physical activity levels, but not normally to a degree sufficient to improve fitness.

Morgan (2005, **2+A**) published a narrative review of evidence on the effectiveness of exercise referral schemes. It included studies from the UK, the US and New Zealand. Morgan concluded that exercise referral schemes can increase exercise rates in certain population sub-groups, and that motivational activities combined with exercise provision *per se* improve outcomes. With regard to the pursuit of additional possibilities for intervening at a public health as opposed to individual care level, Dishman and Buckworth (1996, **2-B**) argued that in aggregate the (highly heterogeneous) effect sizes associated with interventions aimed at promoting increased physical activity were sufficiently large to justify 'accelerated attention in clinical trials'.

In the UK Ogilvie et al (2004, **2-A**) sought to assess the effectiveness of interventions to promote shifts from using cars to walking and cycling, and what health gains might occur as a result. They found that targeted behaviour

change programmes can change the habits of motivated subgroups, and that this might at a population level result in up to 5 per cent of all trips being switched away from cars. Interventions such as the provision of new railway stations and subsidies for preferred commuting patterns were found to be effective. But such they may also increase social class related health inequalities.

Evidence statements

There is mixed evidence (Hillsdon et al 1995, 1+B; Dishman and Buckworth 1996, 2-B) that health behaviour change interventions can to a moderate degree increase physical activity rates in adults. These can be delivered in a range of settings, including work places and primary health care (Blue and Conrad 1995, 2-B; Ashenden et al 1997, 1+A; Lawlor and Hanratty 2001, 2++B; Petrella and Lattanzio 2002, 2-A; Morgan 2005, 2+A).

To be sustained increased physical activity is better undertaken at home rather than in special centres, or otherwise to be integrated into normal daily life. There is weak evidence (Ogilvie et al 2004, 2-A) that health behaviour change interventions can help facilitate changes in contexts such as commuting.

1.4.3 Smoking reduction and cessation in adult populations

Over twenty reviews relevant to this area were identified via the search and inclusion process used for this review of reviews. Points of particular relevance are as follows:

A) There is a robust body of evidence that interventions provided by health care professionals of many types can (cost effectively) enhance quit rates by in the order of 50 to 100 per cent (Academic and Public Health Consortium 2005, **2+A**; Lancaster and Stead 2004, **2++A**; Ashenden et al 1997, **1+A**; Gorin and Heck 2004, **2-B**; Rice and Stead 2004, **2+A**; Blenkinsopp et al 2003, **2+A**; Sinclair et al 2004, **1+A**). But brief (*ad hoc*) advice on smoking cessation provided by doctors appears to be more effective than similar advice given by pharmacists and nurses. The latter appear better able to provide more intensive

advice in settings such as clinics or booked sessions in pharmacies, and delivering cessation interventions for individuals at special risk.

B) In relation to variations in the effectiveness of health behaviour interventions associated with professional status, Thompson et al (2003, **1++A**) found that dieticians were more effective than doctors in communicating about dietary change. Such differences may in part be associated with the expectations of message recipients regarding the roles of given professional groups.

C) Lancaster and Stead (2004, **2++A**) found brief interventions by physicians to be relatively effective, quoting (with some caveats) an NNT (number needed to treat to achieve a single desired outcome) of 40. The data they presented indicated that the provision of more intensive interventions by physicians could approximately halve this figure. These authors argued that this would not represent a cost effective use of medical time. However, no data were given to support this conclusion. In fact, the available information suggests that smoking cessation is so beneficial that the additional medical time and other resources costs involved in providing intensive rather than brief interventions could well represent (notwithstanding the professional preferences involved) a good use of doctors' time, as well as that of other less well paid health service workers such as pharmacists and nurses (Rice and Stead 2004, **2+A**; Blenkinsopp et al 2003, **2+A**; Sinclair et al 2004, **1+A**).

D) Moher et al (2005, **2+A**) found that group therapy, individual counselling and pharmacological treatments given to promote smoking cessation are as effective in the workplace as they are in other settings, such as those provided by health service providers. Using work place based strategies might allow relatively large proportions of the adult population to be reached.

E) There is limited evidence that partner support might, if appropriately provided, enhance quit rates (Park et al 2004, **1+B**). These authors found that approaches in this area are more likely to more effective among 'live in' partners and spouses, providing they focus on enhancing positive and supportive behaviours to smokers and on minimising negative and critical behaviours. These observations have important contextual implications. They imply that supportive as opposed to critical home settings are more likely to enable individuals to convert behavioural intentions into actions.

F) Nicotine replacement therapy is a powerful behavioural change aid in the field of smoking cessation. It can often obviate the need for other forms of support. A number of the studies identified for this tertiary review explored the effects of interventions such as telephone support for individuals seeking to quit (Stead et al 2003, **1-B**), group therapy sessions (Stead and Lancaster 2005a, **2-A**), individual behavioural counselling (Lancaster and Stead 2005a, **1-A**) and the provision of self help materials (Lancaster and Stead 2005b, **1-A**). Alone, there is evidence that all these interventions can be effective. But a common finding to all these studies was that, when used in an adjuvant setting in which NRT was a component of the main intervention, their additional effects failed to reach significance.

G) Jepson (2000, **2+B**) did not find sufficient evidence of the effectiveness of preventing smoking in public places to be able to draw a conclusion. Yet Serra et al (2000, **2+B**), in a review of uncontrolled studies specifically addressing this field, found a range of positive effects in institutions such as hospitals and workplaces. The Contributors to the Cochrane Collaboration and the Campbell Collaboration (2000, **2+A**) were supportive of the introduction of smoking bans, along with other population measures such as increasing the price of cigarettes and banning their advertising.

H) The role of biomedical risk assessments in smoking cessation is uncertain. Bize et al (2005, **1+A**) found that although measures such as recording carbon monoxide and cotinine levels among quitters may be useful to researchers seeking to validate interventional trial outcomes, there is no evidence that this in itself influences outcomes.

I) 'Quit and Win' contests and other forms of smoking cessation incentivisation through cash or other rewards are popular in some parts of the world, and have been encouraged by the WHO. However, two reviews by Hey and Perera (2005a, **2+B**; 2005b, **2+A**) question the effectiveness of such interventions. These authors found that overall less than one smoker in 500 quits because of entering such contests. Those who in the short term quit during such competitions do not in the longer term, after the prospect of a reward ceases, appear to do any better than unsupported quitters. The significance of these observations relates to the issue of motivational context.

J) Community level interventions for reducing smoking in adult populations appear to have very limited efficacy. A systematic review by Secker-Walker et al (2002, **2+A**) noted the two most robust (in terms of randomisation and statistical power) studies included (out of a total of 34) did find an increase in quit rates. Women's attitudes may change more than men's in relation to such programmes, but men appear more likely to quit. These authors also found that longer duration interventions (> two years) appear to be more effective than shorter term ones. Secker-Walker et al's work highlights the difficulties involved in statistically correcting for factors such as base line variations and supervening secular trends in evaluating community level health behaviour change interventions. They describe related problems, like the diffusion of interventional components to outside areas. Such factors could lead to community level intervention effects being understated.

Evidence statements

There is good evidence (Academic and Public Health Consortium 2005, 2+A; Lancaster and Stead 2004, 2++A; Ashenden et al 1997, 1+A; Gorin and Heck 2004, 2-B; Rice and Stead 2004, 2+A; Blenkinsopp et al 2003, 2+A; Sinclair et al 2004, 1+A) that interventions provided by all types of health care professional can (cost effectively) enhance quit rates. But brief advice on smoking cessation provided by doctors appears to be more effective than similar advice given by pharmacists and nurses. This could be a function of contextual variables that may be capable of modification.

There is good evidence (Moher et al, 2005, 2+A) that smoking reduction and cessation interventions are as effective when delivered in work places as they are when provided via other settings, and that they could reach a wide range of people.

There is good quality but limited evidence (Park et al 2004, 1+B) that partners can enhance quit rates. Supportive and uncritical relationships between 'live-in' partners are more likely to facilitate quitting than critical home environments.

There is good evidence (Hey and Perera 2005a, 2+B; Hay and Perera 2005b, 2+A) showing that short term incentives to stop smoking are not effective in promoting long term behavioural changes, once the incentive has been removed.

There is good quality evidence (Secker-Walker et al 2002, 2+A) that community interventions that endure for longer periods and achieve higher awareness levels than others are more likely to be effective, regardless of the communication channels used. This source also provides limited evidence that they are more likely to change women's perceptions of community views than those of men, but that the latter are more likely to stop smoking.

1.5 Health behaviour change in later life

In more affluent and educated communities chronic illnesses are relatively prevalent, Adults in later life may regardless of their health status be more likely than their younger peers to be aware of health hazards and the benefits of avoiding them. Thus interventions to promote health behaviour change may be particularly valued by (and be relatively cost effective in) people at or over the formally defined retirement age. In the context of smoking cessation no studies concentrating specifically on later life were identified via the search

and selection process used in this review. However, quitting can reduce the risk of a myocardial infarction by 50 per cent in two years.

1.5.1 Dietary interventions

In this field Fletcher and Rake (1998, **2+B**) reported large effect sizes in trials where selected populations of older people at very high risk of malnutrition were supplied with special meals services in their own homes or in day centre or other institutional settings. These authors found weaker evidence of benefit derived from other nutritional interventions amongst other older people living in communal settings or in the community. However, one study analysed showed a large (> 50 per cent) increase in the sale of wholegrain bread to older persons following a targeted social marketing campaign. In commenting on nutrition in later life, Contento et al (1995, **3-B**) highlighted the importance of individual and group interventions aimed at facilitating behavioural changes via techniques such as goal setting.

Evidence statement

Programmes that provide nutritionally appropriate meals to older people at high risk of malnutrition have large effect sizes. There is weak evidence (Fletcher and Rake 1998, 2+B) of effect for other interventions providing dietary advice and allied support to older populations, although 'social marketing' approaches to issues such as promoting whole grain bread consumption can be effective.

1.5.2 Physical activity

Cyarto et al (2004, **2-A**) found evidence of immediate positive effects of interventions made in this context. Tailored interventions maintained over extended periods of time are most likely to have relatively large effect sizes. Ashworth et al (2005, **1++B**) reported that although in the short term centre based programmes may display greater success than home based programmes, the latter are more likely to be effective maintaining increased activity levels in the longer term. Given the importance of effect duration in relation to health risk reduction, this is an important observation. Individuals

with special needs may need special, relatively intensive, services, which could well be cost effective in their particular circumstances. Yet the wider population of older people who would benefit from increased physical activity are likely to be better served by programmes aimed at facilitating more active normal daily lives. Findings reported by Dishman and Buckworth (1996, **2-B**) also support this conclusion.

