



REPORT

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Young people and healthy eating:

A systematic review of research on barriers and facilitators

The Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre) is part of the Social Science Research Unit, Institute of Education, University of London



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PREFACE

Who needs to read this report?

This systematic review has synthesised the research evidence to assess what is known about the barriers to, and facilitators of, healthy eating amongst young people (aged 11 to 21), with a view to making recommendations about how healthy eating can be promoted. There are many useful messages contained within the review for policy-makers, commissioners, practitioners, health care consumers (e.g. young people and their families) and researchers who have a remit to promote or conduct research on, promoting healthy eating amongst young people. In particular, the key messages of this review can help:

- **policy-makers** by highlighting where current policy relevant to promoting healthy eating amongst young people is supported by research evidence and where there are contradictions/gaps;
- **health authorities** and **other services** involved in addressing healthy eating targets in the National Service Framework on Coronary Heart Disease (DoH, 2000a) to examine the evidence-base for action within this population group;
- **health** and **education partnerships** involved in the National Healthy Schools Standard to advise schools on which school-based interventions can be effective in promoting healthy eating (and which interventions are ineffective or harmful and which do not yet have evidence of effectiveness); and
- **services** to gain an insight into what young people think should be done to promote healthy eating and thus support the NHS's commitment to **involving the public in the development and delivery of services**

Since part of the reviewing process involved assessing the amount and quality of the evidence available to services to help them promote mental health, this review also:

- outlines a future research agenda for promoting healthy eating amongst young people; and
- makes recommendations for how this research may best be conducted.

Scope of this report

Promoting healthy eating is necessarily part of the remit of a range of public services and their partners. Because of this, difficult decisions were taken to focus effort on particular areas in order to complete the review within the time available. To ensure that this process still resulted in a useful review, it was commissioned in two stages: a mapping stage to describe the characteristics (but not the findings) of all the relevant research literature; and an in-depth review stage which synthesised the findings of a sub-set of this literature. The results and key messages to come out of both of these stages are presented in this report.

A range of research designs can illuminate the barriers to, and facilitators of, healthy eating amongst young people. Relevant literature was considered to fall into two main types:

- *intervention studies* which can provide valuable information about barriers and facilitators, aside from answering questions about effectiveness; and
- *other studies* which aim to describe the factors influencing young people's healthy eating in a positive or negative way.

The sub-sets of literature reviewed in-depth were chosen in consultation with policy-makers at the Department of Health, and the EPPI-Centre Steering Group, representing health promotion policy-makers, practitioners and researchers.

The focus of the in-depth review was:

- studies which evaluate interventions targeting barriers and facilitators at a community or society level (e.g. those which aim to make a change to young people's social or physical environment to support them in healthy eating); and
- other studies which elicit the views of young people on what they think are the barriers to, and facilitators of, their healthy eating and on what should be done to promote it.

This means that intervention studies which only target psychological barriers and facilitators, and other studies which seek to describe young people's lives (rather than seeking young people's own descriptions of their lives) are not featured in our in-depth review. However, these studies have been catalogued and described in our mapping exercise and provide the wider context for the findings of this review.

How to read this report

Because this review is a systematic review, and uses explicit and rigorous methods to synthesise the evidence in this topic area, the report is necessarily lengthy. Complexity and length have also been increased

because the review synthesises evidence from 'qualitative' research together with experimental evaluations of interventions, something that traditional systematic reviews do not usually do. Some readers will be interested in the whole review to get an overall picture of, not only the findings of the review, but also how we came to those findings. Others will want to be directed to the parts most relevant to their needs. The following guide will help readers make these decisions.

All readers are advised to read the **executive summary**. This gives an overall picture of the findings of the review and ends with explicit recommendations for:

- the types of interventions which have been demonstrated (through high quality evaluations) to have positive effects for promoting healthy eating amongst young people (and the types which have NOT been shown to be effective);
- the development of future healthy eating interventions (i.e. those interventions which look promising but which need to be developed and tested further; gaps in the kinds of interventions which have been evaluated);
- involving young people in developing and evaluating interventions to promote healthy eating; and
- how to best evaluate interventions promoting healthy eating.

Taken together, these recommendations emphasise the need for different readers to work in partnership with each other to build on the current evidence-base. A fuller description of the recommendations, explaining clearly how they have been derived, is given in **chapter 9**.

The individual chapters flesh out the above sections in more detail. Readers who want:

- **detailed information on effective interventions and how to implement them** (e.g. practitioners, service commissioners, policy specialists) may be most interested in **chapter 5** (especially 'which interventions are effective' in **section 5.4**) and **chapter 7** which illustrates whether/how these interventions match young people's views on the barriers to, and facilitators of, healthy eating.
- **details of the views of young people on healthy eating and how it might be promoted** (e.g. practitioners, service commissioners, policy specialists, researchers) may be most interested in reading **chapter 6** (especially **section 6.5**) and **chapter 7**. Chapter 6 describes the findings of studies which elicit young people's views, while chapter 7 compares young people's views on promoting healthy eating to the kinds of strategies that have been evaluated.

- **guidance on the kinds of interventions they should be developing and testing further and why** in partnership with a range of stakeholders (e.g. practitioners, service commissioners, policy specialists, researchers, research commissioners) may be most interested in reading **chapters 7, 8 and 9**.
- **a discussion of how the findings of the review relate to current policy and practice in promoting healthy eating** may be interested in reading **section 8.2** in **chapter 8**.
- **to find examples** of healthy eating interventions **not covered in the in-depth review** can see **chapter 3**.
- **guidance on how to best to evaluate the effectiveness of healthy eating interventions** may be most interested in **section 9.4** of **chapter 9**.
- **guidance on how best to involve young people** in the development of healthy eating interventions may be most interested in reading **section 9.3** of **chapter 9**.
- **details on the amount and quality of research** conducted on the topic of young people and healthy eating (e.g. researchers, research commissioners) may be most interested to read **chapters 3, 5 and 6**.
- **to know in detail about the methods used** in this systematic review may be most interested to read **chapter 2** and **chapter 4**. A reflection on the methods used in the review is also contained in **chapter 8**.

EXECUTIVE SUMMARY

The aim of this report is to describe a systematic review of the research literature pertaining to the barriers to, and facilitators of, healthy eating amongst young people, especially those from socially excluded groups. The context of the review is the promotion of healthy eating in general. It is the third report in a series of reviews collating the evidence on the barriers to, and facilitators of, health behaviour change and attitudes to risk and risk taking amongst young people. This series of reviews covers three topic areas: mental health, physical activity and healthy eating. A composite report will bring together the findings from the three areas.

The promotion of good nutrition is high on the health policy agenda in the UK. Evidence regarding increased prevalence of obesity and unhealthy eating patterns in the UK is mounting. Whilst promoting healthy eating is an important goal in its own right, young people are a particularly important group, as poor eating habits established during teenage years may be maintained into adulthood, creating a number of cardiovascular and other health-related problems later in life. The nutritional health of young people is compounded by material and social context, with those at greatest risk for poor nutrition belonging to groups which are considered to be 'socially excluded'. While this has been known for some time, much less is known about how different social factors interact, and about where and how to intervene successfully.

Methods

Literature searches were undertaken to identify studies examining barriers to, and facilitators of, healthy eating amongst young people aged 11 to 16. Because of the overlap between physical activity and healthy eating in many studies, we conducted an integrated search for both literatures. We included in our searches studies reporting evaluations of health promotion interventions examining outcomes ('outcome evaluations') and systematic reviews carried out in any country from around the world. Also included were evaluations looking at the processes involved with these interventions ('process evaluations') and 'non-intervention' research carried out in the UK. 'Non-intervention' studies did not aim to evaluate specific interventions, but aimed to describe which factors influence young people's healthy eating in a positive or negative way. The review was restricted to studies in the English language and to those studies focused on the primary promotion of healthy eating. It was carried out in two stages: a mapping and quality screening exercise, and an in-depth review of particular sets of studies.

Results

Mapping and quality screening results

The searches identified a substantial amount of potentially relevant literature - 7048 citations (including both physical activity and healthy eating). Of these, 186 met our inclusion criteria (main focus of healthy eating/ physical activity; promotion of healthy eating/ physical activity; young people (11 to 16); 'potential' systematic reviews of effectiveness; outcome evaluations; UK non-intervention studies) and were available within the relevant time frame. A total

of 135 reports focused on healthy eating and described 116 studies (some studies were described in more than one report). There were 75 intervention studies (64 outcome evaluations and 11 outcome and process evaluations combined), 32 reports of non-intervention research (e.g. surveys), and nine potentially systematic reviews.

Only 22% (N=25) of the 116 healthy eating studies identified in the mapping exercise addressed issues of social exclusion, and most of these were not carried out in the UK. Just over 70% (N=66) of evaluated interventions were implemented in school settings (primarily by teachers), thus potentially missing a large proportion of socially excluded young people (i.e. those excluded or not attending school).

The majority of the barriers and facilitators addressed by the studies were at the level of the individual (e.g. 'life event factors', 'physical factors', and 'psychological factors'). Almost a quarter of studies evaluating interventions focused solely on factors at this level.

Over 80% (N=61) of the outcome evaluations had a controlled trial design and just over half were randomised controlled trials. Using criteria for methodological soundness (reporting of equivalent intervention and control groups and both pre- and post-test data) almost three quarters were judged to be "potentially sound".

The 75 outcome evaluations (with or without integral process evaluations) and the 32 reports of 'non-intervention' research went on to be considered for inclusion in the in-depth review.

In-depth review: results from outcome evaluations

Twenty-two outcome evaluations met the criteria for our in-depth review (interventions aiming to make a change at the community or society level; potentially sound outcome evaluations; studies of young people's views in the UK since 1990). Most studies of effectiveness were conducted in the USA, with only one in the UK. In addition to promoting healthy eating, they also addressed issues relating to cardiovascular disease, tobacco use, accidents, obesity, alcohol and illicit drug use. Most were based in primary and secondary school settings and were delivered by teachers. While most interventions involved some form of information provision, 13 involved attempts to make structural changes to young people's physical environments; 11 also trained parents in or about nutrition, seven developed health screening resources, five provided feedback to young people on biological measures and their behavioural risk status, and three aimed to provide social support systems for young people or others in the community. Social learning theory was the most common theoretical framework used to develop interventions.

Most of these studies ignored issues to do with minority group status, or social exclusion. Only six specifically recruited ethnic minorities, all in the USA. In the one UK outcome evaluation, up to 20% of the study population were Asian.

Young people, on the whole, were not involved in developing these interventions. Only five studies based their programmes on 'felt' need.

Following detailed data extraction and critical appraisal, only seven of the 22 studies were judged to be methodologically sound. Three of these were in the

USA, with one each from the UK, Norway and Finland. Generally, these were multi-component interventions complementing classroom activities with school wide initiatives as well as involving parents.

The UK based intervention was an award scheme (the 'Wessex Healthy Schools Award') that sought to make health promoting changes in school ethos, organisational functioning and curriculum. Changes made in schools included the introduction of health education curricula, as well as the setting of targets in key health promotion areas (including healthy eating). This intervention was effective for reported behaviour, but only for young women in the older age group taking part (aged 15 to 16 years). A process evaluation involving school staff showed that they considered barriers to achieving a healthy school to include lack of time and resources, and poor facilities. Facilitators included the commitment of the staff, support from management, staff concern for pupils' health, and pupils' own awareness of health.

The 'Know Your Body' intervention, a cardiovascular risk reduction programme, was evaluated in two separate studies in two demographically diverse areas of New York (the Bronx and Westchester County). Lasting for five years it comprised teacher-led classroom education, parental involvement activities, and risk factor examination in elementary and junior high schools. Increases in knowledge were detected, but the programme was only partially effective in reducing cholesterol levels and blood pressure and inducing favourable dietary fat and carbohydrate intake. In the Bronx evaluation many of the changes were not statistically significant, and in the Westchester County evaluation the reviewers judged the effects to be unclear.

A second USA based study, the three year 'Gimme 5' programme, focused on increasing consumption of fruits and vegetables through a school wide media campaign, complemented by classroom activities, parental involvement and changes to nutritional content of school meals. The programme was effective at increasing knowledge (particularly among young women), and healthy eating behaviour.

In third USA study, the 'Slice of Life' intervention, peer leaders taught ten sessions covering the benefits of fitness, healthy diets, and issues concerning weight control. School functioning was also addressed by student recommendations to schools' administrators. The intervention was more effective for healthy eating behaviour for young women than young men, although it was effective for salt reduction for both sexes. The process evaluation of this intervention suggested that having peers deliver training was acceptable to students and the peer-trainers themselves. It was also felt that the peer leaders were adequately trained for their role as educators. It appeared, however, that young women enjoyed the intervention more than the young men.

A study conducted in Norway evaluated a similar intervention to the 'Slice of Life' programme, employing peer educators to lead classroom activities, small group discussions on nutrition, a computer programme to analyse nutritional status of foods, and students analysing the availability of healthy food in their social and home environment. It was effective for healthy eating behaviour, although this was not sustained amongst young men.

The 'North Karelia Youth Study' which took place in Finland featured classroom educational activities, a community media campaign, health

screening activities, changes to school meals and a health education initiative in the parents' workplace. It was judged to be effective for healthy eating behaviour, reducing systolic blood pressure, and modifying fat content of school meals, but less so for reducing cholesterol levels and diastolic blood pressure.

The evidence from the well designed evaluations of healthy eating initiatives is thus mixed. There is stronger evidence for effectiveness amongst young women compared to young men.

In-depth review: results from studies examining young people's views

A total of eight 'non-intervention' studies met the criteria for in-depth review (privileging young people's view by seeking their own descriptions of their lives). The most consistently reported characteristics of the young people included in these studies were age, sex and socio-economic status. None of the studies focused on young people with a low socio-economic status. In the two studies reporting ethnicity, the young people participating were predominantly White. Most studies collected data in mainstream schools and may therefore not be applicable to young people who infrequently or never attend school.

All eight studies asked young people about their perceptions of, or attitudes towards, healthy eating, whilst none explicitly asked them what prevents them from eating healthily. Two studies asked them what they think helps them to eat healthy foods, whilst only one asked for their ideas about what could or should be done to promote nutrition.

Young people tended to talk about food in terms of what they liked and disliked, rather than what was healthy/unhealthy. Healthy foods were predominantly associated with parents/adults and the home, whilst 'fast food' was associated with pleasure, friendship and social environments. Links were also made between food and appearance, with 'fast food' perceived as having negative consequences on weight and facial appearance. Attitudes towards healthy eating were generally positive, and the importance of a healthy diet was acknowledged. However, personal preferences for 'fast foods' on grounds of taste tended to dominate food choice. Young people particularly valued the ability to choose what they eat.

Despite not being explicitly asked about barriers, young people did talk about factors inhibiting their ability to eat healthily. These included poor availability of healthy meals at school, healthy foods sometimes being expensive, and wide availability of, and personal preferences for, 'fast foods'. Facilitators of healthy eating included reduction in the price of healthy snacks and better availability of healthy foods at school, at take-aways, and in vending machines. Will power and encouragement from family were commonly mentioned support mechanisms for healthy eating, whilst teachers and peers were least commonly cited sources of information on nutrition. Ideas for promoting nutrition included the provision of information on nutritional content of school meals (for young women particularly), and better food labelling.

Synthesis across study types

There were some matches but also significant gaps between, on the one hand, what young people say are barriers to healthy eating, what helps them

and what could or should be done and, on the other, soundly evaluated interventions that address these issues.

In terms of the school environment, most of the barriers identified by young people appear to have been addressed. At least two sound outcome evaluations have demonstrated the effectiveness of increasing the availability of healthy foods in the school canteen. Furthermore, despite the low status of teachers and peers as sources of nutritional information, several soundly evaluated studies have shown that they can be employed effectively to deliver nutrition interventions.

Young people associated parents and the home environment with healthy eating, and half of the sound outcome evaluations involved parents in the education of young people about nutrition. However, problems were sometimes experienced in securing parental attendance at intervention activities (e.g. seminar evenings). The reason why friends were not a common source of information about good nutrition is not clear. However, if peer pressure to eat unhealthy foods is a likely explanation, then it has been addressed by three sound outcome evaluations (generally effectively) and three outcome evaluations judged not sound (effectiveness unclear).

The fact that young people choose 'fast foods' on grounds of taste generally does not feature in intervention studies. Young people's concern over their appearance (which could be interpreted as both a barrier and a facilitator) has only been addressed in one of the sound outcome evaluations (which was generally effective). Will power to eat healthy foods has only been examined in one outcome evaluation in the in-depth review (judged to be sound and effective). The need for information on nutrition, as expressed by young people, was met by the studies in the in-depth review, the majority of which included components to raise awareness of the nutritional value of different foods, and the value of eating healthily.

Barriers and facilitators relating to young people's practical and material resources were generally not addressed by interventions included in the in-depth review, soundly evaluated or otherwise. No studies were found which examined the effectiveness of interventions to lower the price of healthy foods. However, one soundly evaluated intervention which was effective did achieve an increase in the availability of healthy snacks in community youth groups. At best, interventions have attempted to raise young people's awareness of environmental constraints on eating healthily, or encouraged them to lobby for increased availability of nutritious foods, without reporting whether any changes have been effected as a result.

Conclusions and recommendations

The main findings of the review were that there is insufficient good quality research evaluating the effectiveness of interventions to promote healthy eating, particularly in the UK. Only seven rigorous outcome evaluations were identified. These showed some effect on increasing healthy eating, particularly for young women. There is a similar lack of research examining the views of young people on barriers and facilitators to healthy eating.

Currently, interventions evaluated by good quality research do not always target what young people themselves see as the main barriers to healthy

eating and do not always build upon what they see as the main facilitators. Whilst practical and material resources are seen by young people as being an important influence on their eating behaviour, there are few evaluated interventions which have targeted such structural factors at a community or societal level. There is also currently little soundly evaluated research on the promotion of healthy eating amongst socially excluded groups.

In terms of recommendations for those wishing to implement interventions which have been evaluated and shown to be methodologically robust, a 'whole school' approach (i.e. one involving all members of the school community) can be effective in promoting healthy eating. Interventions which make changes to the availability of healthy foods in the school, complemented by classroom activities to provide information on nutrition can also be effective. Classroom based initiatives to promote healthy eating (e.g. small group discussions, peer-led activities), complemented by analysis of environmental influences on food have been judged effective for reported healthy eating, particularly among young women. Health risk reduction screening combined with classroom based educational activities, as well as a initiatives to involve parents, in which results of the screening are fed-back to young people in order to set behavioural goals, has been associated with favourable changes in clinical risk factors for cardiovascular disease. However, problems related to implementation of such interventions have also been identified.

Future initiatives to promote healthy eating among young people should take their views as a starting point. Approaches which could take into account young people's views and which require further development and evaluation include: interventions in supermarkets which provide information about the nutritional value of food purchases; interventions which aim to influence young people's personal preferences for 'fast foods'; interventions which seek to encourage healthy (dietary) behaviours to achieve weight loss, or prevent obesity; interventions which attempt to help young people set behavioural goals for healthy eating; interventions which assess the effect of lowering the price of healthy foods and increasing their availability; and interventions which encourage better labelling of food products.

AIMS

This report is the third in a series of reviews from the health promotion stream of work at the Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre)¹ at the Social Science Research Unit, Institute of Education, University of London. The current report is preceded by two reviews in the area of mental health (Harden *et al.*, 2001) and physical activity (Rees *et al.*, 2001) and will be followed by a final report, due in mid 2001, which will bring together the findings from the three areas.

This third report describes the findings of an extensive literature review concerned with young people and healthy eating. The overall aim of the report series is to collate the evidence on the barriers to, and facilitators of, health behaviour change and attitudes to risk and risk-taking amongst young people, especially those from socially excluded groups. This will hopefully provide practitioners, policy-makers and researchers with a summary of evidence to help them plan interventions for young people which are likely to be effective in bringing about sustainable behaviour change, and will also identify future research needs.

The **overall series of reviews** is guided by the following overarching research questions:

- What is known about the factors which promote or hinder young people's health behaviour change across a number of health topics/settings?
- How well do these factors explain the health behaviour/change of young people?
- Which factors best explain young people's attitude to risk-taking and the relationship between these and health behaviour/change?
- How can we use the conclusions of this research to improve the efficacy of health promotion interventions for young people?
- What gaps in the research evidence exist, and how might these best be filled?

This series of reviews builds on previous work on systematic reviews of the effectiveness of health promotion (Oakley *et al.*, 1996; Peersman *et al.*, 1996, 1998, see also France-Dawson *et al.*, 1994; Oakley *et al.*, 1994a; Oakley and Fullerton 1994; Oakley *et al.*, 1994b; Oakley and Fullerton, 1995; Oakley *et al.*, 1995a; Oakley *et al.*, 1995b; Oakley *et al.*, 1995c). The current series of reviews includes a wider range of study types than are normally included in systematic reviews of health promotion effectiveness. One of the central objectives of the reviews is to take further methodological work on identifying criteria for assessing the reliability of evidence from non-experimental studies. Here, the work carried out for the reviews builds on a previous descriptive

¹ The EPPI-Centre was previously known as the Centre for the Evaluation of Health Promotion and Social Interventions (EPI-Centre)

mapping of health promotion research and young people (Peersman, 1996), and on previous attempts to include non-experimental studies in systematic reviews (Harden *et al.*, 1999a; Oliver, 2001).

The aims of the review described in this report were:

1. To undertake a *systematic mapping* of research undertaken on the barriers to, and facilitators of, healthy eating amongst young people, especially those from socially excluded groups.
2. To select a sub-set of studies to review *in-depth*.
3. To *synthesise* what is known from these studies about healthy eating barriers and facilitators amongst young people.
4. To identify gaps in existing research evidence.

This report describes work carried out in two stages: an overall mapping and quality screening of the literature (chapters 2 and 3) and an in-depth review of a small subset of this literature (chapters 4, 5 and 6). Chapter 1 sets out the background to the report. The results of the in-depth review are brought together in a synthesis (chapter 7). An overall discussion is presented in chapter 8, and chapter 9 draws conclusions and makes recommendations.

1. BACKGROUND

Outline of Chapter

This chapter sets out the context for this systematic review by outlining a rationale for the importance of promoting healthy eating amongst young people; describing prevalence rates and factors associated with mental health problems; and summarising current UK policy relevant to promoting young people's mental health. In addition, it lays out the scope and the approach taken in this systematic review. This chapter will therefore be of interest to all readers of this report.

Key Messages

- *Healthy eating contributes to an overall sense of well-being, and is the cornerstone in the prevention of a number of health conditions, including heart disease, diabetes, high blood pressure, stroke, atherosclerosis, cancer, asthma, dental caries, iron deficiency and osteoporosis.*
- *Adequate nutrition for children and young people is particularly important in order to promote healthy bone and muscle growth, and to facilitate cognitive and emotional development.*
- *Recommendations for healthy eating are not necessarily being followed.*
- *Specific policy initiatives include the National Service Framework on Coronary Heart Disease and the Health Development Agency guidance for its implementation; DfES nutrition standards for school lunches; NHS Plan 'Five a Day Community Projects'; breakfast clubs, Cooking for Kids; and the Child Poverty Action Group study about children not claiming free school meals.*
- *Research indicates that young people in households of lower socio-economic status eat less well and face greater barriers to healthy eating.*
- *Research on the determinants of healthy eating and models of health promotion suggest the need to promote healthy eating among young people at three main levels: the individual (e.g. through promotion of self-esteem); the community (e.g. through social support); and society (e.g. through tackling social and material inequalities).*
- *Services promoting healthy eating for all need to work within the broader government agenda of tackling social exclusion.*
- *Healthy eating is a broad term and research on the barriers to, and facilitators of, healthy eating is extensive. This review was therefore carried out in two-stages: a descriptive mapping and quality screening of all research identified to be relevant and an in-depth review of a sub-set of studies.*
- *Taking advice from the commissioners and potential users of the review, we prioritised for in-depth review: community or society level barriers and facilitators; intervention studies of a high methodological quality from around the world; UK studies which seek young people's own descriptions of what helps them and what stops them from eating healthily.*

1.1 Why promote healthy eating amongst young people?

A distinction should be made at this point between 'healthy foods' and 'healthy eating/healthy diets'. The former is about foods which contain specific nutrients, whilst the latter is about eating the right amount and best combination of these foods. Definitions of healthy eating vary but most tend to emphasise achieving the right balance of different foods. For example, Bush *et al.* (1997) base their definition on recommendations laid out by the HEA (1995) which suggest eating increased amounts of bread, cereals and potatoes, fruit and vegetables, and moderate amounts of milk and dairy foods, meat, fish and alternatives. The recommendations also suggest avoiding adding fat or rich sauces to foods, not eating foods containing sugar too often, and using low fat versions of foods wherever possible. Roe *et al.* (1997, p16) suggest healthy eating to be "a diet reduced in fat or salt; or increased in starchy foods, fruits or vegetables". The promotion of healthy eating is defined as "activities designed to promote a healthy dietary intake in free-living populations, whether the intervention includes nutrition education or not" (p. 16). These definitions are used as a basis for this systematic review.

Fruits and vegetables in particular have been singled out as an important component of a healthy diet (DoH, 1994, WHO, 1990). For example, the US national prevention strategy 'Healthy People 2000' and its successor 'Healthy People 2010' has set a number of objectives for health improvement in the area of nutrition, including increasing the consumption of fruit and vegetables. To this end a '5 A Day for Better Health Programme' has been set up, lead by the National Cancer Institute, to achieve the objective of increasing the per-capita consumption to five or more servings of fruits and vegetables daily. A similar emphasis has been adopted in the UK by the NHS Plan which states that eating at least five portions of fruit and vegetables a day could lead to estimated reductions of up to 20% in overall deaths from chronic diseases such as heart disease, stroke and cancer (DoH, 2000b). It has been suggested that one third of cancers may be influenced by diet, and dietary recommendations for the prevention of cancer are consistent with those for prevention of obesity, diabetes and cardiovascular disease (DoH, 1998a). Therefore, eating a well balanced diet is one of the most significant actions individuals can choose to reduce their risk of chronic disease.