Evidence statements

There is good quality evidence (Ashworth et al 2005, 1++B; Dishman and Buckworth (1996, 2-B) that although in the short term centre based programmes for promoting physical activity are often more successful than home based programmes, the latter are more likely to be effective in maintaining increased activity levels in the longer term.

Providing special centre based programmes to individuals with special needs can be cost effective. But these sources indicate that the wider population of older people who would benefit from increased physical activity can be better served by programmes aimed at facilitating more active normal daily lives.

2 Gender and health behaviour change

Krummel et al (2001, **2-B**) reviewed 51 studies relating to the prevention of cardiovascular disease in women via changing smoking, diet and activity related behaviours. They noted in the context of smoking that some components of women's attitudes may be more inclined to change in response to community interventions than men. But this may not make them more likely to quit (Secker-Walker et al 2002, **2+A**). Social support and networks seem to be more important to female as opposed to male well-being. It is uncertain whether such differences reflect socialised characteristics, or more inherent sex-linked variations.

Krummel et al concluded that behavioural strategies utilising techniques such as self-monitoring and feedback can increase exercise rates, and that women respond better to lifestyle related physical activity interventions than structured exercise programmes. This is consistent with other evidence

sources. (See, for instance, Fletcher and Rake 1998, **2+B.)** Women from many cultures seem more inclined than men to assume that physical activity is embedded in their family care and home roles, and that it is wasteful of time and effort for them to seek additional sports/leisure based physical activity. But attitudes like this could on occasions serve to hide asymmetries between male and female power relationships within ethnic and other social groups.

With regard to diet, Krummel et al commented that few relevant interventions have been tailored specifically for women. But there is evidence that both younger and older women tend to respond more to dietary information than males, in terms of both the knowledge they gain and the action they take. (See, for example, Brunner et al 2005, **1++A**; Shepherd et al 2001, **3+A**.)

Evidence statements

There is evidence (Krummel et al 2001, 2-B; Brunner et al 2005, 1++A; Shepherd et al 2001, 3+A) that women are more likely than men to respond positively to health behaviour change interventions aimed at promoting healthy eating and restricting weight gain. At the same time they may be less likely to respond positively to exercise promotion interventions, other than those aimed at increasing physical activity in the context of normal daily living.

In the context of smoking cessation there is good quality although limited evidence (Secker-Walker et al 2002, 2+A) that women's attitudes may change more than those of men in response to community interventions. But this does make them more likely to quit.

3 Income, social position and health

Differences in income and social position are strongly related to health status variations (Drever and Whitehead 1997; The Acheson Report 1998; Graham 2000). There is in Britain today a clear association between relative social disadvantage and behaviours like smoking and 'junk food' consumption. Yet it should not be assumed that these relationships are directly causally linked. In the context of smoking, for example, lung cancer rates in Spain (where the smoking pandemic is less advanced than it is in Britain) are still higher in

better off as opposed to less advantaged men and women (Mackenbach et al 2004). This has a number of important implications for public health improvement.

The Contributors to the Cochrane Collaboration and the Campbell Collaboration (2000, **2+A**) highlighted the importance of structural change programmes, such as those aimed at increasing the cost of smoking. They quoted research indicating that interventions aimed at enhancing knowledge and choice are more likely to benefit advantaged groups than those whose health behaviours are determined more immediately by environment pressures (Gepkens and Gunning-Schepers 1996, **2-A**). However, the historical, social, psychological and biomedical factors underlying health inequalities are complex, and there may be hazards associated with exaggerating the differences between people in different socio-economic groups.

Kaper et al (2005, **1++C**) systematically reviewed the impact of alternative approaches to health care funding on interventions to enhance quit rates. Their conclusion was that full funding of smoking cessation interventions (that is, funding that from a consumer perspective makes such services free at the point of demand) is at a population level more effective in reducing smoking rates than partial funding (involving co-payments) or no funding other than via consumer out of pocket payments. This suggests that in the case of preventive interventions the availability of adequate public funding is likely to be a critical success determinant, especially in relation to reducing health inequalities associated with socio-economic positioning.

Taylor et al (1998, **2-D**) systematically reviewed 14 US studies with the intention of assessing the effectiveness of interventions to promote increased physical activity rates in low-income groups, ethnic minorities and people with disabilities. Programmes addressing the needs of people with physical disabilities were found to be effective in facilitating enhanced activity rates. But these authors identified no studies concerning physical exercise

promotion in low income groups, other than research into the effectiveness of interventions aimed at ethnic, and particularly Afro-American, populations.

Evidence statements

There is evidence (Gepkens and Gunning-Schepers 1996, 2-A; Contributors to the Cochrane Collaboration and the Campbell Collaboration 2000, 2+A) that structural interventions that affect the health behaviours of entire populations are more likely to reduce health inequalities than interventions focused primarily on increasing knowledge and facilitating informed choice.

There is good evidence (Kaper et al 2005, 1++C) in the context of smoking cessation that fully funded preventive interventions are, particularly if they are to reduce health inequalities, more likely to be effective than partly or consumer payment funded interventions.

4 Ethnicity and health behaviour change

There is a risk that analyses based on 'untheorised ethnicity' will (like naïve approaches to the health inequalities associated with socio-economic positioning) over-state the inherent differences between people with different cultural backgrounds and/or varying genetic endowments. The general salience of material factors like income, housing, access to education and employment should not be ignored.

With regard to diet and ethnicity, White et al (1998, **2+A**) pointed to a dearth of relevant studies in the UK. But these authors suggest that 'culturally tailored' one to one, small group and adult class based interventions can be effective in changing the eating patterns of people from ethnic minorities. This is consistent with the findings of Ammerman et al (2001, **1+B**) in relation to total and saturated fat intake, and the recommendations of the Contributors to the Cochrane Collaboration and the Campbell Collaboration (2000, **2+A**). Lawrence et al (2003, **2-C**) also found evidence of positive effect being gained via ethnically tailored programmes. Stead et al (2003, **1-B**), in a review of evidence on telephone counselling for smoking cessation, noted that (in combination with targeted advertising) services utilising this communication channel might provide a cost effective way of supporting minority populations.

Evidence statements

There is a lack of robust research evidence on the extent to which ethnic minorities can benefit from culturally specific health behaviour change interventions. However, White et al (1998, 2+A) and Lawrence et al (2003, 2-C) found limited evidence that appropriately tailored interventions can have enhanced effectiveness in changing the eating and smoking patterns of people from ethnic minorities.

There is limited evidence (Stead et al 2003, 1-B) supporting the view that targeted telephone based services may be of value in aiding smoking cessation, especially in contexts where personal contact opportunities are limited.

5 Place and health behaviours

Place, in terms of geographical location, the dynamics of neighbourhood and the ways in which the social history and linked physical characteristics of areas of residence may have a significant influence on health and health behaviour – see, for example, Gatrell et al (2000). However, none of the studies identified for the purposes of this tertiary review were aimed specifically at elucidating the influence of place on the effectiveness of health behaviour change interventions. Although locational context is a potentially important variable to take into account when evaluating health behaviour change programmes, its components do not appear as yet to have been systematically identified and quantified.

6 Other context related influences on the effectiveness of interventions to promote behavioural change

For the purposes of this study five further sets of context related findings have been identified.

A. The effects of smoking cessation (and other) interventions in people with complaints such as circulatory disorders may, at least in some

circumstances, be greater than that of similar interventions in the general population. Van Berkel et al (1999, **2-A**) found evidence that smoking cessation rates amongst adults with coronary heart disease are normally more effective than similar interventions amongst the general population. These researchers concluded that people recovering from myocardial infarctions, which can be seen as initial warnings of serious illness, are most likely to respond positively to relevant behaviour change interventions. By contrast, patients recovering from planned surgical interventions for heart and related disorders may believe themselves to 'cured', and therefore be less likely to respond positively.

B. DeHaven et al (2004, **2-B**) found that faith related organisations can provide settings for the effective delivery of health programmes. The great majority of the studies identified by these authors involved African Americans.

C. Computer and internet based interventions may be able to offer new low cost ways of reaching selected populations, and providing them with information, peer group support and professional advice (Bessell et al 2002, **1-B**). Wantland et al (2004, **2+B**) conducted a meta-analysis of the effects of web-based interventions aimed at ends such as weight loss, exercise promotion and dietary change. Small to moderate positive effects were recorded in a range of knowledge improvement and behavioural change dimensions. A reduced number of cardio-vascular events was claimed in one study.

D. Tailoring HBC interventions can in some contexts enhance their efficacy (Ryan and Lauver 2002, **2-A**). These last authors found interventional tailoring to have increased effect when it facilitates ipsative feedback, allowing individuals comparative information about their past and present behaviours.

E. Mass media coverage provides in modern societies an intellectual environment that can locate individuals and groups within a wider national and international framework, and guide their interpretation of information and events. Many of the reviews discussed in this analysis acknowledged the power of such media based communications to influence the outcomes of health behaviour change interventions at a population level. However, few presented any evidence relating to the scale of the effects achievable via mass media based interventions alone, or as adjuvants to personal and group interventions. This may in part reflect the difficulties inherent in separating the latter from the impact of secular trends. It could also reflect limitations in the agendas and expertise of not only health behaviour change and health promotion researchers in the US and elsewhere, but also the agencies responsible for commissioning their work.

Evidence statements

There is limited evidence (van Berkel et al 1999, 2-A) that groups provided with information and support at timely points in the development of given types of illness, such as shortly after a first myocardial infarction, may be more motivated to change their behaviours than other populations.

There is relatively weak evidence (DeHaven et al 2004, 2-B) that faith based interventional settings may facilitate effective communication with groups less easily reachable via other routes.

There is limited quality evidence (Bessell et al 2002, 1-B; Wantland et al 2004, 2+B) that targeted internet based services can provide a cost effective means of supporting health behaviour change amongst those sections of the population able and motivated to use this channel

There is limited quality evidence (Ryan and Lauver 2002, 2-A) that tailored interventions that allow ipsative feedback can be more effective than standard interventions in some contexts.