There are signs, however, that healthy diets are not necessarily being followed. For example, current average consumption of fruit and vegetables in the UK is only about three portions a day (DoH 2000b). Furthermore, a survey of young people aged 11 to 16 years found that nearly one in five did not eat breakfast before going to school (HEA, 1999).

One of the many consequences of not following a healthy diet is an increase in overweight and obesity. Evidence regarding increased prevalence of obesity and inactivity amongst young people in the UK is mounting. A recent study examined trends in weight and obesity among primary school children in England and Scotland (aged 4 to 11 years) through three cross-sectional studies between 1974 and 1994 (Chinn and Rona, 2001). Data indicated that whilst overweight and obesity as measured by body mass index remained stable between 1974 and 1984, there was a noticeable increase between

1984 and 1994. A recent report, 'Tackling Obesity in England', highlights the extent of obesity, affecting one in five adults (NAO, 2000). Obesity caused an estimated 30,000 deaths in 1998, with the NHS spending at least £500m a year on treatments. It is thus imperative to promote healthy eating from as early an age as possible as one way of tackling these increasing trends in obesity.

Adequate nutrition for children and young people is also particularly important in order to promote healthy bone and muscle growth, to promote healthy balance of minerals, promote good dental health and to facilitate cognitive and emotional development. The onset of adolescence and puberty is a particularly important time, with the body undergoing profound changes which require a good balance of vitamins and minerals. Eating behaviours adopted during this period are likely to be maintained into adulthood, underscoring the importance of encouraging healthy eating from as early an age as possible (Krebs-Smith *et al.*, 1995).

1.2 Current policy framework for promoting healthy eating amongst young people

Our Healthier Nation, the government's strategy for health (DoH, 1998b) set the aim to reduce the risk from chronic and preventable disease and the promotion of positive health across all population groups, including young people. 'Saving Lives', which came out a year later (DoH, 1999a), set specific targets for the prevention of deaths from cancer, coronary heart disease, stroke, accidents and mental illness across all population groups, including young people. The promotion of healthy eating is a key aspect that permeates this policy. It is recognised that a good diet and participation in exercise play significant roles in reducing the risk of coronary heart disease, cancer, stroke and diabetes, as well as promoting an overall sense of well-being.

The importance of nutrition was re-affirmed in 2000 with the publication of the NHS Plan (DoH 2000b). Priorities for nutrition included emphasis on increased consumption of fruits and vegetables, specifically promoting consumption of five portions a day; tackling poverty through ensuring children from poorer backgrounds have access to healthy foods; collaboration between the Department of Health and the food catering industries to increase provision of healthy foods (e.g. establishing local food co-operatives), as well as recommendations to food manufacturers to modify the constituents of food products (e.g. reductions in the use of salt and sugar).

Another policy initiative which has implications for the promotion of healthy eating is the National Service Framework (NSF) on Coronary Heart Disease (DoH 2000a). The framework sets out 12 service standards that cover a number of areas including reducing heart disease in the population, preventing coronary heart disease in high risk patients, and heart attack and other acute coronary syndromes. There is a particular focus on prevention of smoking, tackling inequalities, and community development, to be addressed through multi agency partnerships. For example, it is recommended that health authorities, local authorities, and primary care groups/trusts should work together to ensure that a community development initiative is implemented in deprived areas in each local authority area. Such initiatives would include smoking cessation programmes that target pregnant women and young people. The promotion of healthy eating is encouraged in targets to be

reached by a number of milestones. For example, by April 2001 all NHS bodies in collaboration with local authorities should have agreed, and be contributing towards, a local programme of effective policies on promoting healthy eating, physical activity, reducing overweight and obesity, as well as reducing the prevalence of smoking. By April 2002 every local health community should have quantitative data less than a year old on the implementation of these policies. A National Service Framework specifically focusing on the health of children and young people is expected to be published in the near future.

The Health Development Agency (HDA) has published guidance for implementing the preventive aspects of the NSF (HDA, 2000). The purpose is to assist health authorities, primary care groups/trusts, and local authorities in developing strategies for achieving the standards set out in the NSF, covering smoking, physical activity and diet. For each suggested intervention evidence is cited regarding its demonstrated effectiveness, details of potential collaborators, the skills and resources needed, hints to take into consideration, and where to seek further information.

Cross government initiatives for promoting healthy eating

The National Audit Office (NAO) has undertaken a review of policies relating to tackling obesity across government departments to identify where collaborative work is taking place and further opportunities (NAO, 2000). One of the recommendations of the audit was that the DoH should prioritise implementation of the initiatives on nutrition specified in the NHS Plan, which would involve working with food manufacturers and caterers. A substantial amount of cross-departmental work addressing obesity was identified, including the promotion of healthy eating (e.g. promoting healthy eating in schools) as well as the promotion of physical activity (e.g. active transport and active recreation initiatives).

The key governmental agencies engaged in promoting nutrition in partnership with the DoH include the Department for Environment, Food and Rural Affairs (DEFRA), the Food Standards Agency (FSA), and the Department for Education and Skills (DfES). The FSA was set up in April 2000 following consultation on the White paper 'The Food Standards Agency: a force for change' (DoH, 1998c), and is responsible for providing policy advice to Ministers on food safety and nutrition to inform the development of legislation. The objective of the Agency is to improve the health of the UK population through encouraging and facilitating the adoption of a healthy, balanced diet. There are nine guiding principles laid out in the White paper, the overall aim being the protection of public health in relation to food. The other principles include ensuring the general public have adequate, clearly presented information to make informed choices; having an open decision making process; consulting as widely as possible before taking action; ensuring consistency in decision making; taking full account of obligations of domestic and international law; and operating with efficiency and economy.

Encouragingly, the agency has a commitment to assessing food standards using the best available evidence, and commissions its own research into nutrition. For example, the FSA and the DoH are conducting research into food acceptability and choice, to encourage greater consumption of fruit and vegetables. The DoH and the DfES also work together to achieve mutual objectives, such as ensuring that the school environment promotes healthy

lifestyles with provision of education on health, diet and physical activity. Examples of collaboration range from high-level consultation on legislation and policy (e.g. White Papers), to the establishment of joint working teams which tackle specific projects.

Programmes have been set up which target nutrition at the level of the population, as well as initiatives directed at children and young people (e.g. in schools). Specific examples of collaborative initiatives include:

- The 'Healthy Schools Programme' and the 'National Healthy School Standard' run jointly by the DfEE and the DoH (DfEE, 1999) and managed by the Health Development Agency (HDA). The programme provides an accreditation process for education and health partnerships and has set a target for all local education authorities to be involved in an accredited education and health partnership by March 2002. Through the provision of local support for schools, the scheme aims to ensure that education is provided within the curriculum on health issues, including nutrition. For example, schools must present consistent messages regarding foods, thereby ensuring healthy options are available in school canteens and tuck shops, reinforcing education on nutrition provided in the curriculum. Local programmes must include young people in planning to ensure responsiveness to needs, and must support a whole school approach to education and health.
- The DfEE programme to develop nutrition standards for school lunches (DfEE, 2000). Compulsory regulations stating minimum standards for school lunches came into place in April 2001. These stipulate that at least two items from the following should be available every day during lunch: starchy foods (bread, potatoes, pasta); vegetables and fruit; milk and dairy foods; meat, fish and alternative sources of protein (non-dairy). Guidance for implementing these regulations has been issued. Interestingly, the guidance encourages schools that have delegated budgets for school meal provision to try and modernise the image of school meals. It is suggested that this might be achieved through lively packaging of products such as sandwiches or baguettes, and more importantly, offering an 'attractive price' for healthy meals (thus competing with local food outlets available to students who are allowed to leave school premises at lunchtime).
- The 'National School Fruit Scheme', proposed in the NHS Plan and set to commence in 2004. Every child in nursery and infant schools (aged 4 to 6) will receive a free piece of fruit each school day. A series of pilot schemes is currently underway in a number of Health Action Zones, which will be evaluated to assess how the scheme can be implemented effectively. In particular, the pilot programmes will focus on how best the fruit can be distributed (e.g. as part of a 'Breakfast Club' initiative for example, see below) and how the children can be encouraged to eat the fruit.
- The 'Five a day Programme'. Also specified in the NHS Plan is the aim to increase provision of fruit and vegetables, particularly to those in deprived communities. As part of the programme, Five-a-Day community initiatives are currently being piloted in five communities across England with a view to a national roll out of the initiative in early

2002. Evaluation will consist of dietary surveys to assess fruit and vegetable consumption. One of the communities, Sandwell in the West Midlands, is promoting fruit and vegetables within the context of sports activities (e.g. football coaching schemes), as well as preparing a 'food map' that illustrates price and availability of foods in local shops.

- The 'Breakfast Clubs' scheme. This initiative has been set up to ensure that children and young people eat sufficiently before going to school. Breakfast clubs are usually open for about one hour before school starts and are located in school premises or community settings (e.g. churches, community centres). Food provided might include cereals, toast, and fruit juice. An evaluation is currently in progress, conducted by a multi-disciplinary research team at the University of East Anglia. All schools which receive funding will be surveyed in order to describe the current pattern and diversity of provision of Breakfast Clubs in England. The second phase evaluates the effectiveness of the initiative using a cluster randomised controlled trial model. Schools taking part are randomly allocated to either an intervention or a control group. Outcomes include a range of social, education and psychological indicators, and assessment of impact will be accompanied by evaluation of the processes associated with implementation of the initiative. Methods used will include ethnographic observation, interviews with all key individuals involved as well as documentary evidence. Case studies are being undertaken in a sample of schools taking part in the scheme to explore its impact on family life and well-being.
- The 'Child Poverty Action Group'. The DfEE have worked in partnership with this group to ascertain why some children decline to claim free school meals. Recently published evidence suggests that one in five children do not claim their meals (Story and Chamberlin, 2001). Reasons for this include parental concerns over their children being stigmatised or embarrassed to be seen receiving free meals; negative perceptions of quality and choice of the food on offer; and parents not being aware of their child's entitlement to free meals. Recommendations include collaboration between schools, Local Education Authorities (LEAs) and benefits agencies to raise awareness of entitlement of free meals, and practical initiatives in the school canteen, such as cashless systems and swipe cards, so that children receiving free meals are not readily identifiable.
- The DfEE/DoH 'Cooking for Kids' initiative, launched in 1999 in association with the Food Foundation, the Royal Society of Arts and Food Federation. The aim of the programme is to teach practical cookery skills to school pupils (in years 6 and 7), making use of facilities outside of school hours. Celebrity chefs visit schools all over England to emphasise the benefits of healthy eating and that cooking can be fun.

In April 2001 it was announced that a new initiative was to be launched, the 'Food in Schools' programme, which will co-ordinate under one umbrella all of the initiatives in schools which aim to improve nutrition (e.g. 'Breakfast Clubs', the 'National School Fruit Scheme' etc). One of the aims of the project is to promote clear and consistent messages about healthy foods throughout the school.

1.3 The needs of socially excluded groups

The recent policy focus on socially excluded groups is in recognition of evidence that the homeless, the unemployed, the abused, the chronically ill, and ethnic minorities, amongst others, are all at elevated risk for ill-health. Young people from lower socio-economic classes may be less likely to engage in lifetime healthy eating leading to social inequalities in health.

The Acheson report (Acheson, 1998) has emphasised a clear commitment to tackle health inequalities across governmental sectors. Based on an independent inquiry, the report makes 39 recommendations for action to reduce ill health due to poverty and socio-economic disadvantage. This is to be achieved through building healthy communities, provision of better housing, promotion of better educational attainment (including health promoting schools), improvement in employment opportunities, reduction of crime, and better public infrastructures (e.g. improved and affordable transport). Interventions to promote healthier lifestyles, termed 'downstream' interventions, are also advocated, linking in with the goals set in 'Our Healthier Nation'. This is in direct contrast to prior initiatives which focused more narrowly on improving the health of individuals without necessarily tackling their wider socio-economic circumstances.

Recommendations in the Acheson report applicable to young people and healthy eating, include: policies to increase the availability and accessibility of foodstuffs for an adequate and affordable diet, and reduction of poverty for children and young people by improving material support of parents. Specific initiatives have already been set up, including, as mentioned above, a healthy schools initiative called 'Cooking for Kids' and the development of Breakfast Clubs.

1.4 What influences healthy eating?

A number of factors are significant in determining the types of foods young people eat. Williams and Dowler (1994) provide a framework for the determinants of food and nutrition. At the macro-level are the policies which drive the system (e.g. agriculture, economics, housing, employment, transport etc) which affects access to food (e.g. food price), the way information on nutrition is provided (e.g. food labelling, education) and availability (e.g. range and quality of foods in shops). This in turn influences the foods households and individuals can buy, which is also mediated by factors such as personal taste preferences, social and cultural norms, and knowledge.

The key influences on healthy eating can therefore be viewed as operating at the level of the individual (e.g. psychological factors), the community (socio-cultural factors), and society (economic and environmental factors).

Individual factors

Age is a key influence on food choice. Adolescence is a time of increased independence from home and family as well as greater financial autonomy. Young people generally have greater freedom to choose their own foods often buying snack foods when socialising with friends. However, differences may exist in dietary attitudes and behaviour between younger and older teenagers. Therefore, considering young people as a homogenous group may not take

into account differences that exist across the age range. For example, 15 to 16 year olds are more likely to have part time jobs and thus have greater power to purchase foods, and may even be responsible for routinely preparing their own meals. In contrast, 10 to 11 year olds may be much more likely to eat foods with, and prepared by, parents or other significant adults.

Gender is also an important factor in food choices. Young women are generally more receptive to healthy eating messages than young men. Surveys of young people consistently demonstrate that young women are more likely than young men to consume healthy foods, and consider healthy eating to be important (Dennison and Shepherd, 1995; Miles and Eid, 1997; Sweeting *et al.*, 1994). This might be explained by the notion that women, in general, are more conscious of their health. However, young women are also more likely than young men to diet. Poor self-esteem has been shown to predict unhealthy eating attitudes amongst young women (Wood *et al.*, 1994). There is also evidence to suggest that dissatisfaction with appearance and dieting become more prominent with increasing age (Hoare and Cosgrove, 1998). Dieting amongst young men however is not uncommon. In a study of the dieting patterns of 402 12 year olds in the UK, 15% of young men reported dieting to lose weight, with a quarter of the sample reporting feeling overweight (Edmunds and Hill, 1999).

Personal taste preferences may govern, to an extent, choice of foods. It has been suggested that there is a widespread preference for sweet and salty foods (Birch, 1999; Logue, 1991). A recent study examined the interaction between taste and perceived healthiness of drinks amongst children between 9 and 11 years (Wardle and Huon, 2000). The study examined whether placing a healthy label on a drink would influence ratings of its taste and perceived healthiness. Children were given either a drink labelled as 'a new health drink' or 'a new drink'. The latter was generally preferred over the former, suggesting that children do not necessarily equate notions of 'healthy' with 'tasty'. However, whether the same results would be achieved using older participants (e.g. 15 to 16 year olds) is not clear.

Whilst information on the benefits of eating healthily and on the nutritional content of different foods is a necessary step in following a healthy diet, it is widely recognised that on its own it is insufficient to motivate behaviour change. Favourable attitudes towards healthy foods, however, have been suggested to be a key influence. Dennison and Shepherd (1995) conducted a survey of young people in schools across England to test the appropriateness and effectiveness of the Theory of Planned Behaviour (Ajzen, 1988) as an explanatory framework for food choices. The theory posits that behavioural intentions are influenced by a person's attitudes, subjective norms and perceived control over behaviour. The model was revised to take into account perceptions of friends' behaviour and social pressure. It was found that attitudes and perceptions of control play a large part in influencing food choice decisions, in contrast to perceived social pressure.

Community factors

For children and young people, family and home are highly significant influences on eating behaviour. In a study of nutrient intakes of young people the largest source of energy and nutrients came from foods consumed in the home, constituting approximately 70% of total energy intake (Adamson *et al.*, 1996). However, family and the home may become less influential with age,

as young people become more independent, spending more time with friends, and purchasing their own foods (Dennison and Shepherd, 1995). It is at this age that food choices may become overtly influenced by peers. In a study of social and environmental influences on children's diets conducted in the US, it was found that negative peer opinions discouraged the consumption of fruit and vegetables (Cullen *et al.*, 2000).

Cultural beliefs also play a part in what young people eat. In most Western countries being slim is viewed as a positive body image. In a survey of young people in England in 1997 (Bost *et al.*, 1998), 34% of young women aged 16 to 24 felt that they were too heavy for their age and height (14% of those aged 8 to 15), and 49% were trying to lose weight (25% of those aged 8 to 15). For young men the patterns were different. For those aged 16 to 24, 18% were trying to lose weight, whilst 25% were trying to gain weight. Similar findings were shown by Sherratt *et al.* (1996) in a survey of young people from the West Midlands. Only just over half of their sample reported that they were happy with their weight, and these were mostly young men. Young men were more inclined to want to gain weight, whilst in contrast, young women wanted to lose it.

However, in some cultures, a different body image is valued and fatness is considered to symbolise power and happiness. For example, young women may be expected to gain weight to become eligible for marriage. There is some evidence linking cultural beliefs around eating and body image to development of eating disorders (Weiss, 1995). A study of Asian and British young women aged 12 to 18 in the UK found some (limited) evidence to suggest that young Asian women integrated into British culture resented their families and cultural beliefs and that this might precipitate an eating disorder (Furnham and Patel, 1994).

Society factors

Disorders such as hypertension, cancer, heart disease, diabetes, asthma, and obesity are more common among people from lower social classes (Power *et al.*, 1991). Good nutrition plays a part in preventing these conditions, however, a great deal of evidence links poverty with poor eating habits. For example, poor housing can result in inadequate and unhygienic food storage facilities; unemployment or low wages can affect the ability to afford good quality healthy foods; and lack of access to food retailers, and/or poor transport facilities significantly limits choice (Low Income Project Team, 1996).

Differences in healthy eating according to socio-economic status have been observed in studies of young people's eating patterns. In a longitudinal survey of young people aged between 15 and 18 in Scotland, those from non-manual social class backgrounds were more likely to be classed as a 'healthy eater' (Sweeting *et al.*, 1994). Another survey which assessed the contribution of foods from outside the home to the nutrient intake of young people aged 11 to 12 years found that a greater proportion of those from higher socio-economic status groups ate at least one school meal than those from the lower status groups, and that low status groups had lower nutrient density intakes than higher status groups (Adamson *et al.*, 1996). Detailed data on the types of food consumed according to social class have recently been provided by the National Diet and Nutrition Survey (Gregory and Lowe, 2000). The findings of this survey are described below.

1.5 Young people's eating patterns in the UK

In order to determine the level of need for interventions to promote healthy eating it is necessary to consider the extent to which young people in the UK have healthy diets.

One of the most up to date and comprehensive assessments of the dietary patterns of children and young people is the 'National Diet and Nutrition Survey' (Gregory and Lowe, 2000). Conducted in 1997, it included a representative sample of 2672 young people aged 4 to 18 years across the UK. The survey assessed commonly consumed food and drinks; energy intakes; protein, carbohydrate and fat intake; vitamin and mineral intakes; and physical measurements such as weight and height.

Most commonly consumed foods included white bread, savoury snacks, potato chips, biscuits, mashed and jacket potatoes and chocolate confectionery. These foods were consumed by more than 80% of respondents who participated in the seven-day dietary record. More than half of the sample had not eaten any citrus fruits, leafy green vegetables, eggs, or raw tomatoes in this period. Fruit juice had been consumed by approximately half of the sample. Twenty per cent did not consume any fruit and 4% did not consume any vegetables. Girls and young women consumed significantly larger amounts of apples and pears, 'other' raw and salad vegetables and raw tomatoes compared to boys, although the proportions eating fruit generally decreased with age across both sexes. For meats, chicken and turkey dishes were consumed by the largest proportion of young people. Over a quarter had used non-polyunsaturated soft margarine, with the same proportion reporting using butter. Almost half of the sample ate wholegrain and high-fibre breakfast cereals. The percentage food energy was 13.1% from protein; 51.6% from carbohydrate and 35.4% from fat (approximately 14% from saturated fatty acids).

For vitamin and mineral intake, over 90% met the recommended nutritional intake for vitamin A, although this tended to decrease with age. No more than 2% of any age and sex group had intakes below recommended levels for thiamin, niacin or vitamin B₁₂, and for Vitamin C, nor more than 1%. Intakes of vitamin D from foods were low. Mean intakes of iron were below recommended levels for 45% of young women aged 11 to 14 years and 50% of those aged 15 to 18 years. Intakes of calcium for both young men and women were below recommended levels in the 11 to 14 and the 15 to 18 age groups. Excluding salt added during cooking and before eating food, mean intakes of sodium and chloride were twice the recommended nutritional intake values.

Energy intakes were lower than in a previous comparable survey in 1983. In terms of regional variations, there were relatively few significant differences in energy and nutrient intakes between regions. However, intake of vitamins tended to be lower in Scotland and the North of England. These regions tended to have lower biochemical status of vitamins including Vitamin C and folate. The survey was carried out in 'waves' throughout a 12 month period in order to counter any bias through seasonal availability of, or seasonal preference for, particular types of foods. An analysis of type of foods consumed according to season generally revealed few differences however,

and the authors argue that these tend to reflect seasonal preferences (e.g. for salad in the summer) rather than seasonal availability of foods.

Variations in diet are also presented according to socio-economic characteristics. Several indicators were used: the social class of the head of the household, based on occupation (manual and non-manual); whether the young person's parent(s) were receiving state benefits (e.g. family credit); and gross weekly household income. Amongst the differences which were consistent across at least two of these indicators, those from a lower socio-economic background were more likely to have consumed whole milk and table sugar; and girls and young women from a lower socio-economic background were less likely to have eaten salad or some types of raw vegetables, green beans, some types of fruit or fruit juice. In terms of fat intake, the diets of boys and young men from lower socio-economic backgrounds tended to be lower in total fat, including saturated fat (e.g. the diets of those in manual households were richer in monounsaturated and polyunsaturated fatty acids). For vitamins and minerals there was a general pattern for a lower intake from food amongst young people from lower socio-economic backgrounds.

These differences underscore the need to address inequalities in healthy eating. Variations according to sex also highlight the need to consider gender issues within this context. The needs of socially excluded groups are a particular focus within this series of reviews. This is in recognition that the most disadvantaged are more likely to experience barriers to healthy eating. People on low incomes eat substantially less fruit and vegetables, and children in disadvantaged families are about 50% less likely to eat fruit and vegetables than those who earn higher incomes. Poorer communities may lack access to shops with affordable nutritious foods (DoH, 1999b).

Information on dietary patterns has also been derived from surveys assessing young people's health in general. The 'West Midlands Young People's Lifestyle Survey 1995-1996' (Sheratt *et al.*, 1996) included a representative sample of around 2000 young people from each of the 15 district health authorities in the West Midlands, comprising a total sample of over 27,000 participants. The study included young people from school year seven (age 11 to 12) to year 11 (age 15 to 16). Data were collected on a range of health topics including smoking, alcohol, drugs, accidents and, crucially, nutrition. It was reported that over a quarter of the sample did not usually eat breakfast on a school day, with this trend increasing with age. Differences were observed between the sexes, with only 20% of young men reporting not eating breakfast in comparison to 35% of young women. The most popular choice of lunch in the school day was either school provided meals, or a packed lunch. Meals provided at home, or bought in cafes and take-aways were in a minority. The vast majority of the sample (83%) said that their mid-day meal was not their main meal of the day (on weekdays). In terms of specific foods eaten, around a third of young people reported that they ate fresh fruit daily, whilst a quarter said they ate fresh vegetables, again with young women reporting higher consumption than young men. Consumption of sweets/chocolates, and savoury snacks were higher (around 40% and 45% respectively).

1.6 Approach taken in this review

This review has a number of distinctive features which make it different, not only to ordinary (non-systematic) reviews of the literature, but also to traditional systematic reviews of effectiveness. This section lays out the general principles adopted in the review in terms of: a framework for conceptualising barriers to, and facilitators of, healthy eating; the rationale for the methods used in the review (including our 'novel' attempt to integrate the findings from experimental research and observational and 'qualitative' research); the two-stage process by which the review was carried out (descriptive mapping and quality screening followed by in-depth review); and defining a sub-set of studies for in-depth review.

Barriers and facilitators: a conceptual framework

For the purposes of this review, we are using the terms 'barriers' and 'facilitators' to refer to factors which either promote or hinder healthy eating amongst young people. Research findings about the barriers to, and facilitators of, healthy eating amongst young people can help in the development of potentially effective intervention strategies. Interventions can aim to modify or remove barriers and use or build upon existing facilitators. We have categorised barriers and facilitators according to whether they reside at three levels: *the individual* (e.g. knowledge, attitudes, skills); *the community* (e.g. social support networks, family relationships); and *the society* (e.g. discrimination, social class, access to resources).

These three levels are supported by various definitions and models of health promotion which incorporate the determinants of health in general and how it may be promoted (e.g. Green and Kreuter, 1991; Hawe *et al.*, 1990; Tones and Tilford, 1994). For example, Tones and Tilford (1994) emphasise environmental influences, (e.g. cultural, socio-economic and physical), individual choice and lifestyle and the provision of health services. Social networks and support at the community level feature as important influences in a model of the dynamics of self-empowerment also outlined in Tones and Tilford (1994:26). Similarly Hawe *et al.* (1990), in their framework for assessing the factors associated with health problems or behaviour to aid in planning health promotion programmes, emphasise factors which can be classified according to whether they reside at the individual (e.g. attitudes, knowledge), community (e.g. role models, social support) or society level (e.g. policies on health and equity; health services). As Lister-Sharp *et al.* (1999) note, an increased understanding of the determinants of health and health behaviours has led to the recognition that health promotion needs to develop multi-faceted approaches which tackle barriers and foster facilitators at all levels. Such a framework also fits in with the strategies for improving mental health outlined in 'Saving Lives' (DoH, 1999b), which emphasises what individuals can do, what communities can do and what governments can do.

The inter-relationship between the three levels clearly needs to be acknowledged. For example, barriers and facilitators arising out of individual psychological factors may be dependent on an individual's interpersonal relationships or status in society. Similarly, social support may be achieved by changes to structural factors at the society level, but may also be fostered at the individual level by strengthening a person's social skills.