7 Discussion and conclusions

A further summary overview of the evidence analysed in this tertiary review is provided at the start of Section 4 of the main report. The research question addressed by this review is '*How does the social and cultural context in which people live influence the effectiveness of interventions to change (health) knowledge, intentions and behaviour?'.* Yet the evidence summarised in above has only a limited capacity directly to provide answers relevant to this inquiry. Further, one of the main conclusions that can be drawn from the information gathered is that outside the area of smoking prevention and cessation support in adults it is not at this stage possible to state robustly which broad types of (and targets for) health behaviour change intervention are likely to be most (cost) effective. Similarly, the evidence gathered during this study indicates that it would be wrong to assume that differences in gender, ethnicity and class are consistent markers of different levels of responsiveness to health behaviour change interventions.

There are many potentially important opportunities to support exercise and dietary changes across all life stages, and in a wide range of social contexts. But given the presently available biomedical and health promotion science evidence base, considerable caution should be taken in offering generalisations about what options are most desirable and/or viable. Within any specific area some interventions may offer significant health gain and good value for money, while others will not. This situation is further complicated by the fact that some of the most important impacts of HBC interventions may relate to their capacity to influence secular trends, rather than their more immediately measurable impacts on individuals and groups.

Given this, the quality of individual project planning and delivery may, for present planning and funding decision purposes, often be taken to be the most significant differentiator between successful and less successful interventions. Much recent debate about public health policy and the reduction of health inequalities has concentrated on the merits of promoting informed individual choice, as against those of interventions which have a structural impact. That is, interventions that affect the entire community, regardless of variations in personal volition. Such environmental changes are most likely to

be of particular benefit to people living in circumstances that are unsupportive of voluntary behavioural change. They are also likely to be more cost effective that those which require extensive programmes of persuasion and support (Wanless 2004).

However, it can be argued that in today's social conditions a pragmatic balance is required between structural intervention – when this is both beneficial and politically viable – and the effective support of informed health behaviour choice (Blair 2006). The latter may be especially relevant in circumstances where a majority of the public is uncertain of the benefits of preventing health harming behaviours. Individually oriented progress towards the more general adoption of healthier options could in such social and political contexts eventually open the way to structural protection. The banning of smoking in public places illustrates this point.

The effectiveness of health behaviour interventions is not simply a function of their capacity to influence individual cognitive processes. Their impact is in large part shaped by wider social processes, and the physical environments in which people live and exercise choice. The analysis provided by this review highlights the importance of variables such as the perceived credibility of health promotion messages (and messengers) amongst groups and communities, as well as the strength of the biomedical evidence available on the mechanisms involved in generating specific forms of health gain.

The (cost) effectiveness of health behaviour change interventions depends critically on the scale of the individual and population level health benefits to be derived from the actions being encouraged, rather than on the sizes of intermediate effects. But it can nevertheless generally be said that more effective interventions are not aimed at simply providing information and increasing salient knowledge levels. Rather, they more directly support behavioural change through measures such as enhancing motivation and removing environmental barriers to action. Examples of the latter range from goal setting (Ammerman et al 2001, **1+B**; Ammerman et al 2002, **2+B**) and employing CBT based techniques in, for example, the context of adolescent

smoking cessation (McDonald et al 2003, **2-B**) through to increasing convenient access to healthy foods in environments like schools (Shepherd et al 2001, **3+A**). Evidence showing that exercise levels in later life are more likely to be enhanced and maintained as a result of home based interventions also serves to highlight the relevance of convenience (alongside factors such as enjoyability and affordability) as a determinant of day-to-day behaviour (Ashworth et al 2005, **1++B**).

The narrative as well as empirical evidence contained in the studies included in this tertiary review also indicates that the frequency, source plurality, goal specificity and duration of health message delivery also helps to determine interventional effectiveness. Programmes that last for longer periods and have high awareness ratings and clear, interesting and credible messages are likely to be more effective than brief, less widely noticeable interventions with unclear ends and messages. The extent to which interventions are mediated via the use of factors such as, for instance, media coverage, written materials, internet communications and third party comment additionally influences their (cost) effectiveness. Although there are exceptions, ‘value for money’ is likely to be limited in the case of interventions that rely only on face-to-face interactions.

The channels by which messages are delivered and the settings in which they are received can also affect interventional effectiveness, as may the status of the individuals involved in the communication process. But the size of these effects seems on the basis of the evidence reviewed here often to be relatively small. Media channel and professional group linked effect size variations may be primarily dependent on audience perceptions of appropriateness. These factors might themselves be amenable to change.

Cultural preferences, community values and social capital linked influences (ranging from varying levels of trust in ‘official’ health messages to, for example, the availability of safe areas for sport and the extent to which smoking is locally accepted as desirable and normal) exercise a further influence on the effectiveness of health behaviour change interventions.

Against this, there is evidence that targeting and tailoring interventions to meet the needs, expectations and cultural requirements of particular groups can to a degree offset the negative impacts of such contextual variables. (See, for instance, White et al 1998, **2+A;** Ryan and Lauver 2002, **2-A.**)

It might be argued that attempts should be made to combine data on the impacts of factors like those noted above in a summary format, in order to provide a rapid guide as to which HBC interventions can most confidently be expected to be (cost) effective. However, if such an approach were in future to be adopted care should be taken to ensure that any such evaluative instrument is not applied in an unduly simplistic manner by public health service commissioners. Each case ought to be considered on its merits, against the background of a broad understanding of the contextual and other considerations likely to impinge on HBC interventional effectiveness.

8 Conclusion: commissioning more relevant research

Variations in what can perhaps be best described as health related behavioural fashion clearly exist. Growing awareness of this fact may in future lead to a greater emphasis on the use of 'social marketing' techniques to attain public health goals (Adshead 2006, Mayo 2006 – this will be the subject of another NICE CPHE commissioned review). Other issues raised by the direct and deductive findings of this study relate to the differing needs of children and adolescents as opposed to working age and older adults; the role of medicines as instruments of public health improvement, alongside more conventional HBC programme components; and the value of psychological theory in HBC interventional design and delivery.

However, it is most relevant to conclude here by re-emphasising the point that many of the authors of reviews included in this tertiary analysis have complained of interventional and effect measurement heterogeneity, and that the effects reported frequently cannot satisfactorily be linked to either health

outcomes (Ketola et al 2000, **1-B**) or interventional costs. This largely precludes the meaningful application of techniques such as meta-analytical (or even systematic) review, and cost effectiveness analysis. The current body of (English language) research on the effectiveness of HBC interventions might in overview be described as a disparate literature, relating primarily to US experience.

There is thus a need for a more coherent, adequately funded, public health research commissioning approach in England (and/or the UK and the EU more widely) which seeks to build constructively on work aimed primarily at summarising existing knowledge. This should in future facilitate the conduct of original, well planned, primary studies of sufficient size to provide 'new knowledge' based answers to high priority, generally significant, public health questions. The authors of this review of reviews hope that it will help contribute to the identification of relevant questions for such studies, and the further creation of a culture that is unequivocally focused on excellence in the context of improving the public's health in the most affordable and socially acceptable ways available.

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Appendix 4a

Review of the Effectiveness of Road Safety and Pro-Environmental Interventions

Background

As part of its programme for developing public health guidance on behaviour change, NICE commissioned a review of *"the effectiveness of general interventions, approaches and models at individual, community and population level, that are aimed at changing knowledge, attitudes and behaviours outside of public health"*. The aim was to gather evidence on behaviour change from other fields, such as marketing, psychology, the environment or criminal justice, which might transfer to or yield useful learning for public health interventions.

The review was conducted on behalf of NICE by the Institute for Social Marketing (ISM) at Stirling and the Open University. Three topic areas were selected on the basis of their relevance to the guidance and their potential for yielding useful evidence:

- Road safety
- Pro-environmental behaviour change
- Marketing to low income consumers

In light of the breadth of the topic areas, and the fact that considering interventions in these areas in relation to public health is a relatively novel activity, the decision was made to focus on review-level literature. The advantages and disadvantages of this approach have been discussed elsewhere[2].

The review of marketing interventions is still in preparation. This report presents the methods and results for the road safety and pro-environmental topic areas.

Review Aims

The road safety section of the review aimed to examine the effectiveness of interventions designed to improve road safety related knowledge, attitudes and behaviour, and wider outcomes by addressing the following three review questions:

1. What are the characteristics of road safety interventions?
2. What is the evidence for effectiveness of interventions in terms of changes in road safety-related knowledge, attitudes, behaviours and other road safety outcomes?
3. What information if any is provided on factors which influence effectiveness?

[2] See, for example, Swann, C, Naidoo, B & Kelly, M (2006) Evidence for public health practice: conceptual and methodological challenges. In A Killoran, C Swann & M Kelly (eds) (2006) *Public Health Evidence: Tackling health inequalities.* Oxford: Oxford University Press.

The pro-environmental section of the review aimed to examine the effectiveness of interventions designed to encourage the adoption of pro-environmental knowledge, attitudes and behaviour, and other related outcomes by addressing the following three questions:

1. What are the characteristics of pro-environmental interventions?
2. What is the evidence for effectiveness of interventions in terms of changes in pro-environmental knowledge, attitudes, behaviours and other related outcomes?
3. What information if any is provided on factors which influence effectiveness?

Review Methods

Comprehensive literature searches were designed and carried out to identify systematic reviews, meta-analyses and other reviews to provide information on the effectiveness of interventions designed to improve road safety and pro-environmental behaviours and other related outcomes. Results from each database search (containing at least the author, title, publication year, source and ideally an abstract for each record) were downloaded as text files and imported into ORL software. The titles and abstracts for each topic (road safety and pro-environmental behaviours) that were generated by the searches were then examined according to pre-defined inclusion and exclusion criteria.

Eighteen reviews met the inclusion criteria for the road safety review and six met the criteria for the pro-environmental review. These reviews were then subject to a full critical appraisal to determine their relative quality.

Road safety: Results

The 18 reviews covered the following:

- cycle helmet ownership use
- seatbelt/child restraint within motor vehicles
- education of child pedestrians
- the effectiveness of graduated licence systems and driver education
- drink driving interventions
- traffic calming and safety cameras

The interventions were aimed at various road user groups (car drivers, motorcyclists, cyclists, pedestrians), had wide-ranging aims, and adopted a variety of strategies. Individual, community and population level interventions were all examined. The results of the interventions examined by these reviews are now briefly described.

Educating children about road safety can increase their knowledge, but for young children the effects on behaviour may be limited, therefore it may be better to separate or protect children from the road environment rather than expect them to interact with it safely. Educating parents and children about

the correct use of child restraints and/or cycle helmet use can be effective, but using a multiple strategy by combining education with incentives, legislation or coercion can increase effectiveness. However, the effect of these interventions drops off with time. Peer pressure and good examples set by adults can also be effective in changing behaviour.

A graduated licensing system for newly qualified or young drivers, where restrictions are placed upon these drivers for a period of time is a very effective method for reducing accidents for these drivers. Driver education at best is ineffective, but it is probable that by educating drivers, pre or post licence, increases accident rates. Administrative per se drink driving interventions may be effective in preventing re-offending, however interlock systems most likely have an overall negative effect and it is probably more effective to combine these interventions with some form of rehabilitation. A lower (a zero) blood alcohol concentration level for new or young drivers reduces the injury accident rates for these drivers. Safety cameras reduce the accident rates in the immediate area of the cameras, and most likely in the wider area as well.

Pro-environmental review: Results

The six reviews (two meta-analyses and four narrative reviews) addressed a small range of environmentally responsible behaviours. Three focused exclusively on recycling, one examined the conservation of resources like energy and water (Abrahamse et al 2005), one examined litter reduction (Huffman et al 1995), and the final review, a meta-analysis, reported on several environmentally responsible behaviours including recycling, energy conservation, water conservation, efficient transportation and litter reduction. The interventions were aimed at various target groups (e.g. residential households, school pupils, college students), had wide-ranging aims, and adopted a variety of strategies. The majority of interventions involved individual or community-level changes. The results of the interventions examined by these reviews are now briefly described in turn by behaviour-type.

There is some evidence that an awareness of the need to recycle and knowledge of recycling programmes are very strong predictors of recycling behaviour. There is also evidence that the use of prompts can increase recycling behaviour, as the studies that examined this strategy tended to report consistent positive effects. Commitment strategies also produced consistent positive improvements in recycling. Altering the environment and increasing the frequency of the collection of recyclables or scheduling the kerb-side collection of recyclables to coincide with regular waste collection can have small moderating effects on recycling behaviour. When comparisons were made, strategies that attempt to manipulate aspects of the environment in order to make recycling easier and more convenient for people were shown to be less effective than other strategies like offering monetary rewards or getting people to make a commitment to recycle.

There is some evidence that monetary rewards can improve recycling behaviour, as the studies that examined this as an intervention strategy

reported consistent positive effects. When compared to other interventions strategies, reward-based strategies produced greater improvements in recycling behaviour though changes tended to be fairly short-term and participation in reward-based interventions was usually low. Providing people with feedback about their performance in recycling was found to be a promising strategy for promoting recycling but further research is needed.

There is some evidence from a meta-analysis of environmentally responsible behaviours that the most effective strategies for increasing recycling are providing incentives, using social norms, getting people to make a commitment, setting goals and manipulating situational factors.

Getting people to make a commitment was also an effective strategy in encouraging reductions in their energy use. Longer-term effects were seen in one study (six months). Monetary rewards also had an overall positive effect in promoting energy conserving behaviours. Although goal setting could be effective in getting people to reduce their energy use, it more effective if combined with feedback on how people were doing in terms of meeting their goals.

Providing people with tailored information about their energy use – through, for example, home energy audits – tended to show more positive effects that other more general information strategies like mass media campaigns, especially in achieving behavioural change. Modelling and demonstrating appropriate energy saving behaviours resulted in improvements in knowledge and behaviour in one study. Providing people with feedback about their energy use was also generally effective in getting them to adopt more energy saving behaviours.

There is some evidence from a meta-analysis of environmentally responsible behaviours that the most effective strategies for conserving energy are providing incentives, using prompts and getting people to make a commitment.

Prompting strategies were again shown to have consistent positive effects on littering behaviour. Both community involvement and modelling strategies were also effective in getting people to dispose of litter correctly. Removing prior litter was also found to be an effective strategy in nine studies.

Environmental design strategies, like increasing the proximity of litter bins and improving the way they are labelled and decorated were also shown to have positive effects on littering behaviour. Reward-based interventions were effective in the studies that examined them. Only two studies examined the effects of feedback on littering and both reported positive results.

Getting people to make a commitment, and setting goals, were the interventions identified through one meta-analysis to have the strongest relationships with environmentally responsible behaviours in general, suggesting that they are likely to produce the best results. In contrast, providing incentives and ‘changing the situation’ (which refers mostly to

environmental changes like increasing the proximity of recycling containers) had the weakest relationships with environmentally responsible behaviours. This is surprising given that rewards and incentives were consistently shown by the reviews that exclusively addressed specific areas (recycling, energy conservation and litter reduction) to have positive effects (though these were notably usually short-term), and interventions that involved altering the environment were shown to have moderate effects in the other reviews.

References

Abrahamse W, Steg L, Vlek C, Rothengatter T (2005). A review of intervention studies aimed at household energy conservation. *Journal of Environmental Psychology*, **25**(3): 273-291.

Huffman KT, Grossnickle WF, Cope JG, Huffman KP (1995). Litter reduction: a review and integration of the literature. *Environment and Behavior*, **27**(2): 153-183.

Appendix 4b

Marketing Review

Background

The review was conducted on behalf of NICE by the Institute for Social Marketing (ISM) at Stirling and the Open University. The report helps to shed light on the question of whether and how commercial marketing and social marketing can influence behaviour. To do so, it draws upon several types of evidence:

- a narrative review on the nature of marketing and social marketing as behaviour change techniques (Section 3)
- a review of marketing strategies for low-income consumers (Section 4)
- a recent systematic review of the extent and nature of food promotion to children and its effects on their food knowledge, preferences and behaviour (Section 5)
- a series of systematic reviews of social marketing effectiveness in changing health behaviours (Section 6).

Methods

The narrative review of marketing and social marketing (Section 3) draws upon key marketing and social marketing publications in order to provide a useful account of social marketing's origins and development, its key principles and processes, and the role of research in social marketing.

The review of marketing strategies for low-income consumers (Section 4) adopted systematic search methods. A wide-ranging literature search was designed and carried out to identify any literature reviews, primary studies or other articles providing information on the marketing strategies used to influence low-income consumers' and any effects on their behaviour. Six electronic databases were searched for relevant literature published since 1980. These searches identified over 17,000 potentially relevant titles and abstracts. The majority of these records described grey literature - mostly descriptive or discursive accounts in practitioner journals describing marketing strategies and interventions designed to appeal to low-income consumer segments. Nevertheless, basic relevance appraisal was conducted by three reviewers using a set of inclusion criteria developed for the review.

Full text articles were obtained for 526 records, and these were re-screened for relevance. Only 21 articles met the full relevance criteria for the review. Of these, 18 were non-study articles that provided information on marketing strategies used to target low-income consumers. A further three were primary studies that provided some information on the effects of marketing on low-income consumers. As the vast majority of identified articles did not comprise

reviews or primary research, the usual NICE process of critical appraisal and quality scoring was neither appropriate nor possible. Data extraction forms were completed for all 21 included articles (both studies and non-studies).

International evidence on the extent and nature of food promotion to children and its effects on their food knowledge, preferences and behaviour (Section 5) is based upon a recent systematic review conducted on behalf of the World Health Organization (Hastings et al 2006). This research is based on two previous systematic reviews (Hastings et al 2003, McDermott et al 2004). A summary of the review methodology is provided in the appendices.

Evidence on social marketing effectiveness (Section 6) is based on three existing systematic reviews (Stead et al 2006, Gordon et al 2006, McDermott et al 2006). These reviews were recently conducted for the National Social Marketing Centre for Excellence (NSMC) at the National Consumer Council and Department of Health. The reviews examined the effects of using social marketing techniques to improve diet, increase physical activity and tackle smoking, alcohol and illicit drug use. A summary of the methods used by these reviews is provided in the appendices.

Marketing and social marketing as behavioural change interventions

Social marketing takes learning from commercial marketing and applies it to the social and health sectors: ideas and techniques that are being used to influence *consumer* behaviour can cross the profit divide and be used to influence *health* behaviour. Social marketing techniques and thinking have spread considerably and it is now at the centre of health improvement in many developed countries, including the UK.

Social marketing implies a strategic way of *thinking about and managing social change*. Both marketers and social marketers adopt a strategic approach to planning their activities, guided by seven key stages: defining the problem, defining objectives, understanding the consumer, segmenting and targeting consumers, understanding and addressing competition, creating an exchange, and developing the marketing mix.

Recent thinking in social marketing is characterised by a focus on building relationships, long-term strategic thinking, and customer defined quality. In social marketing, the concept of relationship marketing suggests there are benefits to be gained if we think in terms of building long-term relationships with our target groups. This idea has particular resonance for social marketers typically targeting behaviours which are often high-involvement and multi-faceted, and where trust is particularly important. Relational thinking should apply to both engaging with the general public and to social marketing's 'upstream' targets: policymakers, professionals, retailers, and stakeholders, for example. Social marketing efforts should have the same kind of longevity as commercial marketing programmes and the target group's opinion about a

social marketing offering is as important as that of health professionals and other experts.

Finally, social marketing sees research as a process that provides progressive learning, not just about how we should intervene, but about the people with whom we want to intervene. Social marketers draw upon both positivist and humanist research traditions. The first pushes us towards quantitative methods, establishing cause and effect, and hypotheses testing. The second encourages us to adopt a pragmatic mix of methodologies that will best aid decision making and provide us with a better (though imperfect) understanding of what makes people do what they do.

Findings from the review of marketing aimed at low-income consumers

Eighteen articles were found that provide insights in the strategies and activities used by commercial marketers to target low-income consumers. The articles share useful insights about the characteristics of this group and how they are taken into account when marketing strategies are developed.

Financial products and services are successfully marketed to low-income consumers by ensuring that offerings are tailored specifically to their needs. This has involved:

- Developing straightforward products and services that low-income consumers can understand.
- Removing potential barriers like complex application forms and unobtainable deposit requirements/fees.
- Maximising convenience by making services available through channels accessible to low-income consumers and at times that suit their lifestyles.
- Providing education and counselling to help low-income consumers understand the options available to them and manage their financial commitments.
- Addressing low-income consumers' specific security concerns.