A range of research designs can be used to illuminate the barriers to, and facilitators of, healthy eating. For a discussion of how these were included in the review, see below under 'Review methods: integrating different study types'.

Review methods: being systematic

A systematic review is *a piece of research* that uses explicit methods in order to produce valid and reliable results. The tasks involved in systematic reviewing, from searching for studies and applying inclusion criteria to extracting data and critical appraisal, are all liable to bias. The main ways in which bias can be minimised involve: trying to identify as much as possible of all the relevant research which exists; using standardised coding procedures, ideally applied independently by more than one reviewer; and assessing the methodological quality of the studies such that conclusions and recommendations are based on the most rigorous studies (Mulrow and Oxman, 1997; NHS Centre for Reviews and Dissemination, 2001). Explicit reporting of how the review was conducted allows others to assess potential sources of bias in the review and thus the validity of its findings (Peersman *et al.*, 2001). This review adopts such principles. For example, all studies at each stage of the review were coded using standardised keywording and data extraction forms. The data extraction and quality assessment of the primary studies included in the in-depth review was done by two reviewers independently. Results were compared and disagreements resolved through discussion. Such discussion is important not only for resolving oversights, but also for clarifying important conceptual definitions.

As noted above, a systematic review aims to synthesise only those studies which are judged to have been carried out in such a way as to produce reliable conclusions. There is currently much debate about the use of randomised controlled trials (RCTs) to evaluate the effectiveness of health promotion and other social or 'behavioural' interventions (e.g. MacDonald, 1997; Oakley, 1998; Oakley and Fullerton, 1996; Stephenson and Imrie 1998). This debate is part of a wider discussion about what constitutes 'evidence' in relation to both social and healthcare interventions. However, well-designed prospective experimental studies, which include RCTs, provide a range of good quality data which increase the validity and reliability of inferences about which 'treatments' or interventions work (Kleijnen *et al.*, 1997; Sibbald and Roland, 1998). Including an integral process evaluation in trials provides information on how and why interventions work (or not). This review is conducted within these principles, but also recognises the need to develop an understanding of the role of observational and 'qualitative' research in evidence-based health promotion. The following describes how this review attempts to include such research.

Review methods: integrating different study designs

Although this is a systematic review, it differs from a traditional systematic review of effectiveness. The review question was concerned with identifying barriers to, and facilitators of, healthy eating, rather than 'which interventions are effective?'. A range of research designs are relevant to answering this question. We hypothesised that barriers and facilitators could be identified in the following ways:

(i) by examining the barriers and facilitators targeted by interventions shown to be effective in promoting young people's healthy eating (i.e. which barriers did they aim to reduce/remove? which facilitators did they build upon/show synergy with?);

(ii) by examining the barriers presented by interventions shown to be harmful (i.e. those which lead to a decrease in healthy eating); and

(iii) by examining research which did not aim to evaluate specific interventions, but aimed to describe which factors influence young people's healthy eating in a positive or negative way.

The research designs employed by studies in this third category will range from large scale surveys and epidemiological analyses of large datasets, to 'qualitative' studies which use in-depth interviews or focus groups. Examples of such studies are those seeking to identify barriers and facilitators by examining what characteristics of young people predict or are associated with healthy eating (e.g. age, social class, gender, attitudes, self-efficacy). These studies often involve testing hypotheses generated from a particular theoretical model and produce a description of young people's lives according to the conceptual and analytical framework of that model. Alternatively, some studies will directly present young people's *own* descriptions of their life. These studies may use young people's own analytical observations of what helps them or stops them from eating healthily.

The review therefore includes a wide range of research types including both intervention research and 'non-intervention' research which describes factors influencing young people's healthy eating without introducing and evaluating an intervention. We anticipated that by integrating findings about barriers and facilitators across the different study types we would not only be able to provide guidance in 'what works?' for current policy and practice, but also to make recommendations for future development and evaluation. For example, we anticipated that non-intervention research would identify previously untested barriers and facilitators to target in newly developed intervention studies.

Few systematic reviews have attempted to synthesise evidence from such diverse study designs: most have been restricted to experimental outcome evaluations. Thus integrating the findings from both presents a challenge (Egger *et al.*, 1998; Light and Pillemer, 1984). For example, whilst there is considerable consensus about the quality criteria intervention studies need to meet to produce reliable answers to questions of effectiveness, there is little consensus about how to judge the quality of non-intervention research (including qualitative research) or which questions it can reliably answer (Oakley, 2000).

Whilst all the methods used in the review follow the methodological principles for carrying out systematic reviews outlined above, the review also uses specific methods for integrating different study designs which have previously not been documented. It builds on recent work by Oakley (2000) and Rogers *et al.* (1997) on developing a set of possible quality criteria for judging the soundness of the methods used in 'qualitative' studies. It also carries further attempts to integrate experimental studies with observational and qualitative studies in systematic reviews of effectiveness carried out at the EPPI-Centre. This work includes two systematic reviews which aimed to integrate studies evaluating processes as well

as outcome evaluations in the area of smoking cessation for pregnant women (Oliver *et al.*, 1999a; see also Oliver, 2001) and peer-delivered health promotion for young people (Harden *et al.*, 1999a; see also Harden *et al.*, 1999c).

Stages of the review

This review was carried out in two stages: a descriptive mapping and quality screening exercise of all studies meeting the scope of the review and an in-depth review of the quality and findings of a sub-set of these studies. The rationale for these stages is outlined below.

Previous systematic reviews within health promotion carried out at the EPPI-Centre and elsewhere have tended to uncover large amounts of research to be considered for inclusion in the review (e.g. Peersman *et al.*, 1998; Tilford *et al.*, 1997). This is partly as a result of improvements in searching techniques (e.g. Harden *et al.*, 1999b). However, another important reason is that the questions of interest to health promotion tend to be very broad and encompass a wide-range of possible interventions (e.g. what is the effectiveness of sexual health promotion?); and/or health topics (e.g. what is the effectiveness of peer-delivered health promotion?); and/or outcomes (e.g. what are their effects on knowledge, attitudes, behaviour, environmental changes?). Many systematic reviews in other areas of healthcare address much narrower questions, for example, focusing on the effects of one intervention on one particular outcome. Whilst this ensures that the reviewer's tasks are manageable within given time and resource constraints, it also means that it is much more difficult to piece together the results of narrow reviews to illuminate broader questions (Oliver *et al.*, 1999b). There is therefore a dilemma in balancing the need for reviews of health promotion to address broad questions against the need to ensure the workload is manageable.

In their work on methodological issues in systematic reviews of effectiveness within health promotion, Peersman *et al.* (1999) propose a solution to this dilemma in the form of a two-stage commissioning process. Stage one should involve identifying and descriptively mapping relevant studies. Stage two is a detailed review of studies. This ideally follows a discussion between the researchers, commissioners and potential users of the review to determine the criteria for choosing which studies to include. Therefore this solution also provides a way for potential end-users of the review to be involved in setting the scope of the review. This is important for ensuring that systematic reviews are relevant to users.

Defining a sub-set of studies for in-depth review

In the context of this review, the two-stage process was especially important because of our decision to include a wide variety of research designs not traditionally included in systematic reviews. This required developing of new tools and methods to: systematically extract data from studies; assess their methodological quality; and synthesise their findings. We therefore had to take this additional workload into consideration when making decisions about which studies to review in-depth.

Following the two-stage process outlined above, we presented policy-makers and the EPPI-Centre steering group with a variety of options for choosing a sub-set of studies for in-depth review, and asked for their comments. The

steering group has representation from the commissioners of the review; the practitioner community; and other researchers specialising in either young people's health or systematic reviews.

This section outlines the options chosen and their rationale. A more detailed account of the specific criteria used to select a sub-set of studies is given in chapter 4. It is important to note that, although we restricted the focus of our in-depth review to particular types of interventions to promote healthy eating and to particular groups of non-intervention studies, this does not mean that others were not considered to be important. Furthermore, because we have systematically searched and catalogued this research, we have a bibliography which is available for in-depth examination in the future.

(i) Identifying which intervention studies to prioritise

Consultation with policy-makers suggested a focus on interventions which make changes at the community or society level to support young people to eat healthily (e.g. encouraging family support, provision of opportunities for healthy eating). These types of interventions were considered to be most relevant to current policy. Therefore good quality research studies (e.g. well conducted and reported randomised or non-randomised trials) evaluating these types of interventions were prioritised for in-depth review.

(ii) Prioritising studies seeking young people's own views alongside intervention studies

As indicated above, the review aimed to include a wide range of study designs, including those that did not aim to evaluate specific interventions, but aimed to describe which factors influence young people's healthy eating in a positive or negative way. This type of research traditionally makes a contribution to 'needs assessment'. 'Need', defined by Hawe *et al.* (1990, p.17), is "those states, conditions or factors . . . which, if absent prevent people from achieving the optimum of physical, mental and social well-being". In assessing need, priority areas are determined and an analysis of the health problem is undertaken (Hawe *et al.*, 1990). Needs can be assessed in a variety of different ways, including seeking expert opinion ('normative' need); reviewing epidemiological data and/or use of services ('expressed' need and 'comparative' need). However, increasing importance has been attached to assessing 'felt' need, which is based on what people themselves say. This is reflected in the current commitment of the NHS to involve the public in the development and delivery of services (DoH, 1999b).

In line with this, we proposed to privilege those non-intervention studies which sought *young people's own descriptions of their lives* rather than those which sought to infer their experiences primarily through *researcher description and characterisation of young people*. As indicated earlier, these studies often involve testing hypotheses derived from theoretical models and provide a description of young people's lives within the terms of the conceptual and analytical framework of the researcher or the theoretical model used. These studies can be seen as producing 'expert-driven' descriptions. Whilst this does not mean that these types of studies are not important for illuminating barriers and facilitators, justifications for focusing on the former type of study can be made on ethical, practical and epistemological grounds.

From an ethical perspective, it is only recently that children and young people have been given basic rights to make their voices heard in matters that affect them. Giving a voice to these traditionally silenced groups is now enshrined in the UN convention on the Rights of the Child (1990) (Alderson, 2000). Hennessy (1999:153) notes that eliciting the views of children and young people gives them the opportunity to take part in decision-making; gives them a sense of ownership over their lives; and lets them know that they are valued and respected.

Practically, Hennessy (1999) argues that we should seek children and young people's views because they have a great deal of valuable information about themselves to contribute and what they say can help in understanding the effects of interventions which aim to improve some aspect of their lives. Lloyd-Smith and Tarr (2000:60) note that "young people are capable of producing analytical and constructive observations and react responsibly to the task of identifying factors that impede their learning".

The above practical reasons link into the justification of privileging young people's views on epistemological grounds. It has been argued that the reality experienced by young people cannot be fully understood through research which makes inferences about them. The subcultures they inhabit and the meanings they attach to different aspects of their lives and social worlds may not always be accessible to adults (Lloyd-Smith and Tarr, 2000). Research for young people therefore needs to put young people's own voices at the centre of analysis (Mayall, 1996). This perspective has been reflected in recent recommendations for the planning and development of health promotion interventions. These suggest that it is only by taking into account young people's own views about their health needs and the factors which influence their health, that the most effective and appropriate strategies for promoting health will be developed (Brannen *et al.*, 1994; Moore and Kindness, 1998; Peersman, 1996; Shucksmith and Hendry, 1998).

Synthesising what is known about young people's own beliefs, ideas and experiences complements what is known from mainly 'expert-driven' research about healthy eating barriers and facilitators. Comparing young people's views with expert driven research may raise important issues for policy, practice and research.

(iii) Countries in which studies were carried out and publication date

Prior to retrieving studies for our mapping and quality screening exercise, decisions were made about restricting inclusion of studies according to which country they were carried out in. Previous systematic reviews in health promotion have been criticised because they have not been able to include studies carried out in the UK (Peersman *et al.*, 1999). Consultation with the EPPI-Centre steering group therefore highlighted that UK studies should be a priority. The possibility of restricting inclusion of all study types to those carried out in the UK was discussed. For intervention studies it was noted that such a strategy may lead to excluding the learning to be gained from good quality outcome evaluations from the rest of the world. This was felt to be important given that previous systematic reviews have found a dearth of outcome evaluations carried out in the UK (Peersman and Oakley, 2001). However, restricting inclusion of non-intervention studies to those carried out in the UK was felt to be more acceptable for the following reasons. Firstly, the strength of non-intervention studies in illuminating barriers and facilitators was felt to lie

in their ability to describe the specific contextual factors influencing young people within the UK (e.g. cultural, social, economic). Secondly, there is much more of this 'descriptive' research available in the UK. Thirdly, examining barriers and facilitators amongst young people in the UK would allow us to judge to what extent the barriers and facilitators targeted in intervention studies from other countries would be transferable to a UK context.

For the in-depth review, a publication date cut off point of 1990 was set for non-intervention research. Again, because the strength of non-intervention studies in illuminating barriers and facilitators lies in their ability to describe the specific contextual factors influencing young people within the UK, it was important to prioritise studies which would identify barriers and facilitators currently relevant. As before, these contemporary studies would allow us to judge to what extent the barriers and facilitators targeted in intervention studies from earlier periods of time would be transferable to the current context.

1.7 Summary

This chapter has set the context for this systematic review by outlining the rationale for promoting healthy eating; describing the focus of current UK health policy upon tackling ill health arising from poor nutrition; and noting the factors which are considered to influence food choices. The reasons why it is important to address the needs of young people who might be considered to be socially excluded have been discussed, and a justification for privileging studies which ask young people for their views on what inhibits or facilitates them to eat healthily has been presented. It is against this background that this review has been conducted. The following chapters describe how the available evidence was identified, classified, prioritised, reviewed and synthesised to form meaningful conclusions and recommendations regarding how young people's health can be improved through effective promotion of healthy eating.

2. MAPPING EXERCISE: METHODS

Outline of Chapter

This chapter describes the methods used in the first stage of the review: the mapping and quality screening of research relevant to the barriers to, and facilitators of, healthy eating amongst young people. This was conducted in three stages:*

- (i) developing relevant inclusion and exclusion criteria;*
- (ii) identification of relevant studies; and*
- (iii) classification of these studies.*

This chapter of the report describes these stages in detail. The criteria developed meant that the research described in the rest of the report covers three categories of studies published in English:

- ***evaluations of health promotion interventions** aimed primarily at promoting healthy eating among young people (intervention studies);*
- ***other types of studies** (cohort studies, case control studies and surveys) examining the relationship between healthy eating among young people and various aspects of their lives at the individual, community and societal level and/or reporting on young people's views directly (non-intervention studies); and*
- ***systematic reviews** of primary studies.*

*Evaluation studies include outcome evaluations examining the impact of interventions on healthy eating. These may also conduct integral process evaluations examining how or why an intervention worked. While outcome evaluations carried out in any country are included in the report, we restricted other types of study to those reporting UK research. **Essentially these types of research were considered to be useful for illuminating the barriers to, and facilitators of, healthy eating.***

*This chapter is relevant to all audiences as it describes in detail the 'basic' scope of the review. **But this chapter will be of particular interest to:***

- ***any readers** who want to evaluate in detail how this stage of the review was conducted in order to assess the reliability and validity of the review's findings; and*
- ***researchers or others** interested in carrying out systematic reviews to understand how a mapping and initial quality screening exercise can be conducted. **This chapter may be skipped** by readers who are primarily interested in the findings of the review.*

**This systematic review is part of a series of reviews on mental health, physical activity and healthy eating. Because this review on healthy eating was conducted alongside the one on physical activity, the methods in this chapter also refer to physical activity.*

2.1 Inclusion and exclusion criteria

Because this systematic review is part of a series, this section describes the single set of criteria that were developed for both the healthy eating review (this report) and the physical activity review (Rees *et al.*, 2001). The development of criteria for the inclusion of studies and the identification and classification of studies were run in tandem for the two reviews to make them more efficient, as it was expected that a large proportion of studies relevant to one review would also be relevant for the other.

The aim of the literature search was to locate a wide variety of research dealing with three broad areas: i) healthy eating or physical activity ii) generic and specific determinants of physical activity or healthy eating (e.g. socio-economic factors, lifestyle, culture, risk factors, life change events, attitudes) or the promotion of positive health or prevention of ill-health (i.e. health promotion, primary prevention); and iii) young people.

In order to be considered relevant a report had to either: i) evaluate a health promotion intervention aimed at promoting physical activity or healthy eating (intervention studies); or ii) identify how, or the extent to which, various aspects of young people's lives at the individual, community and societal level were associated with, or predicted their participation in, physical activity or healthy eating behaviour, and/or report on young people's views on these issues directly (non-intervention studies), or iii) report the results of a systematic review within the scope of the promotion of physical activity or healthy eating for young people.

It was clear from the early stages of literature searching that the volume of potentially relevant studies would be substantial. A decision was therefore taken on criteria which would reduce this to a quantity which would be manageable within the time we had for the review, while still addressing the purposes for which it was commissioned.

Reports needed to pass four rounds of exclusion criteria to be included in the descriptive mapping for either physical activity or healthy eating.

Round one: exclusion on the grounds of scope

There were three 'scope' criteria. Studies were excluded if:

(i) The study's focus, or main focus, was NOT healthy eating or physical activity.

Studies were excluded when they had several outcome measures or foci of interest and the majority were unrelated to healthy eating or physical activity.

(ii) The study did NOT focus on young people.

Studies were excluded when they focused on the general population. They were also excluded when the mean age of participants was less than 11 or more than 16. An exception to this was made for systematic reviews which covered older or younger age groups but included a clear section on young people.

(iii) The study was NOT about the *promotion* of healthy eating or physical activity, or the *barriers* to, and *facilitators* of, healthy eating or physical activity.

Intervention studies were excluded if the study population group was identified as having an illness or disability (e.g. anorexia, diabetes, obesity, learning disability) or was resident in a facility that specialises in working with offenders. Non-intervention studies were excluded when the majority of the study population was identified as obese or as having an eating disorder and the study did not examine the factors that might have led to or helped avoid their obesity or eating disorder.

Round two: exclusion on the grounds of study type

There were eleven 'study type' exclusion criteria. Studies were excluded if they were any of the following: (i) editorials, commentaries or book reviews; (ii) policy documents; (iii) surveys solely reporting the prevalence or incidence of physical activity or healthy eating; (iv) non-systematic reviews; (v) non-evaluated interventions; (vi) surveys examining a range of health-related behaviours (only some of which are about physical activity or healthy eating); (vii) resources; (viii) bibliographies; (ix) theoretical or methodological studies only; (x) single-case studies; (xi) studies that evaluated the processes of interventions only.

Round three: exclusion on the grounds of location of study

Studies were excluded if they described a non-intervention study (cohort study; case control study; cross-sectional survey) NOT carried out in the UK.

Round four: exclusion on the grounds of language of the report

Only those studies written in the English language were included. Unfortunately, there were insufficient resources to allow translation of reports published in other languages.

2.2 Identification of relevant studies

Different sources of published and unpublished research literature were searched to locate relevant reports.

Searches were conducted on commercially available electronic databases (Medline, EMBASE, Psycinfo, ERIC, the Social Science Citation Index, CINAHL), specialised bibliographic registers (BiblioMap, held by the EPPI-Centre, HealthPromis, held by the Health Development Agency (England), the Health Promotion Library Scotland Catalogue, held by the Health Education Board for Scotland, the Cochrane Database of systematic reviews and the HTA database, accessible via the website of the NHS Centre for Reviews and Dissemination, University of York). The searches covered the full range of publication years available in each database at the time of searching.

For Medline, EMBASE, Psycinfo, ERIC, the Social Science Citation Index and CINAHL, highly sensitive search strategies were developed using combinations of controlled vocabulary and free-text terms restricted to the title or abstract fields. A wide range of terms for physical activity or healthy eating (e.g. sports, exercise, leisure activities, physical fitness, inactivity, nutrition, food preferences, feeding behaviour, diets, health food) were combined with

health promotion terms or general or specific terms for determinants of health or ill-health (e.g. Health-Promotion; behaviour modification, at-risk-populations, socio-cultural factors, poverty) and with terms for young people (e.g. adolescent, teenager*, young adult*, youth). The specialised registers were searched with a combination of terms for physical activity and healthy eating with terms for young people. (See Appendix A for the full details of the terms used in these search strategies.)

All citations identified by the above searches were downloaded into a ProCite database using BiblioLink data transfer and Biblioscape database software. They were scanned for relevance as to whether they met the inclusion criteria for the mapping and quality screening exercise.

2.3 Classification of relevant studies

Full reports were obtained and first classified according to a standardised keywording system developed by the EPPI-Centre (Peersman and Oliver, 1997). This classifies reports in terms of the type of study (e.g. outcome evaluation, survey, case control study); the country where the study was carried out; the health focus of the study; the study population; and, for reports describing or evaluating interventions, the intervention site, intervention provider and intervention type.

In order to gain a richer description of the research literature relevant to the promotion of healthy eating and physical activity (a related and parallel topic of review) in young people, reports were then classified according to an additional standardised keywording system, developed for the purposes of this review. This keywording system (details of which can be obtained from the EPPI-Centre on request) classified reports in terms of their topic area, context and characteristics of young people under study, their research design and methodological attributes.

Health topic and characteristics of young people

The report's topic was described in terms of its focus (whether this was on healthy eating only, physical activity only, or healthy eating and physical activity together), the health-related context of the study (the rationale presented by the authors for the promotion of physical activity or healthy eating) and its reference to barriers to, or facilitators of, physical activity or healthy eating, grouped into broad categories at three levels: the individual (psychological factors; life events; and physical factors); community (family factors and interpersonal factors); and society (socio-cultural factors and structural factors). The population under study was also described (e.g. unemployed, homeless, other socially excluded group; aged 11 to 15, aged >18).

Research design

Outcome evaluations were described according to whether they employed the design of a randomised controlled trial (RCT), a non-randomised trial, or a one group pre-test and post-test design.

Process evaluations were described in terms of the processes of interest (the intervention's implementation and/or its acceptability, and/or explaining why an intervention might have been successful or unsuccessful).

Non-intervention research (cohort studies; case control studies; cross-sectional surveys) were described according to whether they aimed to identify factors which are linked with physical activity or healthy eating, identify how specified factors relate to physical activity or healthy eating, or ask young people for their own views on physical activity or healthy eating. Non-intervention research and process evaluations were described according to whether they used qualitative and/or quantitative measures, were cross-sectional or longitudinal in design; and were prospective or retrospective in design.

Systematic reviews were described according to whether they focused mainly on outcome evaluations (addressing questions of effectiveness) or on non-intervention research (asking other research questions).

Methodological attributes

The presence or absence of specified methodological attributes was recorded for each report. One set of attributes was described for outcome evaluations, another set for process evaluations and non-intervention studies and a third set for systematic reviews.

Keywords were applied to outcome evaluations to note the presence or absence of: i) a control group; ii) any pre-test data; iii) any post-test data. If reports described controlled trials but did not mention random allocation, it was noted whether study groups were equivalent at baseline. Outcome evaluations were then further described as potentially 'sound' or 'not sound'. An outcome evaluation with random allocation to groups was described as potentially sound only if it reported both pre- and post-test data. Outcome evaluations that did not report random allocation were only described as potentially 'sound' if, in addition to reporting pre- and post- test data, they also had groups that were equivalent at baseline. All other outcome evaluations were described as 'not sound'. We realise these are fairly crude classifications of how studies were reported rather than how they may actually have been carried out, but it was important to have a workable strategy for classifying a large volume of research literature in a short time.

For each process evaluation and non-intervention study (which included studies examining young people's views) a record was made of whether the following were reported, not reported, or unclear: i) the number of people participating in the study; ii) their age range; iii) their sex distribution; iv) socio-economic background; v) the ethnic make-up of the study population. For process evaluations and for non-intervention studies aiming to represent a specific population, a record was made of: i) the proportion of the original population in the final sample; and ii) characteristics of possible non- responders. For longitudinal studies only, the reporting was noted of: i) the number of those recruited and lost to the study; and ii) any characteristics of individuals lost to the study.

Methodological attributes of systematic reviews were also described in some detail. Keywords here noted whether or not reports: i) presented the review's aims; ii) provided information on the methods and sources used to retrieve

studies; iii) described the use of explicit guidelines for determining which material was included or excluded from the review; iv) described standardised methods for extracting data from included studies; v) described undertaking an assessment of the methodological validity of included studies; vi) proposed specific directives for new research initiatives. In addition, each report's analysis and presentation of data was described as one or more of the following: i) studies weighted (authors based recommendations/conclusions only upon those studies which meet some minimum quality criteria); ii) meta-analysis (authors used meta-analysis to pool data from individual studies); studies summarised (authors gave a description of and integrated the individual studies included in the review using text and/or a table).

3. MAPPING EXERCISE: RESULTS

Outline of Chapter

This chapter describes the findings of the mapping and quality screening of the research literature relevant to healthy eating amongst young people. It presents:

- *the content focus of the research (e.g. broad promotion of healthy eating or prevention of specific health conditions, details of the young people studied, barriers and facilitators addressed characteristics of interventions studies);*
- *the methodological characteristics of the studies (e.g. study design, research question addressed, methods); and*
- *gaps in the literature where further research is required.*

These results were used to help identify a sub-set of studies to review in-depth.

Because it gives an overview of relevant research it will be useful as a resource. A searchable database of the studies identified for this review is available on-line at <http://eppi.ioe.ac.uk2>. The chapter will be of interest to:

- ***researchers or commissioners** of research wishing to set an agenda for future inquiry, or considering conducting a similar mapping exercise;*
- ***practitioners, policy specialists and young people and their families and friends** who are interested in the types of research conducted, but not concerned with specific details, and who may find it useful to read the summary and discussion at the end of the chapter; and*
- *those **who want to follow up references to specific types of studies not included in the in-depth review** (e.g. cohort studies of young people in the UK).*

Key Messages

There has been a considerable amount of research activity in this area and a wide range of study types have been used to examine barriers to, and facilitators of, healthy eating amongst young people.

- *Over a third of the studies addressed a broad approach to healthy eating, but most emphasised preventive care for specific health conditions.*
- *Almost half of the studies of specific preventive approaches focused on cardiovascular health. Fewer studies focused on dental health, diabetes, eating disorders, cancer, pregnancy and weight control.*
- *Little more than one in five studies found focused on socially excluded groups or those at risk of social exclusion (e.g. homeless, young parents).*
- *Most studies focused on individual level psychological factors related to healthy eating, fewer on factors at the level of the family and community or wider society.*

- *Most intervention studies were carried out in the USA. Only 7% were from the UK. Most were outcome evaluations with or without integral process evaluations. Four out of five were controlled trials with random or non-random allocation.*
- *Only 12% of the non-intervention studies focused primarily on young people for their own views.*
- *We identified 7 potentially systematic reviews of the effectiveness of interventions to promote healthy eating among young people. All made policy and practice recommendations, although the methods used to conduct them were of variable quality.*

3.1 Identification of relevant studies

Our search strategies for physical activity and healthy eating combined yielded 7048 citations in total. Of these 614 were deemed to meet the mapping criteria described earlier on the basis of information presented in the abstract or title. Most of the 7048 citations were excluded at this stage because they described ‘non-intervention’ studies conducted outside the UK, were not concerned with promoting physical activity or healthy eating, or described non-systematic reviews. Full reports were obtained and processed for 482 (79%) of the 614 citations within the time scale for this review. Once full reports had been obtained, a further 296 were found not to meet the inclusion criteria, leaving a total of 186 available for inclusion in the mapping. Of these 186, 135 focused on healthy eating.

Of the 132 reports we were unable to collect or process in the time available, some (N=29) could not be found (e.g. the wrong reference details had been cited on bibliographic databases, the British Library informed us that they were not available, letters written to contacts were not answered). Of the remaining reports not collected or processed (N=103), 29 were not processed in time for our cut-off date for including articles, and the remaining 74 had not arrived by this date, despite having been on order for over three months. Around a third of these were unpublished Masters or PhD dissertations (N=26, 35%).

Table 1: Literature flow

Total citations	7048
Met inclusion criteria on basis of abstract <i>(healthy eating or physical activity main focus; about the promotion of healthy eating or physical activity; young people 11 to 16; ‘potential’ systematic review of effectiveness, or outcome evaluation or UK non-intervention study)</i>	614
Could not be located/not available in time	132
Full reports available	482
Did not meet inclusion criteria	296
Available for inclusion in the mapping	186
Focused on healthy eating	135

The processes involved in this initial screening are shown in table one above.

Table two shows the productiveness of the different search strategies.

Table 2: Number and per cent of physical activity and healthy eating studies found within different bibliographic sources (N=186)

Bibliographic Source	N	%
'Commercial' bibliographic databases	104	56
Specialised bibliographic registers	39	21
Personal contact	2	1
Reference lists	41	22

Over half of the reports were found on commercially available bibliographic databases (56%). The most productive of these were MEDLINE, CINHALL and PSYCHINFO which found 19% (N=35), 17% (N=32), and 18% (N=34) of all reports respectively. An additional 21% of reports were found uniquely by searching on specialised registers. The most productive of these was BiblioMap which found 18% (N=34) of all reports. Searching for reports in the reference lists of reports as these came in was also productive, resulting in 41 additional reports (22% of reports overall). The remaining two reports were identified through personal contact with other researchers and organisations.

3.2 Classification of studies

Study type

As outlined in the methods chapter, we only included in the mapping exercise reports of those study types which would be relevant to our review questions: intervention studies (outcome evaluations with or without process evaluations), 'non-intervention' studies (cohort studies; case control studies; cross-sectional surveys) and systematic reviews. The 135 reports of healthy eating described a total of 116 studies (a number of the studies were described in more than one report). Table three shows the overall distribution of the 116 studies according to study type.

Table 3: Distribution of healthy eating studies according to study type (N=116).

	N	%
Intervention studies	75	65
Outcome evaluations	75	65
<i>Outcome evaluations only</i>	64	55
<i>Integral outcome and process evaluations</i>	11	10
'Non-intervention' research	32	27
Cohort study	4	3
Survey	28	24

Potentially systematic reviews	9	8
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Nearly two thirds of all the studies were those evaluating interventions (65%). All were outcome evaluations, contained either in reports that evaluated outcomes only (55%) or outcome alongside process (10%). Just under a third (27%) of the studies were classified as ‘non-intervention’ research. Most of these were cross-sectional surveys (24%)³ with a smaller proportion of cohort studies (3%). Potentially systematic reviews made up the remainder of the studies identified (8%). Most of these focused on the effectiveness of interventions (e.g. a review of elementary and secondary school-based cardiovascular disease prevention trials conducted by Resnicow and Robinson, 1997); or offered another type of overview (e.g. a review by Smolak *et al.*, 2000, which examined the relationship between participation in sports and eating problems in young women using meta-analysis). The relative proportions of ‘intervention’ and ‘non-intervention’ studies identified reflects the inclusion criteria employed in this review (non-intervention studies carried out in the UK only were of interest) rather than an accurate picture of the relative proportion of intervention and non-intervention research which exists on healthy eating and young people.

The context of healthy eating

Studies were coded according to the context within which authors placed healthy eating (table 4).

Table 4: Number and proportion of studies (N=116) according to health context/s

	N	%
Healthy eating context only	43	37
One or more context* other than healthy eating in general	73	63

* e.g. cancer prevention, dental health, diabetes, eating disorders, cardiovascular health, pregnancy, smoking cessation, weight loss

Just over a third of the studies (37%) presented their rationale as being the promotion of healthy eating without further focus on its relevance to another specific aspect of health. The authors of the remaining 73 studies most frequently described their rationale in terms of the importance of healthy eating to cardiovascular health (N=34, 47%, not shown in table). Examples include an evaluation by Alexandrov *et al.* (1988) of an intervention to prevent atherosclerosis among 11-year-old schoolchildren in Moscow and a survey by Creswell *et al.* (1983) of the dietary patterns of young women in Glasgow.

The promotion of healthy eating was also studied as a means towards preventing cancer (e.g. an intervention to increase fruit and vegetable consumption amongst young people in the USA evaluated by Nicklas *et al.*, 1998); promoting dental health (e.g. the survey of Freeman and Sheiham, 1997 examining the decision-making processes around sugar consumption); prevention of diabetes (the intervention evaluated by Scrimgeour *et al.*, 1994 which aimed to alter food purchases amongst Australian Aboriginal

³ Note that all of the studies which examined young people’s views were classed as ‘surveys’ (see chapter 6).

community); prevention of eating disorders (e.g. the survey of Furnham and Patel, 1994 which compared the eating attitudes of Asian and White young women); good nutrition in pregnancy (Perkin, 1983); smoking prevention (e.g. the evaluation of an intervention in the UK by Murray *et al.*, 1984 which aimed to change the dietary patterns and prevent smoking amongst young people in the London borough of Lambeth); preventing obesity or promoting weight-loss (e.g. the intervention to prevent obesity amongst African-American mothers and daughters by Fitzgibbon *et al.*, 1995); and the prevention of osteoporosis in young women (Edwards' 1998 survey of young women's diet and exercise habits which could cause problems with bone mass).

Young people studied

Table five shows the findings of the mapping exercise in terms of the age range of populations included in different studies. A third of studies (33%) focused on the exact age range of young people of interest to this review (11 to 16). A larger proportion (51%) covered a broader age range, for example looking at ages spanning from 11 to 18 or 5 to 16 years.

Table 5: Number and proportion of studies (N=116) according to age range

	N	%
Under 16 only	38	33
Over 16 only	8	7
Broader age range	59	51
Not specified	11	9

Table 6 shows the population groups involved in the 116 studies. The majority of studies (78%) involved young people who were not identified by the study authors as being from a group that could be defined as socially excluded or in other ways 'at risk'. Only 25 studies involved participants who were identified as from these groups. These included those from ethnic minorities and/or low-income groups; those who were pregnant; or those who were considered to be from another 'at-risk' group (e.g. with elevated blood pressure or high cholesterol levels).

Table 6: Number and proportion of studies according to target population group (N=116)

	N	%
Socially excluded or other 'at risk' group	25	22
Young people in general	91	78

Examples of studies focused on young people considered to be 'at-risk' included an evaluation of a brief motivational interview involving whole families to change the dietary habits of children and young people with elevated cholesterol (Berg-Smith *et al.*, 1999); and an educational intervention to prevent eating disorders in young people who displayed disturbed eating habits in Switzerland (Buddeberg-Fischer *et al.*, 1998).

Examples of studies focused specifically on young people on a low-income/from a low income family included an intervention for high school girls in the USA using computers and the internet (Winett *et al.*, 1999) which focused primarily on healthier eating but had an increase in the frequency and duration of exercise as an additional goal, and Nader *et al.*'s evaluation of the 'San Diego Family Health Project', described in three reports: Madsen *et al.* (1993), Nader *et al.* (1986), Nader *et al.* (1989) (hereafter referenced as Nader *et al.*, 1989), which involved low to middle-income Mexican-American and non-Hispanic white families in a year-long educational intervention designed to promote both healthier eating and exercise.

For most of those interventions that were evaluated in populations including minority ethnic groups (N=12), it was not clear that a culturally sensitive approach had been used. Examples in which such an approach was explicit, include a nutrition and smoking prevention curriculum developed in partnership with Native American communities (Schinke *et al.*, 1996); and a community-based nutrition education programme for African-American mothers and daughters described as 'culturally sensitive' and delivered by African-American women (Fitzgibbon *et al.*, 1995). Only three UK non-intervention studies focused specifically on ethnicity (Ahmad *et al.*, 1994; Furnham and Patel, 1994; Rogers *et al.*, 1997). Rogers *et al.* (1997) surveyed 12 year olds from 12 ethnic groups in two inner London boroughs, looking at health-related attitudes and behaviours and, in particular, at eating and exercise patterns; and Ahmad *et al.* (1994) examined eating attitudes according to gender and religious affiliation in Asian and 'Caucasian' young people.

Some studies focused on young people who could be considered to be from several different socially excluded groups. For example Alley *et al.* (1995) evaluated the effects of a nutrition curriculum in increasing healthy eating amongst pregnant young women from low-income and ethnic minority groups.

Except for the three UK non-intervention studies, all of the studies focusing on young people with low-incomes or from ethnic minorities were conducted in the USA. This, and their small number (only nine studies in total involve young people either with low-incomes or from ethnic minorities), mean that we have very little research-based information on which to develop healthy eating initiatives for such groups in the UK.

Which barriers and facilitators did the studies focus on?

Table seven shows how authors referred to different types of barriers to, and facilitators of, healthy eating. There were a total of 200 factors mentioned in the 116 studies.

Table 7: Barriers and facilitators (N=200) examined in the studies (N=116)

	N	%
Individual	69	35
'Life event' factors	0	0
Physical factors	4	2
Psychological factors	65	33
Community	47	24
Family factors	35	18
Interpersonal factors	12	6
Society	59	29
Socio-cultural factors	28	14
Structural factors	31	15
Unfocused/unspecified factors	25	12

The largest group of factors addressed were those at the individual level (35%), in particular psychological factors (33%). Such factors included knowledge, attitudes, decision-making and problem-solving skills and particular psychological 'traits', 'personality characteristics' or 'ways of responding' such as self-esteem and self-concept. In terms of the focus of individual studies, just under a quarter of the 116 studies identified in the mapping (N=28, 24%) focused solely on individual level factors. For the 75 intervention studies, the proportion focusing solely on these factors was just under a quarter (N=18, 24%) (figure not shown in table).

Interventions classified as focusing solely on these factors tended to be based on classroom teaching sessions, delivered by teachers or health promotion practitioners with young people provided with information about the nutritional value and health effects of different sort of foods. In some studies, these kinds of interventions were supplemented with 'hands on' cooking sessions. For example, high school students taking part in a USA-based intervention evaluated by Gans *et al.* (1990) took part in a cooking competition in which their recipes were analysed for fat and sodium content. Another intervention evaluated in the USA by Fardy *et al.* (1995; 1996; 1997) treated healthy eating as one component of healthy behaviour and provided a 10-week health promotion curriculum of classroom education modules in healthy eating, nutrition, smoking cessation, stress management and personal problem solving alongside an exercise programme of walking and running.

Few studies addressed factors at the community level such as family characteristics (18%) or interpersonal relationships (6%). Examples included evaluations of interventions involving parents in the promotion of healthy eating, both through joint attendance at health education sessions or through interventions specifically targeting parents with research evaluating the effects on their children, such as the studies by Baranowski *et al.* (1990a) (described in two reports: Baranowski *et al.* (1990a) and Baranowski *et al.* (1990b) and hereafter referenced as Baranowski *et al.* (1990a)); Burke *et al.* (1995); Bush *et al.* (1989a) (described in two reports: Bush *et al.* (1989a) and Bush *et al.*

(1989b) and hereafter referenced as Bush *et al.* (1989a)); Coates *et al.* (1985) (described in two reports: Coates *et al.* (1985), and Simons-Morton *et al.* (1984) and hereafter referenced as Coates *et al.* (1985)); Cohen *et al.* (1989); Hopper *et al.* (1992); Nader *et al.* (1989); Petchers *et al.* (1987); Wagner *et al.* (1992). Examples of non-intervention studies examining factors at the community level include Adamson *et al.*'s (1996) survey examining the relative contribution of home and school meals to nutritional intake; and Anderson *et al.*'s (1993) survey in the West of Scotland examining the occurrence of 'proper meals' and 'snacking' amongst young people.

Few studies focused on the role of wider society in healthy eating (socio-cultural, 14%; structural, 15%). Those classified as addressing socio-cultural factors included several of the interventions detailed above that involved ethnic minority groups. Others were based upon expectations about shared cultural meanings between peers and used older or same-age young people to deliver educational programmes to other young people (e.g. Cohen *et al.*, 1989). The 'Minnesota Heart Health Programme' (described in seven reports: Kelder *et al.* (1993); Kelder *et al.* (1994); Kelder *et al.* (1995); Luepker *et al.* (1994); Perry *et al.* (1985); Perry *et al.* (1988); Perry *et al.* (1994); and hereafter referenced as Kelder *et al.* (1993)) established citizens' panels to help develop health promotion materials appropriate for the community.

Examples of interventions addressing the influence of structural factors include studies which made changes to the kinds of food offered in schools in canteens or tuckshops (e.g. Ellison *et al.*, 1989; Vartiainen *et al.*, 1982, (described in five reports: Vartiainen *et al.* (1981), Vartiainen *et al.* (1982), Vartiainen *et al.* (1983), Vartiainen *et al.* (1986a), Vartiainen *et al.* (1998) and hereafter referenced as Vartiainen *et al.* (1982)); Young, 1993). The 'Minnesota Heart Health Programme' (Kelder *et al.*, 1993) increased the provision of screening for cardiovascular risk factors in the community and worked with restaurants and grocery stores on improving food labelling to encourage "heart-healthy eating". Perry *et al.*'s evaluation of a pilot of one component of this programme (described in two reports: Perry *et al.* (1987) and Klepp *et al.* (1986) and hereafter referenced as Perry *et al.* (1987)) describes how young people in secondary schools developed suggestions for heart-healthy school policies and presented these to school management and teaching staff. Examples of non-intervention studies examining structural or socio-cultural factors include an examination of dietary habits in Scotland according to socio-demographics by Sweeting *et al.* (1994) and a survey of Local Education Authorities (LEA) in Wales to examine their arrangements for promoting healthy eating in schools (Whelan, 1995).

In the study of a UK-based intervention that aimed to modify structural barriers and facilitators of healthy eating (described in two reports: Moon *et al.* (1999a), Moon *et al.* (1999b) and hereafter referenced as Moon *et al.* (1999a)), "Healthy School" awards were offered by local education authorities to schools which were considered to have improved their whole school approach to personal and community health promotion, with the promotion of healthy eating being one component of this.

3.3 Characteristics of intervention studies

This section discusses the substantive and methodological characteristics specific to the 75 intervention studies which were among the 116 healthy eating studies found as part of the mapping as a whole (see table 3).

Country in which studies were conducted

Table 8 shows the number and proportion of the 75 studies classified as intervention studies according to the country in which the intervention was implemented.

Table 8: Number and proportion of intervention studies according to country (N=75).

	N	%
USA	49	65
UK	5	7
Australia	4	5
Canada	3	4
Rest of Europe*	12	16
Rest of World**	3	4

NB: Number and percent of studies do not add up to 75 or 100% as one study evaluated an intervention in the USA and UK (Killen, 1996).

* Denmark, Finland, Greece, Italy, Norway, Russia, Sweden, Switzerland,

** Brazil, Israel, Pakistan

Most of the intervention studies were carried out in the USA (65%). Five (7%) were from the UK (Edwards, 1998; Killen, 1996; Moon *et al.*, 1999a; Murray *et al.*, 1984; Young, 1993). Australia and non UK Europe accounted for 5% and 16% of the studies respectively and other individual countries around the world, 4%. These figures may reflect bias within the bibliographic sources searched towards studies published within the USA and the UK. There is also clearly likely to be a bias as a result of our inclusion criteria restricting studies to those written in the English language only.

Intervention site

Table 9 shows the settings in which interventions were implemented. As they could be in more than one setting the intervention studies covered a total of 93 different sites.

Educational settings (71%), in particular secondary education (N=57, 61% - not shown in table), were the most frequent sites for interventions. This means that most healthy eating promotion interventions were classroom-based, although some used a whole-school approach, for example, by implementing school policies to promote nutrition (e.g. Moon *et al.*, 1999a; Young, 1993).

Table 9: Intervention sites (N=93) described in the intervention studies (N=75)

	N	%
Community	10	11
Educational setting	66	71
Health care setting	7	7
Home	9	10
Unspecified site	1	1

A minority of interventions were delivered in community sites (11%), in a health care setting (7%), or the home (10%). Those in community sites included an eating disorders prevention programme implemented on a Kibbutz in Israel (Latzer and Shatz, 1999); a computer-delivered intervention situated in a supermarket (Wagner *et al.* (1992); and an education programme delivered in a local housing project (Fitzgibbon *et al.*, 1995). Interventions implemented in health-care settings included dietary counselling by health professionals (Badruddin *et al.*, 1993; Larsson *et al.*, 1997). Those which were implemented in the home aimed to involve family members in educating young people about healthy eating through homework assignments or through educating parents about healthy eating/encouraging them to buy and use healthy foods (Hopper *et al.*, 1992; Vandongen *et al.*, 1995).

Intervention provider

Table 10 shows the range of intervention providers involved in delivering healthy eating promotion. As each intervention could involve more than one provider the intervention studies covered a total of 104 different types of provider.

Table 10: Intervention providers (N=104) described in the intervention studies (N=75)

	N	%
Computer	5	5
Health professional	17	16
Health promotion practitioner	7	7
Peer	9	9
Researcher	6	6
Teacher	40	38
Other	8	8
Unspecified	12	11

The biggest single category of providers was teachers (38%), reflecting the fact that most interventions were implemented in school settings. A substantial number of interventions were delivered by professional groups traditionally associated with providing health services (health professionals made up 16% of all providers, and health promotion practitioners 7%). Young people

themselves made up 9% of those delivering interventions (e.g. as peer educators). Computers provided the intervention in five studies. The category 'other' was made up of community workers, 'lay' therapists, parents, psychologists and the community in general.

Intervention type

Table 11 shows the range of different types of intervention evaluated in the studies.

Table 11: Intervention types (N=152) described in the intervention studies (N=75)

	N	%
Advice/counselling	6	4
Bio-feedback/screening	10	7
Education	69	45
Environmental modification	15	10
Parent training	8	5
Physical activity	14	9
Resource/service access	5	3
Skill development	19	13
Other	6	4

The biggest single category of intervention type was education in the form of the provision of information about healthy eating (45%). Interventions often involved skill development (13%) alongside education, for example, learning to read food labels (e.g. Fitzgibbon *et al.* (1995) and learning by teaching (e.g. Holund (1990a) described in two reports: Holund (1990a), and Holund (1990b) and hereafter referenced as Holund (1990a)). Environmental modification, making up 10% of all intervention types, usually involved lowering the fat and salt content of food in school canteens or providing increased access to fruit and vegetables (Ellison *et al.*, 1989; Gordon *et al.*, 1995; Nicklas *et al.*, 1998 (described in three reports: Nicklas *et al.* (1997), Nicklas *et al.* (1998), Nicklas and O'Neil (2000) and hereafter referenced as Nicklas *et al.* (1998)); Young, 1993). Interventions classified as physical activity (9%) were usually part of programmes which aimed to reduce risk factors for cardiovascular disease (e.g. Leslie *et al.*, 1999). Bio-feedback and screening involved young people receiving the results of blood pressure or cholesterol tests (7%). Feedback was often done through advice or counselling (4%). Examples of interventions involving parent training have been described above when describing the ways in which interventions targeted family factors. Interventions providing increased access to services or resources included those which involved referring young people to specialist health services (e.g. Fardy *et al.*, 1997).

Other intervention types included three studies which employed professional training, for example of teachers, food service personnel (Anliker *et al.*, 1993; Latzer and Shatz, 1999; Petchers *et al.*, 1987); two studies involving incentives (Baronowski *et al.*, 1990a; Schinke *et al.*, 1996); and one study involving treatment for high blood pressure (Frank *et al.*, 1982).

3.4 Methodological attributes of intervention studies

Outcome evaluations

All of the 75 interventions studies evaluated the effect of interventions on healthy eating (outcome evaluations). Table 12 shows the design of the outcome evaluations. Just over four-fifths employed a control group (81%); and around half of these (41%) were randomised controlled trials (RCTs).

Table 12: Number and proportion of outcome evaluations according to design (N=75)

	N	%
Controlled trial	61	81
Randomised controlled trial	31	41
Non-randomised controlled trial	30	40
One group pre and post test	14	19

Using the classification described earlier (equivalent intervention and control groups, pre- and post-test data reported), almost three quarters of the outcome evaluations were judged to be 'potentially sound' (N=53, 71%) and just over one quarter as 'not sound' (N=22, 29%).

Only five (7%) of the 75 outcome evaluations were carried out in the UK (Edwards, 1998; Killen, 1996; Moon *et al.*, 1999a; Murray *et al.*, 1984; Young, 1993). Three of these were classified as 'potentially sound' (Killen, 1996; Moon *et al.*, 1999a; Murray *et al.*, 1984).

Process evaluations

We identified a total of 11 outcome evaluations which had also evaluated the processes associated with developing and implementing the intervention (termed 'integral process evaluations') (see table 3).

The process evaluations were classified according to which processes they evaluated. Eight examined the processes involved in the implementation of the intervention (Baranowski *et al.*, 1990a; Latzer and Shatz, 1999; Lewis *et al.*, 1988; Moon *et al.*, 1999a; Murray *et al.*, 1984; Perry *et al.*, 1987; Schinke *et al.*, 1996; Wallin *et al.*, 1993). Perry *et al.* (1987) looked at this issue in some detail, asking students whether they liked having university staff and peer leaders delivering training on healthy eating, if they thought the right people had been selected to be peer leaders and if they thought the peer leaders' training had been adequate.

Seven examined the acceptability of an intervention to young people (Baranowski *et al.*, 1990a; Berg-Smith *et al.*, 1999; Ellison *et al.*, 1989; Latzer and Shatz, 1999; Moriarity *et al.*, 1990; Perry *et al.*, 1987; Wallin *et al.*, 1993). Perry *et al.*, (1987), for example, looked at participants' views of a teacher- and peer-delivered high school curriculum designed to promote healthy eating and physical activity.

Tables 13 and 14 show some of the methodological attributes of the process evaluations. The majority used cross-sectional designs. More studies collected quantitative data but more than half collected at least some qualitative data.

Table 13: Number and proportion of process evaluations according to methodological attributes (N=11)

	N	%
Study design		
Cross sectional	9	82
Longitudinal	2	18
Total	11	100
Type of data collected		
Qualitative	3	27
Quantitative	5	46
Qualitative and quantitative	3	27
Total	11	100

Table 14 shows that the quality of the reporting in the process evaluations varied enormously. Whilst the majority of studies reported number of participants and the age and gender of young people in their sample, only five and four studies respectively described the sample's ethnicity or socio-economic background. Only one of the process evaluations provided a response rate or any details on those young people who chose not to take part in the study (Baronowski *et al.*, 1990a). This lack of information is a problem when it comes to judging the reliability of study findings.

Table 14: Number and proportion of process evaluations reporting sample characteristics (N=11)

	N	%
Sample number	8	73
Age	9	82
Gender	9	82
Ethnic group	5	45
Socio-economic background	4	36
Response rate	1	1
Non-responders' details	1	1

3.5 Methodological attributes of non-intervention studies

This section looks at the 32 studies classified as UK-based non-intervention studies (see table 3). These included four cohort studies, and 28 cross-sectional surveys. As with the process evaluations described in the previous section, there were general problems with poor reporting of participant details.

Table 15 shows the research question and method of data collection featured in the non-intervention studies. The most frequent research questions in these studies (59%) were explanatory questions about how or to what extent specified factors might relate to healthy eating. Just under a third of the non-intervention studies asked research questions concerning the associations between healthy eating and other factors (31%). These sets of studies, arguably, produce findings that are of most use at the earlier stages of planning interventions to promote healthy eating. Many of the explanatory studies used regression analysis to examine interrelationships among several potential factors, aiming to provide a more complete picture of what aspects of young people's lives might be the most important with regard to their levels of healthy eating. Just over a third asked young people for their own views about what helped or stopped them eating healthily.

Table 15: Number and proportion of non-intervention studies (N=32) according to their research question and approach to collecting data

	N	%
Research question*		
Association	10	31
Explanatory	19	59
Young people's views	12	38
Data collection		
Qualitative	3	9
Quantitative	27	85
Qualitative and quantitative	2	6

*Numbers add up to more than 32 (100%) because studies could address more than one research question.

Most of the data collection in the intervention studies was quantitative (85%), using, in the main, self-completion questionnaires. In 27 studies this was the only form of data collection. In five cases, at least some parts of the data were collected with qualitative methods, usually through semi-structured or in-depth interviews (Freeman and Sheiham, 1997; Harris, 1994 (described in two reports: Harris (1993) and Harris (1994), hereafter referred to as Harris (1994); McDougall, 1998; Ross, 1995; Watt and Sheiham, 1997). Two studies collected both forms of data (McDougall, 1998; Watt and Sheiham, 1997).