Finance firms have also taken a long-term approach to this market and have attempted to build strong relationships both with the end consumer and important stakeholders. Grassroots marketing has formed a crucial aspect of this relationship building and finance firms have successfully penetrated the low-income market by offering additional services to community groups and organisations and by attending community events.

Multinational organisations including Unilever and P&G are very dedicated to the low-income market. They have teams of people responsible for developing marketing strategies for this particular group and rely on ethnographic research to guide their product development efforts. Because they recognise the significance of brands to the low-income market, their primary focus is on

developing value-brands - convenient, well-performing, affordable brands – and encouraging affinity for these brands among low-income groups.

Only three studies that directly measured the effects of specific marketing efforts on low-income consumers were found. Because the studies examine very different campaigns and are so few in number, it is difficult to draw any meaningful conclusions. Several additional study and review articles shed light on how low-income consumers engage with or are affected marketing in general. These articles show that low-income consumers are skilled at adopting 'coping strategies' to tackle the financial and other constraints affecting their consumer behaviour. Low income consumers are 'savvy' and even develop shopping strategies that allow them to purchase the best assortment of products they can within a tight budget. Low-income consumers have also demonstrated more accurate price knowledge than more affluent consumers and spend a bigger proportion of their budget on key household products and services including housing, food and transport.

Branding is very important to the low-income market. One study involving school children showed that parents will pay more money for popular, dependable fashion brands for their children because they have knowledge of these brands and are familiar with them.

Other evidence: the effects of food promotion to children

A recent review of the international evidence on food promotion to children confirms that in both developed and developing countries: (i) there is a great deal of food promotion to children, particularly in the form of television advertising; (ii) this is typically for highly processed, energy dense, unhealthy products with evocative branding; and (iii) that children recall, enjoy and engage with this advertising (Hastings 2006). Thus it is clear that children across the world are being exposed to an unhealthy diet of food promotion. Furthermore, globalisation and specifically the opening up of massive economies in India and China, mean that this marketing effort is set to increase. Food brands such as Coca Cola and McDonalds can gain an almost iconic status in the conflation of development with western values.

Establishing the effects of all this promotional activity requires complex (and expensive) studies. From these it is clear that food promotion does influence children's food preferences, purchase behaviour and consumption; the earlier review for the FSA also found that these effects were significant, independent of other influences and operated at both brand and category level (Hastings et al 2003). There is also evidence that food promotion encourages children to request their parents to purchase foods they have seen advertised.

The complexity and cost of cause and effect research means that it has only been done in developed countries. However, there is no reason to believe that children in the developing world will be any less vulnerable to food promotion. Other research, usually in the form of surveys, from countries including Chile, Bahrain, India and Venezuela show that children are interested in trying

advertised foods and often ask their parents to buy the foods they have seen advertised. Parents - especially those from disadvantaged backgrounds - frequently yield to such requests. Disadvantaged mothers also attribute more importance to advertised food products and credibility to food adverts than their more privileged peers. Overall, this indicates that children in developed and developing countries respond to food promotion in similar ways. It is therefore plausible that any evidence of cause and effect from developed countries can apply to children in the developing world.

Indeed three factors suggest that children in the developing world may be more vulnerable to food promotion:

1. They are likely to be less sophisticated about modern marketing and branding because it is such a new phenomenon in many developing countries. In China, for example, the economy has only just opened up to western influence.
2. Western firms see children as a bridgehead for entering developing economies, because they are more flexible and responsive than their parents.
3. They also represent a very real direct and indirect market: even in relatively poor countries they have disposable income from an early age and are known to have a big influence on family consumption behaviour.

Furthermore, the review almost certainly understates the problem. The evidence base focuses on television advertising, with relatively little attention given to other forms of advertising, let alone marketing as a whole. The latter is a much broader phenomenon than advertising, incorporating not just other forms of promotion (eg merchandising and packaging), but product development, pricing strategies and distribution. Some of these other variables may be just as influential as advertising, and it is the combination of all four that underpins the most powerful food brands.

Other evidence: the effects of social marketing interventions on health behaviours

Three reviews examined the effectiveness of social marketing interventions for changing health behaviour. All of the interventions included in the reviews were judged to have adopted social marketing principles in their design and implementation: they all had specific behavioural objectives; used consumer research to understand the target audience, the people whose behaviour they were trying to change (including upstream target groups such as retailers); and considered ways of segmenting the population and tailored the intervention accordingly and appropriately. They also all considered what would motivate people to change (‘exchange’), used a combination of the channels and activities that make up ‘the marketing mix’, and addressed competition or barriers to behaviour change.

The reviews were not intended or designed to compare social marketing with some other framework for developing interventions, rather to contribute to the

evidence base for the effectiveness of social marketing itself. Overall, the reviews found reasonable evidence that interventions developed using social marketing principles can be effective. A majority of the interventions which sought to prevent youth smoking, alcohol use and illicit drug use reported significant positive effects in the short term. Effects tended to dissipate in the medium and longer term, although several of the tobacco and alcohol interventions still displayed some positive effects two years after the intervention. The evidence was more mixed for adult smoking cessation, although small numbers of programmes were nonetheless effective in this area. There was modest evidence of impact on levels of physical activity and psychosocial outcomes, with an apparently weaker effect on physical activity related physiological outcomes. There was strong evidence that social marketing can be used to increase fruit and vegetable consumption and improve dietary knowledge and psychosocial factors associated with diet. The evidence for reducing fat intake was more mixed and again the impact on physiological outcomes was limited.

The interventions seem also to have had some effects on the behaviour of retailers, and to have encouraged adoption of policies and other environmental-level changes, although the data on these are less robust and it is often difficult to attribute changes to the interventions rather than to other events and trends in the community.

Learning points from the report

The report identifies several key, fairly generic learning points for public health:

- It is important to 'get to know' the consumer and target offerings accordingly. Formative research can be a useful navigational aid and can help provide some of this understanding.
- It is important to develop positive, upbeat strategies that appeal to the things that consumers like.
- It is important to do things over and over again (food marketers don't just advertise to children once!)
- It is critical to make it easy for people to adopt new behaviours, especially in the case of vulnerable groups like children and low-income households who face extra difficulties. An insider perspective on these difficulties can be especially insightful and can highlight problems that may be otherwise difficult to detect. Any barriers to behaviour change should be removed or minimised.
- Stakeholders and other key influencers should be identified and accounted for in the marketing strategy.
- It is important to engage in long-term thinking and view engagement with consumers as strategic ongoing relationships, not discrete interactions.
- The consumers' environment should be addressed and 'upstream' change targeted where appropriate.
- It is important to recognise the competition to behaviour change and account for this in the strategy.

References

Hastings G, McDermott L, Angus K, Stead M, Thomson S (2006). *The Extent, Nature and Effects of Food Promotion to Children: A Review of the Evidence*. Technical Paper prepared for the World Health Organization, July.

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Appendix 5

Resilience, coping and salutogenic approaches to maintaining and generating health: a review

Background

As part of its programme for developing public health guidance on behaviour change, NICE commissioned a review of "*resilience, coping and salutogenic approaches to maintaining and generating health".* The review was conducted on behalf of NICE by Cardiff Institute of Society Health and Ethics (CISHE) at Cardiff University.

The review is divided into two sections. The first section; 'characteristics of approaches to maintaining and generating health' aims to consider the theoretical frameworks used by research in this area, the approaches of researchers to these three areas and how these theories and areas of research have been applied to practice based interventions. The second section 'evidence on approaches to maintaining and generating health' considers the empirical evidence on the factors and processes thought to facilitate positive adaptation and the effectiveness of interventions and programmes engaged in generating these 'protective' resource and contexts.

In light of the breadth of the topic areas, and the fact that considering these areas in relation to public health and behaviour change is a relatively novel activity, the decision was made to focus on review-level literature. The advantages and disadvantages of this approach have been discussed elsewhere[3]

In addition, due to the large and broad ranging volume of literature identified on resilience in the search it was necessary to impose further restrictions on our review by restricting the stressor-type or set of adverse/ risk conditions for the literature reviewed for Section Two. In the light of current debates and political and academic interest in health inequalities and the strong associations that exist between socio-economic status and health status, we therefore took the decision to concentrate the evidence section of this review on the positive adaptation of people despite conditions of social-structural adversity

Review aims

The two sections address the following questions:

Section One

1. What are the key theories and models of resilience, coping and salutogenesis used in contemporary research?

[3] See, for example, Swann, C, Naidoo, B & Kelly, M (2006) Evidence for public health practice: conceptual and methodological challenges. In A Killoran, C Swann & M Kelly (eds) (2006) Public Health Evidence: Tackling health inequalities. Oxford: Oxford University Press.

2. How have researchers approached these research areas?
3. How have these theories been applied in practice: what kind of initiatives are there and what are their core characteristics and rationales?

Section Two

4. What evidence has been produced on the positive adaptation of people despite conditions of social-structural adversity?
5. What evidence is there on the effectiveness of interventions engaged in generating contexts and resources which might facilitate coping, resilience and positive development among disadvantaged groups?

Review Methods

One comprehensive literature search was designed and carried out to identify systematic reviews, meta-analyses and other reviews and papers which provide information on the theories, research approaches and practice based interventions relating to the areas of resilience, coping and salutogenesis (for Section One), and also the evidence base relating to theory and practice in these three areas (for Section Two). Results from each database search were downloaded and imported into Endnote. The titles and abstracts were then examined according to pre-defined inclusion and exclusion criteria.

63 reviews met the inclusion criteria for Section One and 45 reviews met the criteria for Section Two. 7 of these reviews were also used in both sections, giving a grand total of 101. The reviews used for Section Two (the 'evidence' section) were then subject to a full critical appraisal to determine their quality. For the majority of the literature used in Section One, it was not considered to be appropriate or necessary to subject the literature to this process.

Section One: Results

This section draws largely on reviews which provide some kind of conceptual or theoretical overview or critical analysis of the literature. All of the literature used in this section was obtained through the searches described in the methodology section. With the exception of four systematic reviews, all of the reviews are traditional literature reviews or discussion papers. Some of the material used here is also used for Section 2, although the majority of papers included in section one did not meet our inclusion criteria for section 2. 37 papers provided overviews on resilience, 14 on coping and 12 on salutogenesis.