Table 16 gives similar methodological information for the non-intervention research as for the process evaluations earlier. It shows considerable variability in the reporting of sample number and demographic characteristics. All studies reported the number of young people in their sample, and a large proportion reported on their samples' age and sex (91% and 94% respectively). However, only a minority of non-intervention studies reported on ethnicity (19%) and just less than half reported on socio-economic background (44%).

Table 16: Number and proportion of non-intervention studies reporting sample characteristics (N=32).

	N	%
Sample number	32	100
Age	29	91
Gender	30	94
Ethnic group	6	19
Socio-economic background	14	44

Table 17 gives information about response and drop out rates. Again, this table illustrates the variability in the quality of reporting of basic information.

Table 17: The reporting of information about response and drop out in the non-intervention studies (N=32).

	N	%
Response rate		
Reported	23	72
Not reported or unclear	9	28
Details of non responders		
Reported	4	12
Not reported or unclear	28	88
Drop out rate		
Reported	4	12
Not reported or unclear	0	0
Inapplicable	28	88
Details of drop outs		
Reported	1	3
Not reported or unclear	3	9
Inapplicable	28	88

Just under three quarters of the studies (72%) reported a response rate for their sample, but only four (12%) provided any details on those young people who chose not to take part in the study. While the reporting of response rate in these non-intervention studies compares favourably with the near zero level seen in the process evaluations described earlier (see table 14), the lack of reporting on who chose not to take part makes it extremely difficult to assess whether the results or conclusions of these studies are representative of the group of young people from whom the samples were drawn.

Dropout rates were reported in all of the four studies where this methodological aspect was relevant (i.e. longitudinal studies). All but one of these studies, however, failed to give any detail about those known to have dropped out. This makes it difficult to assess the extent of any bias due to differences between those dropping out and those who participated in data collection.

3.6 Characteristics and methodological attributes of (potential) systematic reviews

A total of nine potential systematic reviews were identified. These were classified as either reviews of effectiveness (N=7) or reviews of non-intervention research which were not concerned with effectiveness (N=2). There was a great deal of variation in the methods and reporting of these reviews.

Reviews of effectiveness

Of the seven reviews of effectiveness, five covered interventions to promote healthy eating alone (Contento *et al.*, 1995; Contento *et al.*, 1992; Glenny and O'Meara, 1997; Hursti and Sjoden, 1997; Levy *et al.*, 1980) and two focused, in addition, on physical activity (Hardeman *et al.*, 2000; Resnicow and Robinson, 1997). Two of these reviews focused specifically on healthy eating in the context of weight loss or prevention of obesity (Glenny and O'Meara, 1997; Hardeman *et al.*, 2000); and one was set in the context of preventing cardiovascular disease (Resnicow and Robinson, 1997).

Data analysis was primarily by narrative synthesis (N=6), although in one case meta-analysis was used (Resnicow and Robinson, 1997). None of the reviews focused on the exact same age range as this review (i.e. young people aged 11 to 16 only). Instead, the focus ranged from one review that looked at studies involving ages 8 to 15 only (Resnicow and Robinson, 1997), through to those that looked at all age ranges and so included studies involving children (aged less than 11), young people aged between 11 and 16 as well as young people and adults aged over 18 (Glenny and O'Meara, 1997; Hardeman *et al.*, 2000).

Table 18 presents data on the methodological attributes of the reviews. All of the reviews reported their aims, provided at least some detail of the search strategy employed and presented criteria for including studies.

Only four of the reviews provided details on the methods used to assess the quality of the primary studies (Contento *et al.*, 1995; Glenny and O'Meara, 1997; Hursti and Sjoden, 1997; Levy *et al.*, 1980). However, all of the reviews took steps towards giving potentially higher quality studies more weight in informing the conclusions of the review (e.g. through only including controlled

trials in the review). Only two reviews described using a standardised process for extracting data (Glenny and O'Meara, 1997; Hardeman *et al.*, 2000). All reviews provided recommendations for research and practice.

Table 18: Methodological attributes of the effectiveness reviews (N=7)

	N	%
Aims		
Reported	7	100
Not reported or unclear	0	0
Search strategy		
Reported	7	100
Not reported or unclear	0	0
Inclusion criteria		
Reported	7	100
Not reported or unclear	0	0
Quality assessment		
Reported	4	57
Not reported or unclear	3	43
Standard data extraction		
Reported	2	29
Not reported or unclear	5	71
Future directives		
Reported	7	100
Not reported or unclear	0	0

Reviews of non-intervention research

The two reviews of non-intervention research were of much poorer quality. The first was concerned with the relationship between athletic participation and eating problems amongst female athletes (Smolak *et al.*, 2000). The aims of the review were stated, but details of the search strategy were not clear, it was not stated whether inclusion criteria were employed, whether a quality assessment procedure was used, or whether data from the studies were extracted using a standardised method. Recommendations for policy and practice or future research were judged to be unclear.

The second review aimed to examine trends in nutrition amongst young people, such as prevalence and types of nutritional problems (Schneider, 2000). However, much of the information presented regarding the methods used to conduct the review was unclear or not stated. The aims, search strategy and inclusion criteria used in the review were all judged to be unclear, and it was not stated whether studies had been quality assessed or subjected

to standardised data extraction. Again, recommendations for policy and practice or future research were judged to be unclear.

3.7 Summary

There has been a considerable amount of research activity in the area of healthy eating and young people. Searches for both healthy eating and physical activity health promotion studies produced 7048 citations of which 614 were deemed potentially to meet the inclusion criteria on the basis of title or abstract. A total of 116 studies were found to focus on healthy eating and were available within the relevant time frame for the review.

Questions about potential barriers to, and facilitators of, healthy eating have been addressed in a wide range of study types. These include 75 evaluations of interventions, 32 reports of 'non-intervention' research, and nine potentially systematic reviews.

Only 22% (N=25) of the 116 studies identified in the mapping exercise address issues of social exclusion, with all but three of the studies focusing on participants from ethnic minorities or with low incomes (in the UK), and with the most common intervention site the school (71%), potentially missing a large proportion of socially excluded young people.

The most frequently addressed barriers to or facilitators for healthy eating in the studies were individual factors (e.g. psychological factors). Just under a quarter of the 75 intervention studies identified evaluated interventions that addressed barriers to, and facilitators of, healthy eating solely at this individual level.

The reporting of study methods was highly variable for the non-intervention studies, with details of sample numbers, age and sex each provided in over 90% of cases, but ethnic group reported in under a quarter of studies (19%) and socio-economic background in less than a half (44%). Over 80% of the 75 outcome evaluations had a controlled trial design. Just over half of these were randomised controlled trials. Using the criteria for methodological soundness (reporting of equivalent intervention and control groups and both pre- and post-test data), just under three quarters were judged to be "potentially sound".

Of the nine potentially systematic reviews, seven examined outcome evaluations (effectiveness reviews) and two examined non-intervention research. There was a great deal of variation in the methods and reporting of these reviews. Only four of the reviews of effectiveness detailed the methods used to assess the quality of studies examined and only two described using a standard method for extracting data.

The mapping exercise presented a number of challenges.

The size of the literature

Because our search strategies aimed to be sensitive, that is to identify as much as possible of both intervention and non-intervention research in the area of healthy eating and young people, a large number of citations were identified. A great deal of time was spent screening the 7048 abstracts or titles identified through searches. Despite quite restrictive exclusion criteria, we were left with a large number of abstracts for which the full text was required before a decision

regarding its inclusion/exclusion could be made (N=614). This necessitated extensive visits to libraries and requests for inter-library loans.

The wide range of study methodologies covered within one exercise

Unlike many systematic reviews, the mapping exercise described in this report included many different research designs and styles of reporting 'evidence'. A wide range of expertise had to be called on to develop the keywording strategy for this mapping and to apply it to the literature found. Little previous work exists to guide the development of methodological assessment of non-intervention studies in particular, and a framework had to be developed quickly which was able to distinguish in a valid and useful way between different study types and pertinent methodological attributes. Different study types required different sets of keywords, which increased the complexity of the process. The work described in this chapter of the report has thus been extremely valuable on a methodological as well as a substantive level, in that it has taken forward the challenge of classifying and assessing a wide range of research evidence.

The next chapter of the report details the methods used to produce the rest of this report and the following two chapters (chapters 5 and 6) describe the findings of the two sub-sets of studies which went on to be reviewed in-depth. How we got from this mapping exercise to the in-depth review is described in the first section of chapter four.

4. IN-DEPTH REVIEW: METHODS

Outline of Chapter

This chapter describes the methods used in the in-depth review and the process used to select studies. It explains how the results of the mapping exercise were considered, together with suggestions made by the project's funding body and steering group to:

- ***prioritise the focus** of the in-depth review (community and society factors); and*
- ***select the most appropriate study types** to include (high quality outcome evaluations, systematic reviews, studies examining young people's views).*

The inclusion criteria, data extraction and quality assessment methods specific to each study type are then described in turn.

The chapter will be of interest to:

- ***any readers** who want to evaluate in detail how this stage of the review was conducted in order to assess the reliability and validity of the reviews findings;*
- ***researchers or others** interested in how the results of a mapping and quality screening exercise can be applied within a systematic review, and of different study types which can be included in a systematic review; and*
- ***policy specialists, practitioners and young people and their families and friends** who may find section 4.1 of most interest since this describes how different sources/stakeholders had an input into defining the most appropriate and relevant literature to review in-depth.*

4.1 From mapping the literature to in-depth review

The mapping exercise identified many studies relevant to the task of identifying barriers to, and facilitators of, healthy eating. This provided a basis for deciding on the most appropriate types of interventions to review and other types of study to include in the in-depth review. We took advice on how to focus the in-depth review from the EPPI-Centre's Steering Group and from the project's funders.

Because the review question was concerned with identifying barriers to, and facilitators of, healthy eating a range of research designs are relevant. We hypothesised that barriers and facilitators could be identified in the following ways:

- (i) by examining the barriers and facilitators targeted by interventions shown to be effective in promoting young people's healthy eating

- behaviour (i.e. which barriers did they aim to reduce/remove? which facilitators did they build upon/show synergy with?);
- (ii) by examining the barriers and facilitators of interventions shown to be harmful (i.e. those which lead to a decrease in healthy eating behaviour); and
 - (iii) by examining research which did not aim to evaluate specific interventions, but aimed to describe which factors influence young people's healthy eating behaviour in a positive or negative way

We decided to focus on interventions that aimed to address community and society barriers and facilitators (i.e. those that make a change at the community or society level, as opposed to solely aiming to influence individual young people so that they modify their own health behaviour). Such interventions ranged from the provision of additional physical or material support (e.g. free fruit) to organisational changes such as modifications to school meals and broader attempts to change the ethos of schools or other institutions. They could include both the development of education/ support for parents and others in the community to promote community-wide healthy eating, and policy and legislation changes at local or national levels. This community or society level focus is currently considered a priority for the development of policy.

For these intervention studies, further decisions about inclusion were made regarding the quality of outcome evaluations and the type of outcomes assessed. We have included only those outcome evaluations which were judged potentially sound, that is, they included a control group, reported pre- and post-intervention data and, if not randomised, demonstrated equivalence between groups before intervention; and only those evaluations that measured the effects of interventions on behavioural outcomes or health status, as opposed to attitudes, knowledge, awareness, beliefs or intentions as regards healthy eating.

In addition to intervention studies, we also included a wide range of other studies that did not aim to evaluate specific interventions, but aimed to describe which factors influence young people's healthy eating in a positive or negative way. These, however, had to have sought *young people's own descriptions of what helps them and what stops them eating healthily* rather than inferring their experiences primarily through *researcher description and characterisation of young people*. In other words we focused on those studies which report young people's views⁴.

Nine potentially systematic reviews were identified in the mapping exercise. It was decided not to review these in-depth as the use of systematic reviews had been problematic during the first review conducted as part of this series (Harden *et al.*, 2001). Problems included a lack of clarity from review authors as to whether or how they had applied quality criteria when assessing individual studies, as well as considerable variations in the quality of reporting of details about individual studies and even review findings.

⁴ For a fuller explanation of this decision please see chapter 1 under 'Approach taken in this review'.

In summary, the in-depth review thus considered:

- a) evaluations that measure the effect on health behaviour or health status outcomes of interventions aiming to make changes at the community or society level.
- b) non-intervention research focused on young people's views.

All the studies included in the in-depth review were about young people aged 11 to 16 years, focusing on the promotion of healthy eating and which were published in English. Non-intervention studies were restricted to UK studies published in or after 1990.

The remainder of this section describes the process of inclusion and exclusion of studies, data extraction and quality assessment for each study type in turn.

4.2 Outcome and process evaluations

The first type of research to be considered for in-depth review was evidence from outcome and/or process evaluations of interventions to improve young people's nutrition.

Inclusion and exclusion criteria

Outcome evaluations and (where appropriate) the process evaluations linked to them were first assessed to determine if they were potentially aiming to make a change at the community or society level. To do this we identified all the outcome evaluations classified as either: i) making reference to interpersonal, family, socio-cultural and structural barriers to, or facilitators of, healthy eating; or ii) evaluating interventions including one or more of the following types of component (environmental modification, incentives, parent training, resource access, screening, service access, social support, legislation, regulation).

This sub-set of outcome evaluations was then screened independently by two reviewers using the following in-depth review inclusion criteria:

- 1 Study has as its main focus the promotion of healthy eating;
- 2 Study has as its main focus young people (aged 11 to 16 years);
- 3 Study uses a comparison or control group; reporting of pre-test and post-test data, and if a non-randomised trial, equivalent baseline measures;
- 4 Study is of an intervention that aims to make a change at the community or society level;
- 5 Study measures behavioural and/or physical health status outcomes.

All outcome evaluations meeting these criteria went on to the data extraction and quality assessment phase of the review. The process evaluations which were 'attached' to these outcome evaluations also went on to the data extraction phase of the review. These did not, however, undergo any quality assessment.

Data extraction and quality assessment

A standardised data extraction framework was used, the EPPI-Centre's 'Review Guidelines' (Peersman *et al.*, 1997). These guidelines enabled reviewers to

extract data on the development and content of the intervention evaluated, the design and results of the outcome evaluation, details of any integral process evaluation, and data on the methodological quality of the outcome evaluation. Data were entered onto a specialised computer database (EPIC).

These procedures and the criteria used for assessing methodological quality are the same as those described in previous EPPI-Centre reviews (e.g. Oakley *et al.*, 1996; Peersman *et al.*, 1996; Peersman *et al.*, 1998), including our two early reports on the methodology of sexual health interventions (Oakley and Fullerton, 1995, Oakley *et al.*, 1995a) (see these reviews for details). Eight methodological qualities were looked for:

1. Clear definition of the aims of the intervention.
2. A description of the study design and content of the intervention sufficiently detailed to allow replication.
3. Use of random allocation to the different groups including to the control or comparison group(s).
4. Provision of data on numbers of participants recruited to each condition.
5. Provision of pre-intervention data for all individuals in each group*.

*(An exception was made for those studies using the Solomon four-group design (Campbell and Stanley, 1966). In this design, intervention and control/comparison groups are further randomised to receive pre-intervention assessment or not. This means that pre-intervention data is not available for half the participants in each group.

6. Provision of post-intervention data for each group.
7. Attrition reported for each group.
8. Findings reported for each outcome measure indicated in the aims of the study.

Following the procedures used in other EPPI-Centre reviews, and building on other work (Loevinsohn 1990; Oakley and Fullerton 1995; MacDonald *et al.*, 1992), 'core' criteria from the above list were selected in order to divide the outcome evaluations into two broad groups: 'sound' and 'not sound'. 'Sound' outcome evaluations were those deemed to meet the four criteria of:

1. Employing a control/comparison group equivalent to the intervention group on socio-demographic and outcome variables.
2. Providing pre-intervention data for all individuals/groups as recruited into the evaluation.
3. Providing post-intervention data for all individuals/groups.
4. Reporting on all outcomes.

'Sound' outcome evaluations were considered to show sufficient methodological qualities to be able to generate potentially reliable results about the effectiveness of health promotion interventions.

4.3 Non-intervention studies examining young people's views

The second type of research to be considered for in-depth review were those studies that did not evaluate an intervention but which aimed to elicit young people's own views about healthy eating. Knowledge of young people's views is essential for the development of relevant, acceptable and potentially effective policies and practices aiming to promote their health, yet is often overlooked in favour of 'expert' views or research findings which have not been derived from gathering the views of young people themselves.

Inclusion and exclusion criteria

In order to be classified as examining young people's views, a study had to:

(i) Examine young people's attitudes, opinions, beliefs, feelings, understanding or experiences about healthy eating (rather than solely examining health status, behaviour or factual knowledge);

(ii) Access views about one or more of the following: young people's definitions of and/or ideas about healthy eating; factors influencing their own or other young people's healthy eating; whether and how young people think healthy eating can be promoted; and

(iii) Privilege young people's views - presenting views directly as data that are valuable and interesting in themselves, rather than as a route to generating variables to be tested in a predictive or causal model (e.g. measuring a range of attitudes or experiences to see whether/how they predict healthy eating levels).

Studies published before 1990 were excluded in order to maximise the relevance of the review findings to current policy issues.

These inclusion and exclusion criteria differed from those for outcome evaluations in that we did not restrict inclusion of studies according to their focus on a particular kind of barrier or facilitator, since it was important to include all studies which started from the point of view of what young people themselves felt to be important to them.

Identification of additional reports

Despite our extensive search strategy (see chapters 2 and 3), we found that we had only identified a handful of studies examining young people's views which met the above criteria. Although this may have reflected the paucity of available studies, we decided to make a special effort to try to locate more studies, in case our search strategies had missed any, especially unpublished studies or those located in the 'grey literature' (i.e. not formally published) which may have been more difficult to track down using conventional means.

We therefore contacted all authors of the studies we had found to ask whether they had conducted other similar potentially relevant studies or, had further reports of the studies we had found, or whether they knew of other relevant studies. We looked at the websites of organisations involved in commissioning, undertaking or cataloguing research on healthy eating or young people (for example, The Trust for the Study of Adolescence). We also

attempted to obtain potentially relevant references cited in already identified reports.

Data extraction and quality assessment

All studies meeting the above inclusion criteria were examined in-depth. A standardised data extraction and quality assessment framework was used. This was adapted from the EPPI-Centre's review guidelines for assessing outcome and process evaluations. It had been piloted in our previous reviews of peer-delivered health promotion for young people (Harden *et al.*, 1999a), and the review of the barriers to, and facilitators of, mental health in young people (Harden *et al.*, 2001). The criteria proposed by four research groups to assess the validity and reliability of 'qualitative' research, presented in Oakley (2000), were 'amalgamated' based on their commonalities (Boulton *et al.*, 1996; Cobb and Hagemaster, 1987; Mays and Pope, 1995; Medical Sociology Group, 1996). The quality criteria proposed by these four groups were found to converge on seven 'themes' which related to the different stages of the research process: theoretical framework and or background to the study; formulation of aims or research questions; context of the research; the sample; methodology; analysis of data; and interpretation of data. For each of these seven themes the most commonly used criteria across the four sets were used.

These criteria have been modified slightly for the current series of reviews. The 'analysis of data by more than one researcher' criterion, which aimed to provide an assessment of the reliability and validity of data analysis, was changed to a more general statement of whether any attempts had been made to establish the reliability/validity of data analysis. This was in recognition of the fact that there are many different ways in which researchers can attempt to establish the reliability and validity of data analysis within qualitative research; and much of it is funded in such a way that data-analysis is the responsibility of one researcher only.

Each study was thus assessed according to the following seven quality criteria:

- (i) Explicit account of theoretical framework and/ or inclusion of a literature review. Did the report provide an explanation of, and justification for, the focus of the study and the methods used? This question was intended to assess whether the research had demonstrated how it was informed by, or linked to, an existing body of knowledge.
- (ii) Clearly stated aims and objectives: Did the report explicitly and clearly state the aims of the study?
- (iii) A clear description of context: Did the report adequately describe the specific circumstances under which the research was developed, carried out and completed?
- (iv) A clear description of sample: Did the report provide adequate details of the sample used in the study including details of sampling and recruitment? This should include presentation of socio-demographic data and data on any other salient factors so that an assessment of who was included and excluded from the research could be made to aid interpretation and judgements about the validity and generalisability of the findings.

- (v) A clear description of methodology, including data collection and data analysis methods: Did the report provide an adequate description of the methods used in the study including its overall research framework, methods used to collect data and methods of data analysis? This question assessed how the methods used shaped the findings of the study, again to aid interpretation and judgements about the validity and generalisability of findings.
- (vi) Evidence of attempts made to establish the reliability and validity of data analysis: Researchers needed to demonstrate that some attempt had been made to assess the validity and reliability of the data analysis.
- (vii) The inclusion of sufficient original data to mediate between data and interpretation: Did the report present sufficient data in the form of, for example, data tables, direct quotations from interviews or focus groups, or data from observations, to enable the reader to see that the results and conclusions were grounded in the data? Could a clear path be identified between the data and the interpretation and conclusions?

These 'quality' criteria were considered to represent the first step to generating a way of assessing the validity and reliability (or 'trustworthiness') of the results and conclusions of research which aims to answer questions other than effectiveness. Essentially they provide a framework which makes it possible to assess whether enough information has been provided in order to judge whether the framework of the study, context, sample, methodology, data analysis and data interpretation used within the research took into account or, at least, made explicit, any possible alternative explanations for the results shown and/or conclusion drawn. In this respect, the quality assessment of non-intervention research differs from the methodological quality assessment of the outcome evaluations that is also described in this report. The criteria applied to non-intervention research were not used to generate a sub-set of studies from which 'reliable' conclusions could be drawn. Rather, the aim was to provide the reader with a synthesis, within an explicit framework of methodological quality, of the findings of the studies examining young people's views and their implications for what they tell us about barriers to, and facilitators of, healthy eating amongst young people and the development of interventions to promote this.

4.4 Flow of studies from mapping to in-depth review

Table 19 shows the flow of studies through the descriptive mapping and quality screening exercise into the in-depth review. From the 135 healthy eating studies included in the mapping, a total of 30 studies were included in the in-depth review: 22 outcome evaluations and eight studies which examined young people's views. Chapters 5, 6 and 7 describe the characteristics of these studies and synthesise their results.

Table 19: Flow of studies through the mapping to the in-depth review

Mapping literature	Included	Excluded
Total citations after searching	7048	
Applied inclusion criteria to abstracts: * <i>healthy eating or physical activity main focus</i> * <i>promotion of healthy eating/ physical activity</i> * <i>young people 11-16</i> * <i>'potential' systematic review of effectiveness; outcome evaluation; non-intervention study (UK only)</i>	614	
Full reports available	482	
Full reports which could not be located		132
Applied inclusion criteria (as above) to full reports	186	296
Reports focused on healthy eating (number of studies described in reports)	135 (116)	
In-depth review	Included	Excluded
Applied inclusion criteria * <i>Interventions aiming to make changes at community or society level</i> * <i>Outcome evaluations 'potentially sound'</i> * <i>Non-intervention studies: young people's views studies (UK only, post 1990)</i>	22 outcome evaluations 8 young people's views studies	53 outcome evaluations 24 non-intervention studies 9 potentially systematic reviews

5. IN-DEPTH REVIEW: THE OUTCOME EVALUATIONS

Outline of Chapter

This chapter presents the results of the data extraction and critical appraisal of the intervention studies included in the in-depth review. Section 5.1 describes the outcome evaluations in terms of the focus of the intervention, the setting and provider of the intervention. Section 5.2 describes how interventions were developed: the prior needs assessments, who was involved in developing the interventions, the piloting of the interventions and their theoretical basis, and the barriers to and facilitators of developing, delivering and evaluating interventions. The findings from the appraisal of outcome evaluations are presented in section 5.3. Structured summaries of outcome evaluations considered to be methodologically sound appear in section 5.4.

This chapter will be of interest to:

practitioners, policy specialists, young people and their families and friends and others who are interested in 'which interventions are effective?' (section 5.4)

practitioners who are interested in how interventions have been developed and delivered (section 5.2); and

researchers who will find useful the description of the characteristics and methodological attributes of the included outcome evaluations; the description of the methodology of the outcome evaluations will be of particular interest as it highlights the areas in which evaluation might be improved in future (section 5.3).

Key Messages

- *Twenty-two potentially high quality outcome evaluations were included. Seven of these (evaluating six different interventions) were judged to be methodologically sound. Two focused on self-esteem, two on depression, and one on suicide. All were implemented in secondary schools, three in the USA, two in Scandinavia, and one in the UK. They employed various types of intervention using multiple delivery methods.*
- *Clearest findings were:*
 - * *a school wide programme that included changes to the content of school meals (increased availability and portion sizes of fruits and vegetables), complemented by newsletters, recipes and coupons for parents was effective for changing reported health eating behaviour;*
 - * *a multi-component intervention in which students prepared healthy foods at school and home, and shared information with friends and families, and had increased provision of health snacks at youth groups, was effective in changing reported behaviour;*
 - * *teacher-led classroom education together with newsletters, surveys and evening sessions for parents, was effective for decreasing cholesterol and systolic blood pressure;*
 - * *peer-led sessions focused on social influences on eating were effective for reported behaviour, practical skills, awareness and knowledge;*

- * *a multi-component school wide initiative including classroom sessions to explore peer pressure and family influences, was effective in changing reported behaviour.*

5.1 Characteristics of outcome evaluations to promote healthy eating

As stated in chapter 3, a total of 75 outcome evaluations on the topic of the promotion of healthy eating were located. Twenty-two of these met the inclusion criteria for the in-depth review as they (i) evaluated the behavioural and/or physical health status outcomes of interventions that aimed to make a change at the community or society level and (ii) had been judged to be potentially methodologically sound and therefore capable of producing reliable answers about the effectiveness of interventions (reporting employment of an equivalent control group and pre and post data - see chapter 4 for full details of these criteria). These 22 studies were subsequently reviewed in-depth.

All 22 outcome evaluations reviewed were published in peer reviewed journals, the majority (N=19) prior to 1995. A total of 16 (72%) studies were conducted in the USA, with two in Finland, one in Norway, one in the UK, one in Denmark and one in Australia.