Q1: What are the key theories and models of resilience, coping and salutogenesis used in contemporary research?

Resilience

Definitions

There is considerable variation in how resilience has been conceptualised and defined. A ‘most agreed upon definition’ of resilience is proposed in one review which describes resilience as ‘the “successful” adaptation to life tasks in the face of social disadvantage or highly adverse conditions.’

Background
The emergent area of resilience is suggested to have its roots in research on risk, stress and coping, and to have developed out of findings of ‘resilient subgroups’. It is suggested that research in this area is popular because of its potential to identify factors promoting resilience and, in turn, opportunities to enhance resistance to stress and adversity through interventions.

Concepts
Resilience has been variously defined as a trait, process or outcome, but some consensus is emerging on viewing resilience as a process. Positive adaptation and risk are two important constructs in conceptualisations of resilience. There is some consensus that for resilience to be inferred there must be positive adaptation despite the presence of significant risk. Protective factors are another central construct. Protective factors interact with risk to modify the effects of risk in a positive direction. Protective factors have commonly been identified at the individual level, the family level and the community level. Vulnerability factors are conceptualised in the literature as traits or indices that increase vulnerability to stress or exacerbate the negative effects of the risk condition

Conceptual issues and implications
There appears to be consensus that resilience should be seen as multidimensional and variable across time, circumstance and context. Several authors therefore recommended specificity when describing ‘domains’ of resilience (e.g. educational, emotional resilience). It was also recommended that the outcomes selected to infer resilience should be developmentally appropriate and appropriate to the type of risk condition.

Concerns have been expressed that the concept of resilience may lend itself to explanations that are ‘victim blaming’ and could be used politically to justify limited efforts to tackle poverty. The importance of seeing resilience as a process rather than a trait was stressed and a greater focus on the role of social institutions is recommended.

Coping

Definitions
A most widely adopted definition of coping is suggested to be that of Lazarus and Folkman (1984), which defines it as continually changing behavioural and cognitive efforts to manage external and/ or internal demands that are appraised as exceeding the individual’s resources.

Background
Coping research is reported to have evolved from stress research, focusing on the processes and mechanisms by which people adapt to stress. This is

suggested to be important for understanding health needs and problems, and developing strategies or interventions to prevent problems or improve health and well being.

Concepts
Three theoretical perspectives on coping were apparent in the literature; transactional, psychoanalytic and motivational

- The transactional approach

The transactional approach appears to be most commonly applied in relation to the concept of coping. This model suggests that (a) coping is a continuous and dynamic process of person-environment interaction, (b) it fluctuates over time in response to changing demands and appraisal of the situation and (c) it is situation as opposed to person specific. Key stages in the coping process are: primary appraisal of the adverse event; secondary appraisal of coping options; and the use of coping strategies to manage the effect of the stressors or attempt to change the situation, perhaps with a final step of evaluation

Within this framework stress is conceptualised as a mismatch between the perceived demands of a situation and the individual's assessment of his or her resources to deal with these demands. Distinctions have been drawn between life events and daily hassles, controllable and uncontrollable stressors, acute stressors, ordinary stressors, unusual stressors and chronic stressors.

Coping resources are another key component the transactional approach as they are suggested to influence appraisals and coping responses. They are generally grouped into internal resources (e.g. problem solving skills) and external resources (e.g. social support).

Coping efforts or strategies are further important constructs in the transactional framework. They have been defined as cognitive and behavioural actions in a specific situation, which are intended to manage emotions or improve a problematic situation. Several slightly different descriptive models are highlighted, of which the most well known and widely discussed was the problem-focused/ emotion-focused dichotomy. Problem-focused coping efforts are aimed at modifying the stressor (e.g. via direct problem solving) and emotion-focused coping is aimed at regulating the emotional states that may accompany the stressor, or adapting to the stressor without altering it. Emotion-focused coping strategies are suggested to be more adaptive when an appraisal leads to the conclusion that nothing can be done to modify difficult conclusions, whilst problem-focused coping will be more adaptive when the situation has been appraised as amenable to change

- Dispositional approach

The dispositional or psychoanalytic approach was given some mention in the literature. Instead of seeing coping as a process of person-environment interaction, this model suggests stable, person based factors to underlie habitual coping efforts (e.g. personality, attitudinal and cognitive characteristics). These two approaches are not generally seen as

incompatible insofar as dispositional approaches tap into general, preferred coping styles that transcend particular situational influences, whilst contextual approaches describe responses to specific stressful encounters and changes in coping efforts during a stressful encounter

- The motivational approach

The motivational approach was described in only a small section of the literature. From this perspective stress results from an assault on basic psychological needs of relatedness, autonomy and competence. Coping is therefore seen less about fending off the harmful consequences of stress than about peoples' efforts to fulfil these needs.

Conceptual issues and implications

Discussion was limited in this area but in its focus on process, the transactional framework has been criticised for a lack of attention to the content and character of particular stressors. Issues have also been raised regarding the applicability of adult coping models to children in relation to the categorisation of coping responses, and a lack of attention to the links between coping responses and adjustment.

Salutogenesis

Definitions and background

The salutogenic approach was developed as an alternative to pathogenic approaches and essentially grew out of Antonovsky's concerns that a different paradigm was required in order to research health, which was quite different from that which looks at the underlying processes of illness and disease. By focusing on salutogenesis, in contrast to pathogenesis, Antonovsky hoped that researchers might start to identify pathways and mechanisms leading in the direction of health. Salutogenic research therefore implies a focus on health maintenance processes rather than disease processes.

Concepts

'Salutogenesis' and its operationalised form, 'sense of coherence', are associated with the medical sociologist, Aaron Antonovsky. Antovosky saw health-ease and dis-ease at two ends of a continuum. Salutogenic research looks at processes that move people towards, or keep people at, the health-ease pole. A Sense of Coherence (SOC) relates to the way in which human agents make sense of the world, use the required resources to respond to it and feel that these responses are meaningful and make sense emotionally. It has 3 elements; comprehensibility, which is the cognitive element and relates to the way in which the person sees the world, manageability, the instrumental element, and meaningfulness which refers to the way in which the person is motivated to think and act in these ways. General Resistance Resources are a key concept in understanding SOC; these resources may be internal or they may lie in the social environment, and could be material or non material in nature

Conceptual issues and implications
Although Antonovsky stresses the structural dimensions to resistance resources and the SOC, one issue which was raised was that the SOC construct can lend itself to explanations and interventions which are neglectful of the fact that people in poverty often have very limited control over their circumstances.

Q2: How have researchers approached the study of resilience, coping and salutogenesis?

Resilience

Area and focus of research
Research in the area of resilience has been broad ranging, exploring resilience in the contexts of poverty, abusive families, alcoholic families, homelessness, chronic illness/ disability, teen mother, juvenile delinquency. Most research has been carried out on children. Research is described to have shifted from a focus on identifying outcome profiles of at risk groups to identifying and exploring protective factors associated with positive outcomes.

Methods and operationalisation.
The most common approach for resilience researchers is suggested to be a process of identifying vulnerability and protective factors that might modify the negative effects of adverse life circumstances and then identifying mechanisms or processes that might underlie associations found. This mostly involves the use of a quantitative scale correlated with outcome measures specific to the population and domain of resilience being studied. Qualitative methods are seldom used

There has been considerable variability in the measures chosen to investigate resilience e.g. secure childhood attachments, mental health, functional capacity, social competence, behaviour problems, drug abuse, and school failure. It is suggested that outcomes must be conceptually relevant to the risk encountered.

Issues and implications with research
The inconsistency in approaches to defining and operationalising resilience is suggested to cause confusion and undermine the comparability of study findings. Issues have been raised with regard to the arbitrary selection of outcome variables, which are said to reflect the normative assumptions and social values of dominant middle class groups. Increased attention to the social and cultural contexts of different groups is recommended.

With respect to the need to conceptualise resilience as multidimensional and variable across time and context there have also been calls for specificity regarding spheres of adaptation and multiple measures of risks and resources to be studied over longer time scales. A need was also highlighted for research to move away from listing variables associated with positive outcomes and to start exploring underlying mechanisms and processes of adaptation and protection. Interactive statistical models and qualitative

research is suggested to be a way forward for identifying and exploring these mechanisms.

Minority groups are reported to have been underrepresented in research on resilience, and it is also suggested that research on resilience has focused too much on individual factors and has not paid enough attention to ecological contexts and structural influences on behaviours and adaptations.

Coping

Area and focus of research
It is explained how research carried out within a dispositional framework uses indices which focus on how individuals are inclined to cope generally with adaptive demands, whilst research on coping responses or skills focuses on understanding and measuring the coping responses that individuals employ in the context of specific stressful encounters. It is also noted that coping research has traditionally paid more attention to coping with life events, but increased attention is now starting to be paid to coping in the context of 'daily hassles'. Low SES and minority ethnic groups have been found to be under represented in coping research.

Methods and operationalisation.
Most coping research involves the almost exclusive use of checklists and questionnaires. Most research on coping has involved using standardised checklists and scales. Questionnaires associated with transactional perspectives ask respondents to report the coping response used in response to specific stressors, whilst dispositional questionnaires ask respondents to report what they characteristically do with stress.

Issues and Implications with research
Issues raised with methods of research include; inconsistency in the application of questionnaires and the inability of the questionnaires to gather specific data on the character of the stressors and coping responses, or to gather information on the social and environmental context of a stressful event and its meaning to the person. Idiographic methods, daily reports and qualitative methods are recommended as a way of gathering more contextualised and meaningful data.

Research on the coping of disadvantaged and minority groups is also suggested to be lacking, prompting calls and recommendations for research which investigates coping among youth from diverse disadvantaged groups.

Salutogenesis

Focus, methods and operationalisation.
Salutogenic research has primarily been concerned with identifying correlates of a Sense of Coherence, whilst also making some effort to control for identified risk factors. The primary method of data-collection seems to be through the use of standardised scales and questionnaires to obtain

measures of Sense of Coherence and associations with other outcomes or variables of interest.

Issues and implications
Due to the limited number of reviews identified on the subject there was very limited discussion on issues and implications for research. However, it was noted that current scales measuring SOC are unable to measure how sense of coherence is shaped by historical and structural process of which individuals are a part, or how it may be reflected at a collective level. Antonovsky argued for other methods to be used alongside the scales, such as life histories and in depth interviews, which could better capture the complexities and provide better explanations for how SOC works in particular contexts.