The number of studies reviewed does not equate with the number of reports providing details of those studies. Some studies were detailed in more than one report, and one report described two separate outcome evaluations of the same intervention. These two evaluations (of the 'Know Your Body' programme), are described in a total of three reports: Walter *et al.* (1985); Walter *et al.* (1988); Walter (1989). The evaluations were conducted in two demographically diverse areas of New York City: the Bronx and Westchester County and are hereafter referenced as Walter I (1989) and Walter II (1989) respectively.

Table 20 shows the study focus, intervention setting and provider type in the 22 studies. Whilst all focused on the topics of healthy eating, 14 studies also aimed to promote physical activity. There were additional emphases on cardiovascular disease, tobacco use, accidents, obesity, alcohol and illicit drug use. Most of the studies were set in primary and secondary schools, and less commonly in the home, within the community in general, or in health care settings. A range of people were responsible for delivering the interventions, most commonly teachers, peers, community members and researchers. Studies could also involve more than one setting and provider. For example, the intervention by Hopper *et al.* (1992) took place in the primary school setting and also involved activities within the children's homes with their parents. Similarly, in the 'Slice of Life' intervention (Perry *et al.*, 1987) teachers were involved in the overall application of the intervention, whilst peer educators were responsible for delivering the class based sessions.

Table 20: Study focus, intervention setting and provider in healthy eating outcome evaluations: All included outcome evaluations (N=22)

	N	%
Focus (NB each study can have more than one focus)		
Healthy eating	22	100
Physical activity	14	64
Cardiovascular disease	9	41
Tobacco use	8	36
Alcohol use	5	23
Illicit drug use	4	18
Obesity	2	9
Accidents	1	5
Oral health	1	5
Cancer	1	5
Mental Health	1	5
Setting (NB each study can have more than one setting)		
Secondary education	14	64
Primary education	9	41
Home	9	41
Community	7	32
Health care unit – specialist clinic	1	5
Health care unit – primary care	1	5
Provider (NB each study can have more than one provider)		
Teacher/lecturer	16	73
Other (students, physical education specialists, local education authority, parents)	8	36
Health professional	6	27
Peer	6	27
Health promotion practitioner	3	14
Community in general	2	9
Community worker	2	9
Researcher	2	9
Psychologist	1	5
Unclear	1	5

NB As studies can have more than one 'focus', 'intervention setting' and 'intervention provider' the totals exceed twenty-two (100%).

A wide range of intervention types were employed, as illustrated in table 21. The majority involved some form of information provision. Interventions were also classed as involving environmental modification (e.g. development of a whole school approach to health promotion), or development of practical skills (e.g. to read food labels correctly), as well as parent training (e.g. to educate and encourage them to support their children in healthy lifestyles), screening, and social support.

Table 21: Intervention types: All included outcome evaluations (N=22)

	N	%
Information/education	21	95
Environmental modification	13	59
Practical skill development	13	59
Parent training	11	50
Physical activity	11	50
Screening	7	32
Other (community organisation, citizen task forces, food tasting)	6	27
Bio-Feedback	5	23
Social support	3	14
Increased access to services	2	9
Increased access to resources	2	9
Advice/counselling	2	9
Family therapy	1	5
Professional training	1	5

NB More than one 'intervention type' could be reported in a study, so the totals exceed twenty-two (100%).

As well as directing interventions at young people (defined as being aged between 11 and 21 years), eleven of the studies also involved children (aged up to 11 years), and seven involved adults (over 21 years). Those studies involving all three age groups tended to be based on the concept of family approaches to health education, with parents being involved to reinforce school-based education in the home (e.g. Bush *et al.*, (1989a); Hopper *et al.*, 1992, Walter I, 1989 and Walter II, 1989).

Sixteen of the twenty-two studies were classified as targeting 'young people in general', as opposed to young people who might be considered to be socially excluded (e.g. those from low income families, or ethnic minorities, or excluded from school). Six studies concentrated on promoting the health of young people from ethnic minorities. Baranowski *et al.* (1990a) and Bush *et al.* (1989a) both recruited Black American young people, whilst the 'Dance for Health' study by Flores (1995) was purposely designed to appeal to African Americans and Hispanics living in California, who are at greater risk for cardiovascular disease. The other studies, although not in the main focusing on minority ethnic groups, were diverse in terms of the ethnic profile of their samples. The evaluation of the

'Know Your Body' programme in the Bronx district of New York (Walter I, 1989) comprised a sample around half of whom were Black American, and nearly a quarter of whom were Hispanic, in contrast to evaluation of the same intervention in the Westchester County suburb of New York where nearly 80% of the young people were white (Walter II, 1989). Nearly half the study population were Mexican American in the 'San Diego Family Health Project' by Nader *et al.* (1989), whilst in the UK study by Moon *et al.* (1999a) up to 20% of the sample included were Asian. Reporting of the socio-economic status of participants varied, with some authors providing numbers and percentages of those in each socio-economic group, and others providing descriptions of the general socio-economic status of the locality within which the research was conducted. Generally, the young people taking part in these studies were from middle to working class backgrounds. In five of the studies no information was provided to determine socio-economic background.

5.2 Development of outcome evaluations to promote healthy eating

Assessing need

Health promotion interventions can be developed in response to 'comparative' need (determined from examining services provided to one population and inferring need in another), 'expressed' need (determined by examining a population's use of services), 'felt' need (identified by the population or others), and 'normative' need (determined by experts in the topic of interest). In some cases more than one type of needs assessment can be employed (e.g. combining evidence of what experts define as priority needs to address with what young people say they need).

The majority of the interventions included in this review were based on normative need (N=18). For example, in the study by Petchers *et al.* (1987) evidence was cited as to why it is important to provide education to young people about behaviours beneficial to cardiovascular health - to enable them to adopt and maintain such behaviours into the adulthood. Evidence was also provided about factors likely to act as mediators of health behaviour change - in this case social and family influences - which are thus worthy of evaluation in an intervention.

Only five studies based their programmes upon 'felt' need. Nicklas *et al.* (1998), Kelder *et al.* (1993) and Perry *et al.* (1987) all conducted focus groups with young people prior to the initiation of the intervention. Baranowski *et al.* (1990a) conducted extensive interviews with members of the community and attended community advisory council meetings to ascertain the most appropriate content for their intervention, as well as its optimal location and time. In the study by Schinke *et al.* (1996), which evaluated a cancer risk reduction intervention for American Indian young people in the North-eastern United States, a meeting was held for Native American community and organisation representatives to discuss strategies for implementing the project in each community.

In one case the development of the intervention was interpreted as being based on analysis of comparative need (Vandongen *et al.*, 1995), and another three cases no needs assessment was determined (Hopper *et al.*, 1992, Ellison *et al.*, 1989; Fitzgibbon *et al.*, 1995). One study provided a reference to a further

publication which described how needs were taken into account (Klepp and Wilhelmsen, 1993).

People involved in development of the intervention

Table 22 shows who was involved in the development of the intervention. In eight cases young people had an input. The study by Perry *et al.* (1987) described peer leader involvement in the creation of a video which was used as an educational tool as part of a pilot study. In the study conducted by Flores (1995), selected participants chose their own music to dance to as part of an intervention to promote cardiovascular health. Evaluators also had input into devising the programmes, as did health promotion practitioners. Nader *et al.* (1989) identified a registered dietician, an exercise physiologist, an educational technologist, and several psychologists involved in intervention development. In the 'Minnesota Heart Health Programme' (Kelder *et al.*, 1993) community leaders, school superintendents, school administrators, faculty and parents were involved. Perry *et al.* (1987) also specify various individuals not further described. One study was unclear in its description of those involved in the development of the intervention; and two studies did not describe this at all.

Table 22: Person involved in intervention development: All included outcome evaluations (N=22)

	N	%
Young people	8	36
Evaluator	8	36
Other (e.g. dieticians, physiologist, educational technologists, community leaders, school administrator)	6	27
Intervention provider	5	23
Not stated	4	18
Funder	3	14
Health promotion practitioner	3	14
Unclear	1	5

NB More than one 'person involved in intervention development' could be reported in a study, so the total exceeds twenty-two (100%).

Piloting

Thirteen of the twenty-two outcome evaluations had previously subjected the intervention to pilot testing. One study by Perry *et al.* (1987) subsequently led to the development and evaluation of the 'Minnesota Heart Health Programme' (Kelder *et al.*, 1993). However, few details were provided about how the interventions changed as a result of the piloting. In three cases use of a pilot was unclear, in two cases it was not stated and in one case it was determined that no pilot had taken place. Furthermore, three of the studies were considered to pilot investigations themselves (Fitzgibbon *et al.*, 1995; Perry *et al.*, 1987; and Vartiainen *et al.*, 1982).

Theoretical basis of interventions

Table 23 shows the role of theory in intervention development.

Table 23: Theoretical basis of interventions: All included outcome evaluations (N=22)

	N	%
Social Learning Theory	13	59
PRECEDE Model	6	27
Not stated	6	27
Health Belief Model	4	18
Community-Orientated Model	1	5
Cognitive Theory	1	5

NB More than one theory could be used, so the total exceeds twenty-two (100%).

The most commonly cited theory underpinning the development of the interventions was Social Learning Theory (Bandura *et al.*, 1963), cited in 13 of the 22 included studies. The central tenet of the theory is that people learn in social situations through observation of the actions of others, in particular influential role models. Modelled behaviour is observed, imitated and can be reinforced through on going contact with the role model. Later revisions incorporated the concept of self-efficacy (belief that one can perform a particular task, such as giving up smoking) as a factor in behaviour change (Bandura, 1977; 1990). The study by Petchers *et al.* (1987) combined elements of Social Learning Theory with concepts from affective education. The school and home based programme was taught by teachers, with the aim of helping young people develop their cognitive health knowledge and attitudes so as to reduce the risk of cardiovascular disease as adults. The materials used and activities undertaken were based upon affective education, which places emphasis on the individual in the learning process. For example, the 'Special You' module dealt with relationships between personal feelings and health. Concepts from Social Learning Theory included role-playing, and peer discussions.

Barriers to, and facilitators of, intervention development, delivering and evaluation

Studies were examined for indications of factors which were favourable to, or which inhibited, the development and delivery of the intervention, and conduct of the evaluation. Fourteen studies reported what the reviewers interpreted to be barriers, whilst only nine mentioned favourable factors.

Vandongen *et al.* (1995), in an evaluation of a school and home based fitness and nutrition intervention, discussed the problems associated with measuring sexual maturation. It was felt that limited privacy at survey sites, reluctance of children to be assessed, and difficulty of providing same sex personnel for measurement might deter the children from attending the follow-up data collection, thus potentially exacerbating attrition.

The study by Moon *et al.* (1999a) (discussed more fully in the next section) which evaluated the 'Wessex Healthy Schools Award Scheme', encountered a

number of barriers to the adoption of the intervention, including the reluctance of some schools to become involved in the project, and the fact that teachers sometimes viewed evaluation with suspicion, perceiving it to be examining their performance. However, the Award Scheme Co-ordinators (a designated teacher in each school) showed great support for the project and did what they could to promote it. Similar problems were experienced by Bush *et al.* (1989a), and Walter I (1989) and Walter II (1989) in separate evaluations of the 'Know Your Body' programme in Washington DC and New York, respectively, where it was reported that teachers lacked sufficient training and enthusiasm to teach the health education curriculum as it was intended, and there was a lack of time in the school curriculum to realise the full potential of the risk factor screening component as an educational tool.

5.3 Assessment of methodological quality of outcome evaluations

Table 24 shows the methodological quality of the studies, as judged by the reviewers.

Table 24: Number of studies meeting criteria to be gold standard, and sound: All included outcome evaluations (N=22)

	N	%
Numbers assigned to treatment and control groups reported	15	68
Impact of intervention reported for all outcomes	15	68
Aims clearly stated	22	100
Random allocation	13	59
Equivalent study groups at baseline	10	45
Intervention and evaluation described enough to be replicable	15	68
Attrition rates reported for each study group	4	18
Pre-intervention data reported for all individuals/groups	7	32
Post-intervention data reported for all individuals/groups	14	64

NB Criteria needed for an outcome evaluation to be judged methodologically 'sound' are in bold

Whilst all studies clearly stated their aims, only four met the criterion of providing pre-intervention data for all individuals/groups. The remaining studies either provided information only for those who completed the study (rather than all those originally allocated to study groups); and/or provided information for some individuals/groups only (e.g. only for the intervention group); and/or provided information only for some outcomes only; and/or only provided data on changes between baseline and follow-up. Fourteen of the studies provided post-intervention data for all individuals/groups. The remaining nine either provided information for some individuals/groups only; and/or for some outcomes only; and/or just reported change data. Only 10 studies provided evidence that study groups were comparable at the beginning of the evaluation (i.e. at baseline measurement). In six studies it was determined that groups were not comparable, and in a further six cases their status was unclear.

In terms of assignment to study groups, 13 used random allocation procedures (of which 9 described the actual method of randomisation employed). Attrition rates were only reported for each study group in four studies. In the remaining studies attrition was reported for the study population as a whole (7 studies), or for one/some groups only (3 studies). In four studies no statement was made regarding attrition, in three studies it was unclear, and in one study attrition was not relevant (intervention was evaluated by a series of cross-sectional surveys).

As noted earlier, there were four criteria for classifying a study as 'sound'. These are highlighted in **bold** in table 24.

5.4 Which interventions are effective?

The evidence for the effectiveness of interventions to promote healthy eating is limited to the six interventions evaluated in seven studies which were judged to be methodologically sound. Three are from the USA, with one each from the UK, Norway and Finland.

All of the programmes were delivered and evaluated in secondary schools. In two cases the intervention began whilst students were in primary school and continued as they progressed to secondary school (Walter I 1989, and Walter II, 1989). All of them were generally multi-component interventions, that is, they sought to intervene in different settings, such as the classroom, the school as a whole, and the home, whilst using different methods, such as didactic education, group discussions and mass media.

Given the general multi-component nature of the interventions, there were differences in terms of scope and content between them. For example, three studies evaluated the effects of interventions which sought to make school-wide changes in addition to classroom activities. The 'Wessex Healthy Schools Award' (Moon *et al.*, 1999a) sought to promote health throughout the school in terms of its ethos, organisational functioning and curriculum, and set up structured frameworks to enable schools to achieve health-related targets. Key players included all members of the school (teachers, support staff, pupils), as well as people from the wider community including support from local education authorities. The 'Gimme 5' programme evaluated by Nicklas *et al.* (1998) instigated a school wide media campaign to promote increased consumption of fruits and vegetables (e.g. through posters, public address announcements, point of sale signs) and increased availability and portion size of healthy food in the school canteen. These wider, structural changes were implemented alongside classroom activities (e.g. teacher or health educator-led workshops) and parental involvement (e.g. newsletters sent home). The second 'North Karelia Youth Study' (described in two reports: Vartiainen *et al.*, 1986b and Vartiainen *et al.*, 1991 and hereafter referenced as Vartiainen *et al.*, 1991) also instigated changes to the nutritional content of school meals, and conducted initiatives in the classroom to educate young people about cardiovascular health, as well as offering health screening. This intervention also included activities outside of the school with a mass media campaign involving local television and newspapers, and health education activities in the workplace of the parents.

By way of contrast, the other three interventions focused on, in the main, classroom activities in which information was provided and skills were taught. The 'Know Your Body' programme by Walter I (1989) and Walter II (1989)

focused on curriculum activities to motivate participation in physical activity, healthy eating and to prevent smoking, with pupils receiving around two hours a week of classroom based activities throughout the school year, over a period of five years. A risk factor examination component, in which blood pressure and cholesterol levels were measured, was included to provide students with an opportunity to gain awareness of their health status, in order to facilitate personal goal setting and to reinforce behaviour change. Parents were also informed about the school initiative and were also encouraged to engage in healthier lifestyles. The US based 'Slice of Life' initiative (Perry *et al.*, 1987) involved classroom activities to promote healthy eating and physical activity through information provision and exploration of socio-cultural influences on healthy lifestyles. Elected peer leaders, chosen by their classmates for their popularity, taught 10 sessions covering information about the benefits of fitness, healthy diets, and issues concerning weight control. Although structural changes (e.g. modifications to the nutritional content of school meals) were not instigated, pupils were encouraged to analyse and identify environmental influences on their ability to eat healthily. They interviewed each other, and school staff to understand better how the school environment affects their health. Recommendations were then made to the school's administrators on how change could be effected. A very similar version of this intervention was also evaluated in Norway (Klepp and Wilhelmsen, 1993), and although it was generally based within the school, students were encouraged to identify factors influencing their diet in local shops and at home. Local youth groups became involved in the initiative who subsequently increased provision of healthy snacks.

In terms of effectiveness, the results varied according to the outcome measures used. These included behaviour (e.g. reported consumption of fruits and vegetables in questionnaires; interviews to assess dietary intake in the last 24 hours); clinical risk factors (e.g. measurement cholesterol levels and blood pressure); knowledge and awareness (e.g. level of understanding about the nutritional value of different foods), attitudes and intentions (e.g. whether or not young people value healthy food), and practical skills (e.g. the ability to comprehend nutritional information on food labels).

Whilst all studies which measured impact upon health behaviour reported positive effects, differences were observed for sex, and there was variability according to duration of follow-up. The intervention evaluated by Klepp and Wilhelmsen (1993) which lasted approximately four months was judged to be effective for reported healthy eating behaviour for young men at the five month follow-up, and effective for both sexes after one year. The 'Slice of Life' intervention by Perry *et al.* (1987) was mostly effective at promoting healthy eating behaviour for young women, as was the case in the evaluation of the 'Wessex Healthy Schools Award' scheme by Moon *et al.* (1999a) particularly with young women in the higher year groups (aged 15 to 16 years). In both of these evaluations outcomes were measured within a few weeks after the end of the intervention. The three year long 'Gimme 5' programme (Nicklas *et al.*, 1998) was effective for behaviour only in the first two years of intervention, whilst the second 'North Karelia Youth Programme' (Vartiainen *et al.*, 1991) was most effective at two year follow-up for the groups which received the higher intensities of the initiative. The 'Know Your Body' programme, which lasted for five years, was judged by the reviewers to be effective for dietary intake only in the evaluation which took place in the Bronx area of New York (Walter I, 1989).

Clinical risk factors were measured in two studies with mixed results. Cholesterol and blood pressure levels were reduced in Walter I (1989), but judged unclear in

Walter II (1989), whilst Vartiainen *et al.* (1991) detected reductions in systolic blood pressure at two year follow-up. However, there was no effect for cholesterol levels or diastolic blood pressure in this study.

In terms of improving knowledge and understanding of nutrition, the studies were generally effective. The study by Perry *et al.* (1987) was effective for both sexes, as was Walter I (1989), whilst Klepp and Wilhelmsen (1993) was judged to be effective for young men, but not for young women. In contrast, Nicklas *et al.* (1998) found that young women were more knowledgeable after receiving the intervention. The only study which measured impact on knowledge and failed to make an impact was Moon *et al.* (1999a), where knowledge levels at the start of the study were reported to be high anyway and the most marked increases were amongst Year 11 students (15 to 16 year olds).

One study measured the likelihood of the students being able to read food labels in order to check the fat and salt content of their foods (Perry *et al.*, 1987). They were also asked how often they paid attention to particular eating pattern skills such as eating a balanced diet, the salt and fat content of their food, including five vegetables daily, eating the amount the body needs and resisting social influences. It was found that young women were more likely to be doing this than young men after the intervention.

In terms of other outcomes, Moon *et al.* (1999a) measured how health promotion was organised within schools through the calculation of audit scores on the health promotion activity, organisation, and functioning of participating schools. It was found that the intervention schools generally out-performed the control schools on this measure. Vartiainen *et al.* (1991) measured changes in the nutritional content of school meals. It was found that the fat proportion of food decreased in the schools which received the highest intensity of the intervention (the 'direct programme' group). Furthermore, the polyunsaturated/saturated fat ratio increased in the groups receiving the intervention compared to the control group.

Fuller descriptions of these studies and their results are provided below, and in tabulated form in Appendices B and C.

Klepp and Wilhelmsen (1993) evaluated a peer- and teacher-delivered intervention aiming to promote healthy eating among male and female secondary school students in Bergen, Norway. The purpose of the study was to evaluate the impact of the intervention on the dietary knowledge and eating habits of students in intervention schools in comparison with those in schools not receiving the intervention. The intervention aimed to increase the consumption of fresh fruits, vegetables, whole wheat bread and low fat dairy products, and decrease the consumption of high sugar and high fat snack foods.

Teachers and peer educators delivered the intervention over four months between February and May 1989. Students were asked to complete a three day food diary, and to plan and prepare a meal for their families (parents being informed about the study via mailings and a parent evening). Students worked in small groups in classrooms identifying healthy and unhealthy food, considering the consequences of diet and rationales for choosing healthy foods, identifying healthy alternative snacks, and discussing presentation of food by the media. A computer programme allowed students to analyse the nutritional status of various foods. Students analysed food items available in local stores, their homes and local youth organisations. The students elected classroom peer-leaders, who

were trained by University of Bergen staff to lead classroom group-work and role-plays. They also prepared healthy foods at school and home, and shared information with friends and families. Discussion was also initiated between the intervention staff and local youth groups, who agreed to increase the availability of healthy snacks to at the groups. The intervention was informed by a previous study of food preferences and dietary habits of young people conducted by the authors. Teachers worked with the researchers on the study aims and how best to implement the intervention.

The study was undertaken in secondary schools with seventh grade (13 year old) students. Two schools were allocated to an intervention and two to a control group. The socio-economic status of the neighbourhood and schools' willingness to participate were reported as criteria of involvement. Assignment to study groups was non-random, but no further information on allocation procedures was provided. In each of the four schools there were three to seven seventh grade classes with 20-30 students in each. Comprehensive information on the social class and ethnicity of students was not given. From 517 eligible students, 492 completed baseline measures, 486 of whom provided adequate data. Four hundred and forty seven completed baseline and first follow-up, while 415 completed baseline and second follow-up. There was no reporting of the distribution of these between intervention and control groups. Those dropping out at second follow-up overall had significantly lower healthy eating knowledge and behaviour scores. However, males lost to second follow-up at the intervention schools scored higher in healthy eating knowledge than those lost to follow-up in control schools. The authors do not clearly indicate whether there were social class differences between intervention and control groups. They state, however, that any differences were taken into account in an Analysis of Covariance (ANCOVA). Outcome measures were self-reported healthy eating knowledge and behaviour at five months and one year after intervention. Outcomes were measured using self-completion diary/questionnaire. There are no details of this tool being previously validated, but test-retest correlations were performed to establish the measure's reliability.

A process evaluation examined the acceptability and accessibility of the intervention, consultation and collaboration, implementation of the intervention, costs and quality of the programme materials, and the skills and training of those providing the intervention. This was undertaken by the study team using observation and questionnaires completed after the intervention by teachers.

There were significant intervention effects for reported behaviour for young men (first follow-up) and young women (both follow-ups), and for knowledge for young men (both follow-ups) but not young women. This analysis included only those who remained in the study.

The authors report that teachers felt their participation had been a positive experience, and perceived this also to be so for students including peer-leaders. Teachers felt that the intervention was feasible and advantageous to their curriculum, but felt they were constrained from adequate collaboration by lack of time. A shortage of computers also meant that analysis of dietary records by students took longer than expected.

The authors conclude that an important aspect of the project was the involvement of teachers in design and implementation, reporting that previous interventions not involving these tended not to be sustained after the evaluation. The reviewers considered that the involvement of youth clubs, who increased

the availability of healthy snacks to young people, to be a valuable element in the study. Despite some positive effects associated with the programme, both intervention and control groups reported students' overall unhealthy eating habits at first follow-up. The authors suggest this reflects the reduced availability of fresh food in Norway during winter. This underlines the importance of facilitating healthier nutritional environments to reinforce the promotion of healthy eating to young people.

The reviewers judged this study to be methodologically sound and replicable in terms of its evaluation design, intervention contents and delivery. Despite pre-intervention data only being reported for those remaining in the study the reviewers felt that the attrition rate was relatively acceptable (approx. 14% at 1 year), and information was provided on the baseline characteristics of those who were lost to follow-up. It should be noted that the unit of analysis (student) differed from the unit of allocation (school), and this is likely to lead to an exaggeration of intervention effects.

Moon *et al.* (1999a) in a UK-based controlled trial, evaluated the effectiveness of the 'Wessex Healthy Schools Award Scheme' on the knowledge, attitudes, behaviour and perceptions of secondary school pupils aged 11 to 16 years. The aim of the scheme, which was launched in 1992, is to enable schools to become more health promoting through a whole school or 'holistic' approach. There are nine key areas covered: the health education curriculum; links with the wider community; a smoke free school; healthy food choices; physical activity; responsibility for health; health promoting workplace; environment; and equal opportunities and access to health. Targets are associated with each area which the school must aim to achieve (e.g. healthier food choices in the school canteen). Participating schools must select and develop two areas, in addition to implementing the curriculum. Some support for health education resources may be provided by the Local Education Authority (LEA), and validation of the award is performed by OFSTED (Office for Standards in Education, UK).

Evaluation of the Award Scheme in the Wessex area (covering Hampshire, the Isle of Wight and parts of Dorset, Sussex and Surrey) began in 1995 and lasted for approximately 15 months. The authors stated that random allocation to study groups was not possible due to the voluntary nature of participation, with schools not prepared to be randomised. Fifteen schools enrolled in the Scheme were invited to take part in the study, with 11 subsequently comprising the intervention group. One school dropped out due to changes in senior management following baseline. Problems were experienced recruiting control schools. Thirty-five were contacted by letter followed by a phone call. The schools that declined to become involved cited a number of reasons for this including academic pressures, OFSTED inspections, lack of time and resources, and absence of financial incentives. The control group eventually included five schools, matched on area and socio-economic status. In terms of the socio-demographic details of the sample, the age of the pupils ranged from between 11 to 16 years, 4 to 49% received free school meals, and most of them were White, with 1 to 20% of Asian origin.

Outcomes measured included changes in pupils' attitudes, knowledge, perceptions and reported behaviour; and changes in school health promotion activity, organisation and functioning. Measurements were made at baseline during Autumn 1995, and at follow-up in Spring 1997. A questionnaire was used to assess changes in the pupils' knowledge, attitudes, perceptions and behaviour, and a structured audit schedule was devised to assess changes in

school functioning, as well as observation schedules for assessing the school environment.

Process evaluation was also conducted to assess activities in the schools during the programme. Methods included semi-structured interviews with key staff (teachers, support workers) to assess perceptions of health promotion; focus group interviews with pupils; and curriculum review. As with the outcome measurement, process evaluation was conducted both before and after the intervention. The measurement instruments used in both the outcome and process evaluation were either based on existing validated tools, or were specially devised for the study. Where new instruments were developed, they underwent pilot testing.

Results from the pupil questionnaires were presented for school years seven, eight and year eleven, according to sex. Knowledge levels, which were high at baseline, changed little over the course of the intervention. There were mixed results for attitudes and reported behaviour. The intervention group performed better on current smoking behaviour, use of low risk drugs and attitudes towards using drugs. There was also a significant difference between the groups in terms of the number of younger men taking up smoking, with the control group performing worse. In terms of behaviour, young women from year 11 (aged 15 to 16) in the intervention schools performed better in almost all areas, including eating healthier snacks at break time and choosing fruit and vegetables as healthy.

For the audit scores (reflecting health promotion activity, organisation, and functioning of participating schools), the intervention schools generally outperformed the control schools. The control group tended to be superior to the intervention group for the audit items 'physical activities' and 'taking responsibility for oneself'.

Results of the process evaluation provide an indication of how the scheme was implemented in the schools. The semi-structured interviews revealed strong support for health promotion in schools (98% stating this to be important). The main components of a healthy school as identified by respondents were clean environment, caring ethos, healthy eating, health awareness and good manners. Barriers to achieving a healthy school, expressed by those interviewed, included lack of time and resources. Facilitators included the commitment of the staff, support from management, staff concern for pupils' health, and pupils' own awareness of health.

In terms of training and support to teachers in Award schools, only 50% stated that they had received preparation for teaching health education at initial teacher training level. There were, however, opportunities for further training through school and locally based in-service training, however this was not available to support staff. Whilst there was an increase in the percentage of key school staff who felt they were well informed about the Award Scheme from baseline to follow-up, 11% stated at follow-up that they were not aware of the initiative.

A reflective account of the implementation and evaluation of the intervention by the authors revealed a number of problems encountered by the research team. These included problems with recruitment of schools, particularly control schools; misconceptions of the purpose of evaluation by some school personnel; objections to random selection of pupils for the questionnaire, leading to sampling of all pupils, which in turn increased research costs; and compromises

to the confidentiality of pupil responses to the questionnaires. The authors used the findings of the process evaluation and their experiences in conducting the study to make a number of recommendations for good practice.

In general, this study provides a useful insight into the impact and processes associated with an intervention designed to engineer a whole school approach to health promotion. The results show some improvements in pupil outcomes (e.g. attitudes, reported behaviour) for the schools receiving the intervention in comparison to those which did not. Despite difficult circumstances in some schools, there was great commitment to the project and at the end a general feeling that it had made a positive impact. It is not clear, however, exactly what activities took place within each of the schools. A breakdown of the specific activities undertaken in each school for its selected areas would provide clearer guidance on how this intervention could be replicated.

A holistic approach to health promotion, undertaken in this intervention, requires all members of the school community - teachers, pupils, parents, support staff – all to play a role. The fact that the support staff did not have much in the way of support or training in health education mitigates against such a philosophy, as does the fact that even at the end of the programme there were still teachers who were not aware that it had just taken place in their school.

In terms of methodological quality, this study had matched groups at baseline and piloted the measurement instruments used. However, no baseline data were provided on the school which dropped out of the intervention. The reason given for the school's departure was changes in school management, and drop out occurred before the intervention began. It is therefore likely that the school did not leave because of resistance to the health education intervention, which would have suggested differences from the remaining schools on socio-demographic variables or, baseline outcome measures.

Nicklas et al. (1998) evaluated a three year multi-component school-based intervention, the 'Gimme 5' programme, to promote fruit consumption amongst ninth grade pupils, generally from middle class backgrounds, aged 14 to 15 living in New Orleans, USA. The intervention was one of nine projects funded by the National Cancer Institute as part of its '5 a Day For Better Health' programme. The overall aim of the programme was to promote a per capita intake of five servings of fruits and vegetables a day. The aim of the evaluation of the 'Gimme 5' intervention was to assess its effectiveness in promoting changes in knowledge, attitudes and behaviours in relation to daily consumption of fruit and vegetables compared to a no-intervention control group.

The intervention was developed following focus groups with high school students in which they identified barriers to healthy eating including lack of availability, lack of variety and inconsistency in taste. The students also felt that their parents would benefit from participation in the intervention. In terms of theoretical underpinnings, the 'PRECEDE model' was used to guide the design of the programme in order to engineer an environment in which predisposing, enabling and reinforcing factors can influence increased consumption of fruit and vegetables. Results of the intervention were also analysed within the 'stages of change' framework.

Starting in spring 1994, the intervention comprised a school-wide media marketing campaign, classroom activities, parental involvement and changes to the content of school meals. The media campaign involved a variety of activities

to increase awareness and promote positive attitudes, including display information (marketing stations), taste testings, posters, public service announcements, fruit and vegetable baskets and pupil contests. The school curriculum was augmented with supplementary workshop activities led by teachers to promote knowledge of the positive benefits of fruit and vegetables. Changes to the school catering provision included increasing the availability and portion size of fruits and vegetables, and increasing the variety of healthy food. Monthly marketing activities were also conducted and new menu guidelines were developed, including menus designed to appeal to ethnic minorities. To reinforce the school activities parents were sent information brochures, recipes and newsletters once every semester as well as calendars which included coupons. During the formative years the intervention was described as being 'aggressively implemented' with more media marketing activities and greater provision of fruit and vegetables in school meals. As the programme progressed the 'Gimme 5' staff gradually withdrew from the schools as the school staff themselves took on more responsibility for implementing and maintaining the activities. Legislation introduced in 1997 also made it mandatory to offer healthy options in school canteens.

Participating schools (N=12) were paired on the basis of gender, race, school enrolment and geographic location and were randomly assigned in six pairs either to the intervention or the control conditions. Of the 2339 students eligible to take part in the study, 2,213 completed the baseline assessment, with randomisation occurring after this measurement. The number of students in each study group is unclear, but was estimated by the reviewers to be approximately equal between them. The baseline measurement was taken in spring 1994 with outcome assessments taken annually each subsequent spring (1995, 1996 and 1997), by a pre-piloted questionnaire to measure knowledge, attitudes and behaviour. A random sub-sample of 60 students from each school (N=720) were interviewed at the start and the end of the intervention to assess dietary intake. It is reported that all of the schools maintained participation in their allocated study groups and that 81% of the original cohort participated for four years.

The measurement of outcomes was complemented by a thorough process evaluation to assess the acceptability of the intervention, and to monitor its implementation. A battery of instruments were used including a media impact survey, school meal participation forms, promotional produce logs, workshop checklists, parent activity logs, school staff tracking forms, menu recipe documentation forms, and cost monitoring forms.

The intervention was found to be effective for increasing knowledge scores (higher amongst young women), but was only effective at increasing consumption of fruit and vegetables in the first two years of the programme, with no statistically significant differences between the groups between 1996 and 1997. It was not effective in changing attitudes, described by the authors in terms of self-efficacy to eat more fruit and vegetables.

In terms of acceptability, 79% felt the intervention content was relevant for their age group, and 'thumbs up' scores for the different components of the media campaign ranged from 67% to 79%. In terms of implementation it was found that teachers were able to follow the workshop guides, and reported a high degree of confidence in facilitating the workshops according to the protocols. Furthermore, attendance of parents at parent teacher organisations was low, and all of the school meal recipe guidelines were implemented.

It was noted by the reviewers that results from the dietary recall interview were not reported. As this was not the primary outcome measure, and as it was administered to a sub-sample rather than the whole study population, the study was therefore judged to be methodologically sound, despite there being a discrepancy with our quality criteria. The comprehensive process evaluation was considered to be one of the merits of the study, as was attempts to involve young people in the development of the intervention. The fact that all the schools maintained their participation in the programme over the four year period was discussed by the authors as being due to their experience and high reputation in conducting research in schools and communities. It is also reported that a competing programme - the 'USDA school meals initiative' which took place in 1997, as well the increased intensity of the parent programme, 'National 5 a Day for Better Health', may have confounded the results. It is therefore possible that this accounted for no statistically significant difference between study groups in terms of healthy eating behaviour during the latter part of the programme.

In terms of external validity this intervention is likely to be replicable with similar predominantly white, middle class young people, but it is unclear whether it could be implemented effectively with students from ethnic minorities, or those from lower socio-economic groups.

Perry *et al.* (1987) evaluated a peer-led intervention aimed at establishing positive eating and physical activity patterns to prevent cardiovascular heart disease among pupils at a secondary high school in Minnesota, USA. The purpose of the study was to pilot the 'Slice of Life' intervention, a forerunner of the 'Minnesota Heart Health Programme'. Specific aims were to decrease salt and saturated fat intake and increase intake of complex carbohydrates, and to increase levels of physical activity, particularly aerobic activities, in order to improve endurance and prevent injuries.

The intervention took place over 10 sessions, between Autumn 1984 and Winter 1985. Students were asked to select peers they 'respected, admired and would like to be like' and those who received the most votes were asked to become the peer leaders, who then received three training sessions. The development of the intervention was informed by a needs assessment conducted with same age students, the results of which stressed the importance of peer influence in eating choices and attitudes towards exercise. Peer leaders also had a direct input into the content of the programme, having created videos to illustrate situations in which young people resist social pressures to engage in unhealthy behaviour.

The intervention covered knowledge about the benefits of fitness; characteristics of a heart healthy diet; social influences on eating and exercise habits; and issues to do with weight control. Environmental influences were explored through group projects in which pupils interviewed fellow students, teachers and school canteen personnel in order to identify and recognise how their environment impacts on their behaviour. For example, in small groups they observed the food available in the school canteen and compared it to healthy eating guidelines for nutritional content. Presentations were then made to the school administration with recommendations for change to improve the school environment. Social Learning Theory was cited as underpinning the intervention.

The study was undertaken in a suburban high school with Ninth Grade (14 to 15 year old) students. Six classes were randomly assigned to receive the

intervention (N= 173 students) and four classes to the control group (N=95) who received the regular health science curriculum. No attrition was reported. Outcomes measured were reported behaviour (e.g. healthy eating, including salt use, time spent on aerobic activity outside of gym class, choice of aerobic activity); intentions to exercise, knowledge of healthy eating and physical activity; and practical skills (e.g. ability to read food labels correctly to assess nutritional content). Outcomes were measured by a 16-page survey administered by teachers prior to the programme and once again following its conclusion. The questionnaire had been used in a previous study, and the results of reliability tests were reported.

In order to ascertain the acceptability of the intervention, and whether the training the peer leaders had received was adequate, questionnaires were administered to the pupils and leaders alike during the course of the intervention.

In terms of its impact on healthy eating behaviour (e.g. use of salt, healthy food choices), the intervention was more effective for young women in the intervention group than the comparison group. There was an increase in healthy food choices for young men in both groups, but differences were not significant. The intervention was effective at decreasing the use of salt by both sexes, with statistically significant differences between study groups.

There was a significant increase in awareness of healthy eating for young women in the intervention group in comparison to those in the control, whilst increases in awareness for young men between the two groups were not significant. The intervention was effective at increasing knowledge about healthy eating for both sexes in the intervention group, compared to the control. For practical skills (e.g. reading and interpreting food labels correctly) again, the intervention was more beneficial for young women than young men.

In terms of acceptability, the young women tended to enjoy the intervention the most. Having peer leaders deliver the programme was also well received. The peer leaders generally enjoyed their experiences and said they would recommend it to others. The majority of students reported the peer leaders to be adequately trained for their roles as educators, and felt that the election procedures for the leaders had been fair.

The authors discuss the greater impact of the intervention on young women and point to the fact that their higher participation in healthy behaviour at baseline may have motivated them to make further changes. They suggested that the fitness and nutrition messages may have had more salience for the young women, as they are related to issues concerning physical appearance and weight management, which are of less relevance to young men than young men. Recommendations for increasing the perceived relevance of the intervention to young men include emphasising the role nutrition can play in enhancing strength and endurance, particularly in relation to sports.

The fact that pupils were encouraged to identify environmental influences which affect their ability to engage in healthy behaviour, and to think of ways in which any barriers could be altered, is an encouraging feature of this intervention. Merely providing knowledge, and teaching skills to help the young people exercise more is likely to be counter productive if the environment in which they live prohibits them from doing so.

The reviewers judged this study to be replicable in terms of its evaluation design, the intervention content and its delivery. The thorough account of the process of recruitment and training of the peer leaders, and the results of the process evaluation, lends support to this initiative being reproduced in other settings. Indeed, the authors discuss how the procedures for the election of the peer leaders, regarded to be fair and acceptable in the main, might be received differently in other cultures.

In terms of methodology, the study failed to be judged 'gold standard' on the criterion relating to attrition rates being reported for each study group. Although no attrition was reported as the intervention took place over a three to six month period, it cannot be assumed that loss to follow-up did not occur (e.g. some students may have left the school and moved to another locality). Furthermore, the possibility of diffusion of the intervention into the control group via mixing of students between classes, is not discussed by the authors.

Vartiainen *et al.* (1991) evaluated the second 'North Karelia Youth Project', a two-year community and school-based intervention for non-communicable disease prevention among young people aged 12 to 16 years in Finland. The aim of the evaluation was to compare different intensities of the programme with a no intervention control group. The project was thus evaluated using four groups: a 'direct programme' group in which intervention activities were carried out by project workers, teachers and trained peer leaders; a 'teacher-led programme' group in which intervention activities were carried out mainly by teachers trained by project staff; an 'administrative programme' group in which teachers were provided with written and audio-visual material but got no training or assistance from project staff, and a control group which received no intervention. Thus within the three intervention groups the basic intervention programme was the same; the difference was the extra resources given to the project at the school.

The goal of the intervention was to prevent smoking and abuse of alcohol, improve nutrition, promote physically active lifestyles, promote positive social relations with peers and adults, and to improve problem solving and coping skills. The specific aim of the nutrition component was to decrease total fat intake, increase use of polyunsaturated fats, decrease salt and sugar intake, decrease serum cholesterol, and decrease blood pressure. The programme was based on a previously evaluated pilot study (the first 'North Karelia Youth Project' - included in the in-depth review but not judged to be methodologically sound, see Vartiainen *et al.*, 1982). Behavioural outcomes included changes in dietary intake, as well as smoking and alcohol consumption. Additional outcomes were health knowledge, social normative beliefs, social norms, skills to resist peer pressure, and social support and relationship with parents.

The programme consisted of several components. In the classroom component, biology lessons were used as a forum for presenting information about risk factors for cardiovascular health, as well as information on the negative effects of smoking and alcohol on health. This information was provided in three lessons. Students also participated in seven sessions to teach 'citizen skills', in which health beliefs and values, peer pressure and family influences on health are discussed in small groups. In home economics classes students prepared meals which were low in fat. The environmental component involved changes to the nutritional content of school meals. For example, whole milk was replaced with skimmed milk, and use of vegetables and fresh salads was promoted. The health screening activities which normally take place within schools were

adapted to capitalise on their potential as an educational medium, although this was mainly in relation to preventing smoking. The final component involved use of mass media, specifically the production of a television programme entitled 'Keys to Health' in which volunteer parents took part in studio discussions. This was accompanied by publicity in local newspapers and a health education initiative in the workplaces of the parents.

Schools to form the intervention and control groups were recruited from two counties: 24 from North Karelia and 16 from Kuopio. In North Karelia all 24 schools were randomly allocated to three groups; eight schools for direct intervention (N= 832 students); eight for teachers trained to deliver the intervention group (N= 789 students) and eight for the administrative intervention group (N=887 students). Of the 36 schools in Kuopio, 16 were randomly selected in two groups: eight schools for the teacher-led intervention (N=966 students) and eight for the control group (N=779 students). Baseline and two-year follow-up measures were taken on cross-sectional samples of ninth grade students. Dietary variables were only collected on a randomly selected sub-sample of 32 pupils from each of the 40 schools taking part. Parents themselves also completed a questionnaire assessing their socio-economic status, health behaviour, beliefs, and risk factors.

Favourable dietary habits were detected in all groups, with greater changes in the direct programme group and the 'teacher led programme' group than the control group, and changes were more favourable for young women than young men (the results of the study for the 'teacher-led programme' group and the 'administrative programme' group appear to have been collapsed into one composite group referred to as the 'teacher-led programme' group). There was a reduction in fat proportion of school meals in the direct programme group compared to no change in the control group. There was a 2.6% reduction in cholesterol which was similar across all study groups, whilst no effect was observed for changing diastolic blood pressure. However, systolic blood pressure was reduced faster in the 'direct programme' group than the 'teacher-led programme' or control group. The authors posit that the decreases in cholesterol observed in all the study groups was the result of general changes in dietary habits in Finland influenced by changes in legislation regarding fat content of products.

The study was judged to be methodologically sound by the reviewers, as well as meeting the criteria to be judged 'gold standard'. The intervention content and delivery was considered to be reported in enough detail to facilitate replication, as was the evaluation design.

The 'Know Your Body' programme (**Walter I 1989 and Walter II 1989**) was a five year school-based intervention which aimed to promote nutrition, physical activity and prevent smoking amongst children aged nine years old (at the start of the study) living in two districts in New York. Separate evaluations of the intervention took place in two demographically diverse areas of the city, the Bronx and Westchester County, and are therefore counted as two studies in this review. The objective of the intervention was to reduce the young people's risk for developing coronary heart disease and cancer.

Beginning in 1980, whilst the students were in the Fourth Grade at elementary school, the intervention continued as they progressed to the Eighth Grade at junior high school. In terms of socio-demographic status the students in the Bronx sample, a low-income borough of the city, were mostly black or Hispanic,

whilst in Westchester County, a middle to upper income suburb, white students predominated. In both samples there were an equal number of males and females.

The intervention was originally developed in 1975 and underwent pilot testing in several studies. Based on elements of the 'PRECEDE' health education planning model, it comprised teacher led classroom education, parental involvement activities, and risk factor examination. Throughout the school year the students received two hours a week of education on healthy eating (encouraging a diet of reduced fat, cholesterol, sodium, sugar); promotion of physical activity (endurance exercises to build skills and strength); and targeting of beliefs and attitudes around smoking. Parents were sent newsletters to inform them about the activities their children were participating in to advise them on how they might best support them in initiating and maintaining healthy behaviour. Other activities which involved the parents included food surveys and family exercise days, as well as evening seminars. The third component involved a risk factor examination in which students' height, weight, skinfold thickness, blood pressure, post exercise pulse rate and cholesterol levels were measured and those results which didn't require laboratory analysis were immediately fed back to them. Teachers then discussed the results with the pupils in the classroom in terms of setting behavioural goals, with the students recording them in a 'health passport'.

The intervention was evaluated using a randomised controlled design. In both locations randomisation was to the intervention or to a control group that received only the risk factor screening component, with the results sent to students and parents by mail. In the Bronx all eligible schools agreed to participate, with 15 schools (1590 students) randomised to the programme, and 8 schools (693 students) participating as controls. In Westchester County, school districts were the unit of randomisation, with two districts receiving the programme (8 schools, 485 students), and two acting as controls (620 pupils in 7 schools). There was no description of the precise method of randomisation, allocation concealment, or whether outcome measurement was conducted blind. After five years of intervention 1036 (66.3%) of students in the Bronx evaluation qualified for data analysis, compared to 733 (80.5%) of those in Westchester County. It is reported that those lost to follow-up did not differ significantly in terms of risk factor and knowledge scores from those remaining. Dietary recall interviews performed by trained dietitians were conducted on a randomly selected sub-sample to assess nutritional intake, whilst clinical tests were performed as part of the risk factor examination component (height, weight, ponderosity, triceps skinfold thickness, blood pressure, pulse rates, cholesterol). Knowledge and attitudes were also measured, described by the authors as 'mediating variables', in a questionnaire administered in the classroom. Measurements were taken prior to the start of the programme at baseline, and then on a yearly basis. Evaluation of the processes associated with the intervention was also conducted. Trainers observed each of the teachers to determine their competence at implementing the curriculum.

Results are expressed in terms of net changes in outcomes, that is, the difference between study groups. A net change for the intervention group is the increase or decrease in an outcome minus that of the control group. After five years of intervention in the Bronx sample there was a 2.9% net decrease in plasma total cholesterol levels; a 2.1% net mean reduction in intake of saturated fat; a net reduction in systolic blood pressure, and net increase in diastolic blood pressure. The net mean increase in knowledge scores was 18.8% with no

observed sex differences. The authors concluded that the intervention was effective at initiating decreases in dietary fat intake, but state that the confidence intervals surrounding the estimates of effect contain zero (and thus are not statistically significant).

In the Westchester County evaluation, there were net decreases in plasma total cholesterol levels of around 5.1% (with sub-group analysis suggesting a greater reduction among young women); a net mean reduction in total fat intake of 3.6% and an increase in total carbohydrate consumption of 4.5%. There was no change in diastolic blood pressure and a net decrease in systolic blood pressure. There was a net mean increase of 22.6% of knowledge test scores, with greater net increases observed among young women.

Comparing the results of the two evaluations, the authors concluded that there was a greater trend towards decreases in blood cholesterol levels in the relatively more prosperous Westchester County population than in the Bronx. From this it can be argued that this type of intervention may be less effective amongst socially and economically disadvantaged young people, although no explanations are offered as to why. The authors discuss the possibility that the greater than anticipated decline in cholesterol levels in the control group in the Bronx may have disguised the intervention effect, although there is no speculation as to why such a change was observed in the control group. Further research into reduction of cardiovascular risk factors amongst socially excluded young people is recommended.

No data are reported on the results of the process evaluation, but it was suggested that the ability of the teachers to teach the curriculum effectively varied widely. It was felt that their training was not of sufficient duration to adequately motivate them to deliver the classroom component with enthusiasm and skill. This assertion was presented alongside a number of other points interpreted by the reviewers as constituting barriers to the development and delivery of the intervention. Difficulties were experienced with school administrators, who were reluctant to devote time away from the standard curriculum and some of whom objected philosophically to the intervention being implemented in a school setting. It was also noted that the enthusiasm of parents and students waned as they progressed into junior high school. Furthermore, the risk factor examination, one of the staple features of the intervention, was considered to have created considerable disruption of regular school activities, and it was felt that its potential as an educational tool was not fully realised.

The study was judged by the reviewers to be methodologically sound, although it was noted that the impact of the intervention on young people's attitudes was not reported. However, the authors described attitudes as being only one of the mediating factors for changes in coronary heart disease risk reduction, rather than a primary outcome measure. It was also noted that given the five-year duration of the intervention loss to follow-up rates in the two populations were relatively low. This is in contrast to the evaluation of the same intervention in Washington DC where rates were much higher (Bush *et al.*, 1989a).

The author's overall conclusion that the intervention was associated with favourable trends in blood levels of total cholesterol amongst the two populations was not shared by the reviewers. Whilst the evaluation design was considered to be sufficiently robust to enable the study to be judged sound, the unit of data analysis in the Westchester County evaluation was at the level of the school,

whilst randomisation had been at the level of the school district (i.e. cluster randomisation). This may have exaggerated the intervention effect by increasing the level of statistical power and therefore caution is advised when interpreting the results. The reviewers did not disagree, however, with the authors' conclusions on the effectiveness of the intervention in the Bronx.

6. IN-DEPTH REVIEW: YOUNG PEOPLE'S VIEWS

Outline of Chapter

The focus of this chapter is the non-intervention research from the UK included in the in-depth review: those studies examining the views of young people on the barriers to, and facilitators of, healthy eating. It describes:

- *the characteristics of the studies (e.g. focus and context); and the characteristics of young people (e.g. their socio-economic status);*
- *the methodological attributes and quality of the studies (e.g. instruments used, sampling issues, reliability and validity of data collection and analysis);*
- *a synthesis of the findings of these studies (e.g. what 'healthy eating' means to young people and their attitudes to healthy eating, perceived positive and negative influences of eating healthily).*

Detailed structured summaries of each study follow the results, ordered according to whether or not they addressed barriers and facilitators, or asked young people for their ideas about promoting healthy eating. Appendices E and F contain more systematically ordered information.

As with the results of the intervention studies:

- ***practitioners, policy specialists and young people and their friends and families*** are likely to derive most benefit from the findings of the young people's views studies outlined in section 6.4 and described in more detail in 6.5.;
- ***researchers*** will also find useful the description in sections 6.2 to 6.3 of the characteristics and methodological attributes of the studies. The description of study methodology will be of particular interest as it highlights the areas in which research on young people's views could be improved.

Key Messages

- *A total of eight studies were included in this in-depth review. Half of them focused on younger children only (under 14) and most included both boys and girls. None of the studies indicated that their samples were from primarily working class backgrounds.*
- *Methodological quality of the studies was variable. None of the appraisal criteria were met by all eight studies. However, all but one provided a clear description of the context of the study and nearly all stated their aims, and six provided an explicit theoretical framework or literature review, a clear description of the study context and methods and sufficient original data to mediate between data and interpretation. Only two made any attempt to establish the reliability and validity of data analysis.*
- *Young people tended to describe the negative effects of unhealthy foods rather than the positive effects of healthy foods, and classified food as 'healthy' or 'fast'. 'Fast food' was 'junk food' and healthy food was associated with home cooking, adult preferences and lack of choice.*

- *Barriers to healthy eating reported in school were teachers (rarely being sources of information about nutrition) and a lack of healthy choices at lunchtime. Young people also recommended nutritional labeling of meals in school canteens.*
- *Socialising, relaxation and pleasure are associated with eating unhealthy food and friends were rarely sources of information about nutrition, nor were they helpful in changing eating habits*
- *In contrast, families were associated with healthy food and adult preferences, and were conceived as helpful in providing nutrition information and helping change behaviour.*
- *Personal barriers were preferring the taste and texture of fast food, and concerns over appearances which could encourage dieting.*

As highlighted in chapter 4, for the in-depth review we prioritised those UK non-intervention studies which sought young people's own descriptions of their experiences, rather than those studies which seek to infer their experiences through researcher-driven descriptions. We also prioritised those studies published prior to 1990. Eight studies met these criteria. The following describes how we arrived at this set of included studies.