Q3: How have these three theories been applied in practice: what kind of initiatives are there and what are their core characteristics and rationales?

Resilience

Interventions and approaches
Life skills training and social development models are two school based resiliency approaches that were commonly discussed. Life skills training is described as a classroom-based program that focuses on general adolescent skill development and on developing skills for resisting social influences to use substances. Social development approaches are considered to be system centred and therefore to incorporate, but build, on person-centred strategies like life skills training. They typically involve efforts to enhance academic, cognitive and social skills, efforts to strengthen positive parenting practices and increase home-school bonding, and efforts to enhance participation, interaction and bonding with peers and adults in the Classroom and wider school environment

Other practice based approaches discussed with reference to resilience included parent-training programs, community focused programs, mentoring programs and family therapy and clinical approaches.

Issues and implications
For practitioners; the main issue identified with regard to resilience interventions was the problem of ‘educational faddism’, a term used to describe short term, add on programs. It is recommended that programs should be integrated, multi-faceted and sustainable and should focus on building support as well as skills. For policy several authors stressed a need for greater attention to structural influences in communities. For research, a need for more rigorous and comprehensive evaluations of interventions was highlighted.

Coping

Interventions and approaches
Three basic types of coping interventions are identified; the first type of intervention is aimed at teaching general skills which should improve children's ability to cope effectively when they encounter specific stressful events. The second kind of intervention is typically focused on what children think and do to handle demands of specific situations that threaten their wellbeing, the third type is focused on enhancing support e.g. through parent-training and family focused interventions.

Issues and implications
Recommendations were made for more rigorous, comprehensive and theoretically driven evaluations of interventions. No implications for policy or practice were explicitly identified in the literature used for this section.

Salutogenesis.

Interventions and approaches
Two types of intervention approaches were discernable in the literature; approaches aimed at strengthening resources (e.g. self-management skills, community networks) and approaches aimed at creating meaning and order (e.g. interventions to increase perceptions of control and therapy interventions)

Issues and implications
One author commented on the lack of evidence on what works with regard to interventions targeting parenting style associated with positive health. Another author suggests that interventions which focus on individual level factors such as control, without changing the external environment, could lead to frustration, more feelings of powerlessness and more ill-health. The author recommends that interventions should therefore also target environmental and community level factors.

3.3: Section 2: Evidence on approaches to maintaining and generating health.

Q4A: What evidence is there on protective factors and processes that moderate or mediate relationships between structural disadvantage and developmental outcomes?
Evidence on protective factors or processes was provided in 39 reviews. This evidence was mostly derived from data from longitudinal and cross sectional studies, which identified factors associated with positive outcomes. 23 of these reviews were framed within a resilience framework, 5 within a coping framework, and 3 with reference to salutogenesis. Others reviews were located in ecological, transactional, empowerment, social support and self-efficacy theories.

A range of outcomes was used in studies across the different reviews. These included measures of psychological adjustment, mastery of developmental tasks, success at school, avoidance of problem behaviour, mortality and morbidity rates, physical health outcomes, mental health outcomes and health

behaviours. As a result of our inclusion criteria all of the reviews used provide evidence on adaptation or positive development despite conditions of social-structural diversity. Generally this was done either through concentrating specifically on disadvantaged groups (27 reviews) or through controlling for SES in wider population based studies (112reviews).

Only 6 of the reviews used for this question met the minimum four criteria to qualify as 'weak' systematic review, with the remainder of the evidence base (33) relying upon traditional literature reviews (TLR) considered to be 'very weak'.

In spite of the weak evidence base there is considerable consistency across review findings, with most reviews distinguishing between protective factors at the individual level, family level and community level, and with clusters of factors observable within these broader levels of influences.

Individual factors

The identified protective factors have been grouped into the following categories; 'positive identity factors' (e.g. self concept/ self esteem/social/ethnic identity), 'global beliefs' (e.g. religious beliefs, optimism, achievement motivation), 'control beliefs' (e.g. self efficacy, locus of control), 'personality traits' (e.g. temperament) and 'skills and capabilities'(e.g. intelligence, social skills). It is important to note that these categorisations are only to aid clarity and should be thought of as overlapping and interrelated as opposed to distinct.

Positive identity factors
There is evidence from 7 studies that high self-esteem and positive self concept are protective against the effects of adversity and promote positive outcomes. There is evidence from 7 reviews that a positive ethnic or racial identity is protective against the effects of adversity for minority ethnic groups.

Global beliefs
There is evidence from 2 reviews that religious beliefs function as an individual level protective factor. Evidence provided on other 'outlook' or 'orientation' factors included positive orientation to one's surroundings, optimism, high educational expectations and strong achievement motivation.

Control beliefs
There is evidence from 6 reviews that an internal locus of control is protective against the effects of adversity. However evidence from 3 reviews suggests that locus of control may not contribute to resilience among black students. There is evidence from 2 reviews that maternal self efficacy is protective against the effects of adversity.

Personality traits
There is evidence from 3 reviews that an easygoing temperament is protective against the effects of adversity.

Skill and capability factors
There is evidence from 8 reviews that the following skill and capability factors are protective against the effects of adversity; general and social competence (4 reviews), social skills (4 reviews), intelligence and academic skills (5 reviews), cognitive skills and processes (3 reviews), problem solving abilities and coping skills (5 reviews). However, there is some contradictory evidence reported in one review which suggests that intelligence could also serve as a vulnerability factor for high risk, inner city adolescents.

Family factors.

Consistent findings on protective factors were also evident at the family level. The identified protective factors seemed to fall into the following categorisations: Supportive environments (e.g. parent-child attachments, intra-familial relations, kinship networks), family practices (e.g. parenting approaches, norms and values) and resources. Again, these groups should be thought of as overlapping and interrelated rather than distinct.

Supportive environments
There is evidence from 18 reviews that a supportive family environment is protective against the effects of disadvantage. More specifically: there is evidence from 7 reviews that strong parent-child relationships affect adjustment. There is evidence from 9 reviews that cohesive, warm, supportive and communicative family environments are protective against the effects of disadvantage. There is evidence from 8 reviews that extended kinship networks are protective against the effects of adversity. 1 review provided evidence that the effects of kinship networks are mediated by the provision of goods, services and socio-emotional support.

Family practices
There is evidence from 3 reviews that nurturing and supportive care giving is protective against the effects of poverty. There is evidence from 5 reviews that nurturing motivation, high expectations and support for achievement is protective against the effects of poverty. There is evidence from 12 reviews that the following practices are protective against the effects of poverty: encouraging participation in family life and assigning chores (3 reviews); structured parenting, consistently enforced rules and discipline (3 reviews); authoritative parenting (5 reviews) and strong parental supervision and monitoring (6 reviews)

There is evidence from 3 reviews that the process of ‘ethnic socialization’ helps minority ethnic children to develop a positive identity and helps them to cope with the effects of racism and discrimination. There is evidence from 1 review that an emphasis on autonomy with emotional support from the primary caregiver is more effective for girls, whilst for boys an emphasis on structure and rules is more effective.

Physical and human resources

There is evidence from 4 reviews that human resources, such as mother's education and maternal competence, and physical space and size of family, moderate the impact of disadvantage on children's adjustment

Community factors

Consistent findings on protective factors were similarly evident at the community level. 14 reviews provided evidence on the buffering or moderating effect of social networks and social support in relation to disadvantage and a wide range of outcomes.
More specific evidence was also identified on the likely mediators of community effects, which could again be categorised into overlapping and inter-related groups and subgroups; 'psycho-social effects' (felt social support/cohesion and sense of belonging), 'collective efficacy' (informal supports, collective action) and 'cultural norms'.

There is evidence from 11 reviews that social networks influence psychosocial factors which are important to wellbeing. These factors include; emotional support and caring (6 reviews) and a sense of belonging and connectedness (5 reviews). There is evidence from 6 reviews that social networks provide informal supports and aid collective efficacy, which can contribute to a 'common good.' There is evidence from 5 reviews that strong community networks can foster cultural norms which contribute positively to development and health behaviours.

There is evidence from 4 reviews that the structural characteristics of disadvantaged neighbourhoods moderate the relationship between disadvantage and community characteristics such as social networks and the level of community organisation.
There is evidence from 4 reviews of the important role played by human services and institutions which afford opportunities for participation.

School factors

Evidence on the role of schools in fostering educational resilience, student achievement, attendance and persistence, 'resilient functioning' and reduced substance use and problem behaviours was variously provided in 13 reviews. Of these reviews there is evidence from 6 reviews that school factors can be protective against the effects of disadvantage. Evidence was also provided on features and characteristics of schools which promote resilience among students from disadvantaged backgrounds. These features were commonly grouped into classroom practices and school climate. There is evidence from 4 reviews that classroom practices can promote educational resilience. High teacher expectations and opportunities for learner engagement and participation were identified as particularly important here. There is evidence from 5 reviews that the school environment can promote educational resilience. Opportunities for student participation in school life and positive social interactions among peers and with teachers were identified as particularly important.

Religion

There is evidence from 7 reviews that religious involvement or religiosity contributes to a range of positive outcomes. There is limited evidence from 1 review that health practices may partially mediate the effects of religious involvement, and from 2 reviews that a Sense of Coherence may act as a mediator.

Q4B: What evidence is there on the processes and mechanisms underlying adaptation and coping?

The above section has highlighted evidence on protective factors which are associated with resilient functioning and which are theorised as providing individuals with resources that enable successful coping and adaptation. The other main evidence base that this review sought to explore was on the processes of person-environment interaction.

For this section empirical reviews were used which provide evidence on processes of person-environment interaction leading to adaptive psychological and behavioural responses. Only 7 relevant reviews were identified which answer this question, including 1 Systematic Review. The evidence base here includes evidence from 2 reviews that coping responses are context dependent and are influenced by appraisals of controllability, and evidence from 5 reviews that adaptation occurs through complex processes of person-environment interaction and that apparently maladaptive behaviours may serve adaptive purposes when they are located in their wider contexts. This suggests the importance of considering context and meaning when seeking to understand ‘successful’ and ‘unsuccessful’ adaptations.

Implications identified for research

A strong criticism and issue in the section 1 literature was the need to move away from simply listing variables associated with resilience, to explore the underlying mechanisms of protection. The need for greater attention to the specific social and cultural contexts in which coping and adaptation occurs was emphasised in 10 reviews and there were recommendations from 2 reviews for research exploring processes of person-environment interaction.

In 9 reviews calls were made for increased attention to the sampling of minority ethnic and religious groups and other recommendations for areas of research included; research into support networks and neighbourhood resources, research into relationships, research into the role of schools and empirical evaluations of interventions. In terms of measures there were recommendations in 5 reviews for the use of idiographic approaches, mixed method ethnographic research, longitudinal studies and qualitative research and recommendations in 9 reviews for multivariate studies which evaluate multiple outcomes, contexts and moderators, and in particular for studies which account for gender, SES and ethnicity

Implications for practice

Most of the reviews used in this section made recommendations for interventions, programs or approaches. Some of these recommendations were targeted at school approaches, whilst others were focused on community settings. With regards to schools there were recommendations in 5 reviews for more inclusive school approaches and there were recommendations in 2 reviews for skill related programs
With regards to community based interventions there were recommendations in 6 reviews for interventions which build social support and social networks and there were recommendations in 5 reviews for family focused interventions.

Implications for policy.

In line with some of the comments made in section 1, one author called for policy level attention to be given to macro-structural influences such as unemployment, discrimination, and warned against focusing only on micro-level influences, for example, social support, which may be limited in the extent to which they can mitigate the effects of poverty

Q5. What evidence is there on the effectiveness of interventions engaged in generating contexts and resources which might facilitate coping/ resilience/ or other positive developmental outcomes among disadvantaged groups?

Only 6 reviews met our inclusion criteria for this section. More reviews of relevant interventions were retrieved in the search, and some of these reviews were used in Question 3 to map out the different types of interventions related to resilience, coping and salutogenesis. However, for this question on effectiveness only systematic reviews or meta-analyses which met the four minimum criteria were included. The other main cause of exclusion of otherwise relevant systematic reviews was that many did not provide information on the backgrounds and characteristics of study participants, meaning that it would not be possible to draw conclusions on whether these interventions or programs are effective for disadvantaged groups.

One of the reviews was scored as ++, three reviews scored as +, and two scored as -. Four of the reviews reviewed evidence from Randomised Control Trial or ‘quasi-experimental’ studies and one was a review of systematic reviews. The best available pieces of evidence retrieved for the other remaining review were descriptive case studies of schools with ‘good practice’, with the result that no conclusions on effectiveness could be drawn.

The reviews differed quite considerably in terms of the aims and objectives of the interventions, the components of the interventions and the outcomes used to assess effectiveness. The topics of the different reviews included: mentoring programs, inclusive and participatory education, coping interventions, interventions targeting social exclusion to prevent unintended

teenage pregnancy, programs designed to promote family wellness and prevent child maltreatment and drug use prevention. What they shared in common was some kind of focus on one or more of the protective resources identified in question four, for example, developing coping skills or strengthening relationships and social support. They also obviously provided evidence on the effectiveness of the interventions for disadvantaged groups.

Skills training; children and young people
There is some evidence from 3 reviews (1&2 ++, C; 1&2 ++, C; 1&2-, C) that programs which build social and cognitive skills can enhance positive outcomes. Outcomes used to measure effectiveness included; pregnancy rates, academic achievement, employment, attitudes to school, college attendance, behaviour problems, teenage pregnancy and social competence measures and reduced prevalence of drug use. However, two of these reviews also suggested weaknesses or limitations with some of the evidence used.

Mentoring: role modelling and relationships
There is evidence from 1 review (1&2-, C) that mentoring programs can impact positively on emotional/ psychological measures, measures of problem-high risk behaviour, and social competence, academic and career related measures. However, the overall effect size was small but variable between studies.

Family focused interventions.
There is evidence from 2 reviews (1&2-, C; 1&2+, C) that family focused interventions aimed at building family strengths and resources can be effective in enhancing 'family wellness' and can impact positively on college attendance, behaviour problems, teenage pregnancy and social competence measures.

Inclusive school environments.
1 review (3+, A) found no outcome evaluations which could produce data on the effectiveness of inclusive school approaches in the UK.

Reference
Lazarus, R. S., & Folkman, S. (1984). *Stress, Appraisal, and Coping*. New York: Springer.

Appendix 6

The cost-effectiveness of behaviour change interventions designed to reduce Coronary Heart Disease: A thorough review of existing literature

Aim and Objectives

The aim of this report is to summarise the available evidence on the cost-effectiveness of interventions and programmes designed to change knowledge, attitude and behaviour in the whole population and specific communities (including families and individuals) in order to help to promote healthier lifestyles and reduce the risk of developing CHD.

Methods

A systematic search of six databases was undertaken in June 2006 using a fully specified set of search terms as well as inclusion and exclusion criteria. Following a review of 4122 abstracts and 225 papers, 26 papers were retained for full review using a standard set of piloted questions. Data extraction included background data, population characteristics, interventions and alternatives, main features and findings of the study and 3 sets of quality review criteria.

Results

A set of evidence statements is provided, by paper, for

- Exercise (page 37)
- Smoking (page 39)
- Combined interventions (pages 41 to 42)
- Diet (pages 45 to 57)

Main Conclusions

1. Prevention in childhood

   None of the papers reviewed provided evidence on child-focussed health promotion programmes. Children were stated as being included in population level statistics in only two papers (Murray et al 2003, Services DoH, 2003) but data were not evaluated by subgroup[4].

2. General prevention in adulthood

   Three out of the four papers that focussed on combined packages of interventions aimed at multiple risk factors fell into the 'likely to be very

[4] It is possible that children were also included in a number of other interventions aimed at populations, but age ranges were not always specified.

cost-effective' category[5]. These included a mix of population and individual focussed interventions for adults over the age of 30. Whilst short term effects in two papers were based on RCTs, none of the studies were conducted in the UK and none investigated alternative packages of interventions. Two papers compared the combination programme with no programme at all and one against a screening based alternative.

3. Intervention in adulthood to change the behaviour of people with specific risk factors for CHD (eg. smoking, poor diet, lack of physical activity)

Exercise: Both papers on the cost-effectiveness of interventions designed to increase exercise fall into the category 'likely to be very cost-effective' when compared with no intervention and a largely sedentary population aged over 35. However, the quality of short term effectiveness data was not strong.

Smoking: Two out of three papers[6] on smoking fall into the category 'likely to be very cost-effective'. One paper was the advice to individuals in Spain and the other was Heartbeat Wales. Unfortunately the quality of short term effectiveness data from Spain was not strong and the data from Wales very poor quality.

Diet: Of the 17 papers on diet, the cost-effectiveness of professional advisors in changing diet was consistently in the 'very cost-effective' category whereas there is no consistent pattern for any other types of diet interventions (population or screening based or diet alone) which fell in all categories between very likely and very unlikely to be cost-effective, including the 'standard' Step 1 diet which could be considered a more 'standardised' intervention.

Two non-advisory interventions also remained in the likely to be very cost-effective group; food labelling with trans fatty acid content (Services DoH, 2003) and a population-based health promotion programme on healthy food (Kristianson 1991). However, one of the reasons why the food labelling may rest only in one category is because neither sensitivity nor sub-group analysis was conducted, which is surprising given that only level 2 data was (and could be) available. Kristianson's (1991) model used a range of levels of data and undertook a basic sensitivity analysis.

When specified (n=12/17), most papers on diet focused on populations over the age of 35 with the exception of Murray et al (2003) who modelled the entire population. The quality of evidence varied by category of cost-effectiveness, with most RCT data for specifications of interventions in the >£50,000 category, followed by £0-20,000 and then

[5] The remaining paper(s) did not provide QALYs or number of life years saved.
[6] The remaining paper(s) did not provide QALYs or number of life years saved.

£30-50,000. No RCT data supported interventions in the cost saving or £30-50,000 level of cost-effectiveness.

4. Treatment (primary, secondary and tertiary care) in adulthood for people with CHD (e.g. statins, coronary heart by-pass, heart transplant).

The majority of treatments provided and evaluated are not behaviour change interventions or are provided in conjunction with behaviour change interventions. This project was also defined with NICE to exclude secondary and tertiary care. This reviews found no evidence on the effectiveness of behaviour change interventions alone. Several papers were excluded because the effects of behaviour change interventions could not be isolated, particularly from pharmacological intervention.

5. Other findings

- A blanket statement on cost-effectiveness of targeted or population strategies cannot be made as the evidence is mixed; in some cases targeted strategies are more effective and in other cases mass treatment is.

- There is evidence suggesting that the cost-effectiveness of behavioural change interventions varies by age, gender and risk level but in an inconsistent way across intervention type.

- There is considerable uncertainty for a number of interventions around the threshold value of £30,000/QALY, indicating that future modelling may provide useful decisional information for a UK setting.

- Data from studies citing ICERs of between 0-£50,000/QALY was heavily reliant on uncontrolled primary studies

- Few economic evaluations rely on primary data and few modelling studies provide sufficient description to ascertain the methods used.

Evidence gaps

Content of evidence

- With the exception of evaluations that cover the whole population, no evidence is provided on the cost-effectiveness of behaviour change interventions for specified sub-groups e.g. age group 19-30yrs, low income groups, pregnant women, particular ethnic groups or specified disadvantaged groups.

- There is no economic evaluation of a solely child-focussed disease prevention programme targeted at reducing CHD.

- No cost-effectiveness analysis of interventions to reduce smoking or increasing exercise to reduce CHD has included children.

- Very few economic evaluations of behaviour change interventions to reduce CHD have been conducted from a UK perspective

- There is a lack of research looking at patient preferences. Little attention was paid to patient preferences for the type of interventions that would be preferred or how they would be delivered. In turn preference is likely to affect compliance, which needs to be addressed (Murray et al, 2003) as it is key to the success of any behaviour intervention.

- Future research needs to include QALY weights for life years to facilitate comparison across a range of interventions

Quality of evidence

- Few economic evaluations of behaviour change interventions to reduce CHD are conducted alongside level 1 effectiveness evidence

- A lack of reliable data from which to extrapolate the long term health outcomes of behaviour change interventions from short term effects of behaviour change interventions (Kristiansen et al., 1991). For example, Kinlay et al. (1994) cited a lack of adequate information upon the impact of cholesterol and cholesterol reduction upon the risk of CHD among women.