Of the non-intervention studies identified in the mapping exercise, 12 were classified as seeking young people's views on the barriers to, and facilitators of, healthy eating. On closer inspection, two of the 12 studies were excluded because they collected young people's responses to questionnaire items solely for the purposes of developing explanatory models that might predict healthy eating (Waller *et al.*, 1992) or to examine the frequency with which various foods were consumed (Rogers *et al.*, 1997). These studies did not present young people's views in any detail. One study was excluded as it was published prior to 1990 (Balding, 1989). A further study was excluded as it examined young people's beliefs about taking vitamins during pregnancy rather than on factors influencing healthy eating per se (Parker *et al.*, 1998).

Of the eight included studies, nearly all (N=6) were found on commercial bibliographic databases (CINAHL, EMBASE or MEDLINE). One of these was also found on HEALTHPROMIS, the specialist database of the Health Development Agency, England (HDA). Two studies were only found through scanning the reference lists of already identified studies. Publication dates ranged from 1993 to 1999. Two studies were each reported in two separate reports. A survey by Watt and colleagues is reported in Watt and Sheiham (1996) and Watt (1997), and is hereafter referred to as Watt and Sheiham (1996); and a study which used focus groups by Harris is reported in Harris (1993) and Harris (1994), hereafter referred to as Harris (1993). Two were carried out in the North of England (McDougall, 1998; Roberts *et al.*, 1999); two in London only (Watt and Sheiham, 1996; Watt and Sheiham, 1997); one in Scotland (Ross, 1995); one in the Midlands (Harris, 1993); and two in unspecified areas of England (Dennison and Shepherd, 1995; Miles and Eid, 1997).

These eight studies went on to the detailed data extraction and quality assessment phase of the review. The rest of this chapter describes the health focus, context and sample characteristics of the young people represented in the studies, and the methodological attributes and quality of the studies. Finally, we present the substantive findings of the studies - what they reveal regarding young people's views of the barriers to, and facilitators of, healthy eating. The

section ends with a detailed description of each study (see appendices D and E for tables of details about the studies).

6.1 Focus and context of studies

Although all of the studies were concerned with healthy eating, there were some differences in emphasis between them. For example, one study specifically focused on young people's views in the context of dieting (Roberts *et al.*, 1999); three studies concentrated on factors influencing food choice and the meanings associated with different foods (Dennison and Shepherd, 1995; Ross, 1995; Watt and Sheiham, 1997); one study examined experiences of dietary change (Watt and Sheiham, 1996); two studies focused on awareness/knowledge of healthy eating and behaviour (McDougall, 1998; Miles and Eid, 1997); and one study investigated healthy eating in the context of meanings about health in general and physical activity in particular (Harris, 1993). In terms of context and rationale, most studies noted the importance of healthy eating amongst children and young people in terms of the prevention of future health problems in adulthood and some noted an increase in snacking and fast food consumption in this age group associated with increased freedom over food choices. In only two cases was information provided on how the study was funded (Dennison and Shepherd, 1995; Roberts *et al.*, 1999). Two studies were carried out for the fulfilment of a higher degree (Ross, 1995; Watt and Sheiham 1996).

None of the studies reported carrying out the research explicitly to inform the development of specific interventions to promote participation in healthy eating, although four studies noted that the results of their studies need to be considered when developing interventions (Dennison and Shepherd, 1995; Harris, 1993; McDougall, 1998; Watt and Sheiham, 1996). Study authors offered a range of different rationales for why they considered it important to examine young people's views. For example, their views can provide information about the factors affecting food choices (Dennison and Shepherd, 1995; Watt and Sheiham, 1996) and an understanding of the social and cultural context leading to food choices (Ross, 1995; Watt and Sheiham, 1997). One study highlighted the importance of lay perspectives in increasing conceptual and theoretical understanding (Harris, 1993). Two studies offered no explicit rationale as to why it might be important to examine young people's views (Miles and Eid, 1997; Roberts *et al.*, 1999). Interestingly, only one of the study authors stated that it was important to examine young people's views because they are inherently valuable and young people have a right to be heard (Miles and Eid, 1997).

Characteristics of young people included in the studies

The only consistently reported characteristics of the young people who took part in the studies were age and sex. Details of the social class and ethnicity of the sample were less commonly reported. Table 25 gives details.

Exactly half the studies focused on samples of young people classified as 'younger only' and just over a third focused on 'all ages'. The former included two studies with young people aged 13 to 14 (Watt and Sheiham, 1996; Watt and Sheiham, 1997); one study with young people aged 10 to 12 years (Ross, 1995); and one study with young people aged 11 to 13 (Harris, 1993). The latter included the age range 11 to 15 (Dennison and Shepherd, 1995; Roberts *et al.*, 1999) and 11 to 16 (Miles and Eid, 1997). Only one study focused solely on an older age range of 15 to 16 years (McDougall, 1998). Nearly all the studies

focused on young people of mixed sex, but one focused on females only (Roberts *et al.*, 1999).

Table 25: Number and proportion of studies according to characteristics of the samples of young people used: Studies of young people's views (N=8).

	N	%
Age range*		
Younger only	4	50
Older only	1	12
All ages	3	38
Sex		
Mixed sex	7	88
Male only	0	0
Female only	1	12
Social class		
Stated	5	62
Not stated	3	38
Ethnicity		
Stated	2	25
Not stated	6	75
Area of residence		
Stated	5	62
Not stated	3	38
Other information		
Stated	3	38
Not stated	5	62

*A study sample was classified as 'younger only' if the majority of young people in the sample were aged 14 or younger; 'older only' if the majority were aged over 14; and 'all ages' if the sample covered a wide age span (e.g. 11 to 15 years)

All but three studies gave some indication of the social class of the young people. Two of these indicated that they had included young people from primarily middle-class backgrounds (Dennison and Shepherd, 1995; McDougall, 1998) and three from a range of different socio-economic backgrounds (Roberts *et al.*, 1999; Ross, 1995; Watt and Sheiham, 1996). None of the studies indicated that their samples were from primarily working class backgrounds. Only two studies reported whether young people from minority ethnic communities had been included (Ross, 1995; Watt and Sheiham, 1996). Ross (1995) describes her sample as 'predominantly white', whilst Watt and Sheiham's (1996) sample included 38% from 10 diverse ethnic groups. Nearly all the studies stated the area of residence of their samples: four studies had

samples from urban areas only (McDougall, 1998; Ross, 1995; Watt and Sheiham, 1996; Watt and Sheiham, 1997).

All studies collected data from young people when they were in school (not shown in table). This suggests therefore, that the findings from these studies may not be applicable to young people who are excluded from school, who infrequently attend, or have left school.

Three studies presented a range of other information on the study population. This information included weight or Body Mass Index (Miles and Eid, 1997; Roberts *et al.*, 1999); proportion of young women who were pre-menarcheal (Roberts *et al.*, 1999); and family structure (Watt and Sheiham, 1996).

6.2 Methodological attributes of the studies

This section describes the methods reported in the eight included studies. The details in which the methods were described varied considerably. Whilst most studies presented some detail about their sampling procedures, data collections tools, and methods of analysis, very few presented these systematically or in detail. The degree to which methods are reported is likely to reflect in part each report's publication status: whether it is a report for a primarily academic audience, or a shorter summary report for a wider audience; and whether the report is published in a journal with restrictions on length or as a single document, with more space, for appendices and illustrative tables or quotes. Of the eight studies, two (McDougall, 1998; Miles and Eid, 1997) appear to be secondary reports published primarily for health promotion practitioner audiences. All the other studies were published in academic journals.

Methods of sampling were not generally well described. All of the studies gave some indication of how they identified young people, with all using schools as their sole source. However, detailed information on sampling frames was not presented. Details of the methods used to select participants from these sampling frames were given in six of eight studies (75%). For example, in three studies all pupils within a given year group and present on a given day were included in the study sample or asked to participate (Dennison and Shepherd, 1995; McDougall, 1998; Ross, 1995; Watt and Sheiham, 1996); in one study young people were purposively selected in order to get the right balance of characteristics such as gender and eating habits (Watt and Sheiham, 1997); in another random numbers were applied to alphabetically ordered year lists (Harris, 1993). None of the studies gave an explicit description of how young people were *recruited* into the study, for example, in terms of how the study was presented to them and by whom.

Better descriptions were given on methods of data collection analysis. With respect to the types of data collection used, five studies (62%) reported the use of self-completion questionnaires only (Dennison and Shepherd, 1995; McDougall, 1998; Miles and Eid, 1997; Roberts *et al.*, 1999; Watt and Sheiham, 1996). The majority of these questionnaires were made up of closed-ended questions with fixed response categories, although two studies included some open-ended questions (McDougall, 1998; Roberts *et al.*, 1999). One study conducted individual interviews using a card-sorting task (Watt and Sheiham, 1997); and two used focus groups (Harris, 1993; Ross, 1995). In nearly all studies (N=7) some indication about the questions that young people were asked to elicit their views was provided. However, only one study gave explicit

details of the range of questions asked and gave examples of these (Dennison and Shepherd, 1995). In three studies, questions asked had to be inferred from the presentation of results (McDougall, 1998; Miles and Eid, 1997; Watt and Sheiham, 1996). One study presented the topic guide used in the focus groups (Ross, 1995), another gave examples of the issues raised (Harris, 1993); and another indicated how a card-sorting task was used in individual interviews to elicit thoughts, experiences and feelings about different foods (Watt and Sheiham, 1997). No details were presented in one study (Roberts *et al.*, 1999).

Other details of data collection given in some studies were whether the data collection tools had been piloted and/or used in previous studies (Dennison and Shepherd, 1995; McDougall, 1998; Roberts *et al.*, 1999; Watt and Sheiham, 1996; Watt and Sheiham, 1997); the setting in which data were collected (Dennison and Shepherd, 1995; Ross, 1995); and who administered the questionnaires (Roberts *et al.*, 1999). Only two studies gave no details for any of these aspects of their study (Harris, 1993; Miles and Eid 1997).

Details of how data were analysed were provided in five studies, however in three studies no information was given (McDougall, 1998; Miles and Eid, 1997; Roberts *et al.*, 1999). For studies using self-completion questionnaires, data analysis usually involved descriptive statistics to examine proportions of young people responding in a particular way and inferential statistics to identify the strength of associations between different responses. For example, Dennison and Shepherd (1995) and Watt and Sheiham (1996) looked for relationships between attitudes and/or intentions towards healthy eating by age and gender. For studies using interviews or focus groups, the analysis by Ross (1995) reported that grounded theory had been used to arrive at themes and Harris (1993) and Watt and Sheiham (1997) reported the use of content analysis.

Although the eight studies were included in this review because they were judged by the reviewers to have privileged young people's views (for some, at least in part), few studies involved young people actively in the development of the research or tailored their research methods specifically to this group. Two measures of young people's active participation in these studies are requests for consent and young people's involvement in a study's development or evaluation. From the authors' reporting, consent was explicitly requested in only two studies (Miles and Eid, 1997; Watt and Sheiham, 1996); in both of these, consent was requested from parents. Two other studies noted that young people could refuse to take part (Roberts *et al.*, 1999; Watt and Sheiham, 1997). Young people appeared to have been involved in the development of study tools in three studies (Dennison and Shepherd, 1995; McDougall, 1998; Watt and Sheiham, 1996). All these studies used focus groups of interviews to help to focus their self-completion questionnaires on issues relating to healthy eating which would be relevant to young people. For example, Dennison and Shepherd (1995) conducted unstructured interviews with 21 young people not included in the main study to identify salient factors related to food choice. None of the studies reported that the researchers attempted to minimise power relations between the young people and the researchers (e.g. techniques to put young people at ease).

6.3 Methodological quality of the studies

As described in the methods section earlier, we applied seven quality assessment criteria to the studies of young people's views. Table 26 shows the number of studies meeting these quality criteria.

Nearly all the studies clearly stated their aims and objectives (88%). The majority of studies (75%) were judged to have demonstrated an explicit theoretical framework and/or literature review for the approach taken and/or methods used in the study; described the context of the study adequately; presented a clear description of data collection and analysis methods; and included sufficient original data to mediate between data and interpretation. Only half of the studies presented a clear description of the sample and how it was obtained (50%). Only two studies (25%) attempted to establish the reliability or validity of the data analysis.

None of the studies met all seven quality criteria. However, four studies met six out of the seven criteria (McDougall, 1998; Ross, 1995; Watt and Sheiham, 1996; Watt and Sheiham, 1997); two studies met five out of the seven (Dennison and Shepherd, 1995; Harris, 1993); one study met two (Roberts *et al.*, 1999); and one study met just one (Miles and Eid, 1997).

Table 26: Number of studies displaying the different methodological criteria: Studies of young people's views (N=8)

	N*	%
Explicit account of theoretical framework and/or inclusion of a literature review	6	75
Aims and objectives clearly stated	7	88
A clear description of the context of the study	6	75
A clear description of the sample used and how the sample was recruited	4	50
A clear description of the methods used in the study including those used to collect data those used for data analysis	6	75
Attempts made to establish the reliability and/or validity of the data analysis	2	25
Inclusion of sufficient original data to mediate between data and interpretation	6	75

*N does not add up to 8 or 100% as studies could meet more than one of the quality criteria.

6.4 What did studies examining young people's views find?

In order to synthesise the results about young people's views on healthy eating, each study's findings were considered in terms of their potential to answer questions relevant to the task of developing interventions for promoting healthy eating. As a result of this exercise, studies were classified according to the main questions addressed by their findings. Results of this exercise are shown in table 27.

All of the studies examined young people's perceptions of, and attitudes to, healthy eating, or the meanings they attach to it. In contrast, none of them explicitly asked them to cite factors they thought prevented them from eating healthier foods. However, in five studies young people cited factors which could

be interpreted as barriers. Only two studies asked young people what they thought might help them to eat more nutritious foods. One study asked for young people's own ideas for promoting healthy eating.

Table 27: Number and proportion of studies according to questions addressed: Studies of young people's views (N=8)

	N	%
What are young people's perceptions of, and attitudes to, healthy eating? What does healthy eating mean to young people?	8	100
What do young people think stops them from eating healthy foods?	0	0
What do young people think helps them to eat healthy foods?	2	25
What ideas do young people have for what could or should be done to promote healthy eating	1	13

NB N does not add up to 8 or 100% as study findings could address more than one question.

A cross-cutting finding was the importance of gender and young people's desire for autonomy and choice. The specific findings are described fully below under each individual question.

***What are young people's perceptions of, and attitudes to, healthy eating?
What does healthy eating mean to young people?***

All eight studies addressed these questions. The findings can be grouped into three broad areas: (i) meanings and general perceptions of healthy eating, and associations between healthy eating and other aspects of life; (ii) how important young people consider healthy eating is to them; and (iii) how their perceptions and attitudes influence their choice of foods.

In terms of meanings and general perceptions, young people talked about what they associated healthy eating with. For example, food, exercise and health were closely related in the study by Harris (1993). Health was broadly viewed as being about avoiding smoking or drinking, not being overweight, having energy and specific actions such as taking vitamin tablets or not eating meat. This study also found that young people tended to describe negative effects of unhealthy foods, rather than positive effects of healthy foods (e.g. to be healthy you must not eat junk food).

Young people also classified foods in different ways. In the study by Ross (1995) they seldom used the words 'healthy'/'unhealthy', rather they discussed foods in terms of what they liked and disliked. Watt and Sheiham (1997) found that the majority of young people classified foods as either 'healthy food' or 'fast food'. Healthy foods were associated with adulthood and the home, while fast food was associated with people of their own age, pleasure and friendship, and life outside the home (including school). 'Fast food' was considered to taste good, be quick to eat, and convenient in the sense that it took little time to prepare. Similarly, Ross (1995) found that healthy foods were associated with foods eaten at home, whilst unhealthy foods were linked to takeaway food, often described as being 'greasy'.

Perceptions of healthy eating were also linked with dieting, weight and appearance. In the study by Roberts *et al.* (1999), which focused specifically on dieting behaviour amongst young women, dieting was considered to be good for health by over two thirds of the sample, and nearly half said that their parents approved of it. In another study being overweight was perceived as unhealthy (Harris, 1993). Furthermore, in the study by Ross (1995) people who eat healthy food were described as slim, fit, sporty and strong, whilst unhealthy foods were associated with spots, and being lazy.

Concerns over diet and its effect on health were viewed as being the responsibility of adults rather than young people, who thought that as long as they undertook regular exercise they could keep healthy (Watt and Sheiham, 1997).

Some of the studies included in this review shed light on how important healthy eating is to young people, and their perceptions of their own health. It was generally the case that they considered nutrition to be important, with young women reporting more favourable views than young men. For example, two thirds of the sample in the study by Miles and Eid (1997) said a healthy diet was important to them (74% of young women and 47% of young men), and in Dennison and Shepherd (1995), young women were more negative about chips and sweets and more positive about fruit, viewing it as better for health and better tasting than young men. Attitudes were more variable in the survey conducted by Watt and Sheiham (1996) in which 32% of the sample were classified as having generally 'positive' views on food and health, 49% had 'mixed' opinions, and 19% were classed as being 'negative' in their opinions. Worthy of note is the fact that young people interviewed by Watt and Sheiham (1997) perceived healthy foods to be generally unappealing in terms of taste.

Just over half of the sample in the study by Dennison and Shepherd (1995) saw themselves as 'someone who is concerned about the effect of what I eat on my health', and just under half viewed themselves as being 'health conscious'. All of the young people in the study by Harris (1993) considered themselves to be healthy. They tended to view their own health in relation to their peers and made relative judgements about unhealthy foods. For example, one person was quoted as saying that 'eating 2 bags of chips per day is not as bad as eating 4 bags'.

The studies also illuminated how young people's perceptions and attitudes influence their choice of foods. As mentioned, unhealthy foods were perceived as causing spots, and healthy foods were associated with slimness and fitness. It is not surprising therefore that one of the major factors influencing their views on food choices was appearance. Again, differences were apparent between the sexes. For example, when asked about important reasons for eating healthy food 75% of young women in comparison to only 50% of young men cited health, fitness and appearance as priorities (McDougall, 1998). Those who reported reducing their sugar or fat consumption in the last six months in the study by Watt and Sheiham (1996) cited a desire to improve appearance (e.g. to lose weight and prevent spots) as the most important reason, with young women significantly more likely to mention this as a reason than young men. Some of the young people interviewed in the study by Watt and Sheiham (1997) were concerned about 'fast foods' as being fattening and causing acne. Moreover, almost all of those who reported dieting in the study by Roberts *et al.* (1999) did so because they were concerned about being overweight.

Another factor governing young people's food choices was personal preferences for certain foods. Both Ross (1995) and Watt and Sheiham (1997) found that taste was an important issue. In the former study, taste and texture of foods was more likely to influence food choice rather than whether or not food is perceived to be healthy.

The fact that fast food was perceived to be convenient highlights the practical issues governing food choices. Watt and Sheiham (1997) found that fast food was appealing because it required little preparation, was easy to access, and because it could be eaten with friends (e.g. after school). The young people interviewed by Ross (1995) valued their spare time (particularly to play sports) and attached less importance to spending time preparing and consuming food.

What do young people think prevents them from eating healthily?

None of the eight studies explicitly asked young people what inhibits them from eating healthy foods. However, in at least five studies responses were given which highlighted factors which inhibit their ability to eat healthy foods. These have therefore been 'interpreted' to be barriers by the reviewers, given that the young people were not explicitly asked this question.

Poor school meal provision was one limiting factor. Only around a quarter of those taking part in the survey by McDougall (1998) stated that they thought their school offered healthy food choices, and more than half said that they thought meals could be improved. More worrying were the results of the focus groups conducted by Ross (1995), where school meals were viewed as being cold, badly prepared, with little choice, and with healthy options sometimes expensive. This was echoed by young people in the study by Watt and Sheiham (1997) in which it was reported that fast food is cheap and easy to access at school, as well as in shops and cafes near school, with healthy choices often not available to them.

Another barrier to healthy eating was personal preferences for eating foods such as 'fast food' take-aways. This was mentioned in the studies by Ross (1995) and Watt and Sheiham (1997) as an important factor in governing food choice. In McDougall's (1998) study the majority of young people (particularly young men) would choose food they liked whether or not it was healthy.

Despite preferring to eat snacks and fast food, the young people recognised that this could have negative impact on their appearance, particularly with regard to acne and being overweight. In the study by Roberts *et al.* (1999) a major reason for dieting was due to weight concerns, with a large proportion of the young women surveyed believing that this was good for their health. Therefore, young people's desire to achieve and maintain attractive appearance can be viewed as a barrier if dieting results in eating the wrong balance of foods.

It was also found that young people's 'social space' could act as a barrier. Watt and Sheiham (1997) found that unhealthy food (such as takeaways) was associated with people of a young age (i.e. peers, as opposed to adults), pleasure and friendship, and, in terms of location, life outside of home.

In the study by Ross (1995) young people indicated that they didn't consider it important to eat the same food as their friends, yet they were observed by the researcher to eat similar foods in school canteen and the playground (e.g. pizzas and chips).

Dennison and Shepherd (1995) explored perceived pressure (in terms of subjective norms, normative beliefs and motivation to comply with these) to eat healthy and unhealthy foods and detected differences according to sex and age. Young women found it easier to eat fruit and perceived less pressure to eat unhealthy foods than young men. The younger age group in the study (aged 11 to 12 years) perceived less pressure to eat unhealthy food, and more pressure to eat fruit than their older peers (aged 14 to 15 years). Interestingly, the older age group were more likely to find it easy not to eat sweets, chocolate and chips than the younger group. The concept of 'pressure' is not expanded upon in this study so it is not possible to elucidate how it is a barrier to healthy eating; however, the age and sex differences in this construct are worth noting.

What do young people think helps them to eat healthy foods?

Two studies asked young people to specify facilitators to healthy eating. Miles and Eid (1997) asked respondents "What could be done to encourage a more healthy diet?" The most common answer was a reduction in the price of healthy snacks, cited by over two thirds of the sample (67%). This was followed by healthy options on the menu at take-aways (56%); healthier choices in school canteens (39%); and healthier snacks in vending machines (37%). Responses to the question of what foods there should be more of in the school canteen included salads, pasta, fruit, and sandwiches with salad. Sources of information about healthy eating included television programmes, although young women were more likely to cite magazines and talking to friends.

Watt and Sheiham (1996) asked young people to specify what factors would be helpful in promoting future changes in diet. The most commonly cited factor was will-power (83%); followed by support from family (67%); wider availability of health foods (67%); advice from doctor (58%); cheaper health foods (53%); better nutritional labelling (50%); and support from friends (46%).

As with barriers to healthy eating, it was possible to identify facilitators in some of the studies, even though young people were not actually asked this question explicitly. The fact that young people viewed home life as involving eating healthy foods can lead to the interpretation that parents and the home are facilitators. This was mentioned in the studies by Ross (1995) and Watt and Sheiham (1997).

Young people's pre-occupation with their appearance can also be construed as a facilitating factor, in that they often saw 'fast foods' as being 'greasy' and causing spots, and weight gain (Ross 1995; Watt and Sheiham 1997). Potentially this may prompt them to reduce their consumption of 'fast foods', although it is not clear whether these may be replaced with healthy alternatives, or whether they may turn to dieting (see the previous section).

What ideas do young people have for what could or should be done to promote healthy eating?

Only one of the studies specifically asked young people this question. McDougall (1998) found that information on nutritional content of school meals would help them to make choices. This was specified by 63% of the young women and 21% of the young men. However, it was also reported that around 70% young men, and "over half" of the young women would choose food they liked whether or not it was healthy.

Some of the factors classed as 'facilitators' to healthy eating could also be interpreted to be about young people's ideas on what could be done to promote healthy eating. Again, the factors mentioned by the young people in the studies by Miles and Eid (1997) and Watt and Sheiham (1996) on what could be done to encourage healthy eating are relevant, including increased provision of healthy foods at school, in vending machines, and in take away venues, as well as reducing the cost of these foods. Moreover, help from friends and family emerged as potentially useful factors too.

6.5 Detailed descriptions of studies examining young people's views

This section of the chapter describes each of the eight studies in detail. The studies are presented in alphabetical order for ease of identification. An 'at a glance' summary of each individual study's methods and findings can be found in appendix D and E.

Dennison and Shepherd (1995) took a social-psychological approach to examine the associations between the self-reported beliefs and attitudes of young people about food choice. Their aim was to increase understanding of factors influencing food choice decisions in the school canteen, and to test a theoretical model of the factors that influence an individual's intentions.

The study was funded by a private catering company which supplied the eight English state secondary schools taking part in the study. The rationale for conducting the study was in recognition that nutrition is important during adolescence as it supports growth and shapes the aetiology of cancer, CHD and obesity. Furthermore, this period of life is characterised by rejection of 'traditional foods' and an increase in snacking and consumption of fast food. It is acknowledged that relatively few health education initiatives are based on appreciation of the factors affecting young people's food choice decisions. Increased availability of cafeteria style menus in which there is a free choice from a range of foods is cited as providing an opportunity to study how young people choose food outside of the home setting.

Respondents were drawn from two school years: year 7 (age 11 to 12) and year 10 (age 14 to 15), although the process of selecting respondents within those years is not described. A pilot study is reported in which, qualitative interviews with 21 pupils were conducted to ascertain the factors important to them regarding the food they eat and their views on different types of food, as well as determinants of their food choices. Following this study a structured questionnaire was designed following guidelines linked to Theory of Planned Behaviour (Ajzen, 1988). Three different types of food were chosen for analysis: chocolate and sweets, chips, and fruit. The questionnaire included closed-ended questions offering respondents options to tick on a seven-point scale. Questions covered: beliefs about the food items (e.g. 'Eating fruit at lunchtimes is good for my health'); how attractive the food items are; views about whether other people held opinions about those foods (e.g. 'Most people think I should eat fruit at lunchtime'); whether significant others, like parents, had views on the respondent's food choices; motivation to do what those people think; intention to eat the foods concerned; how easy it is to control their eating behaviour (e.g. 'For me to eat the amount of chips at lunchtime that I would prefer is extremely easy/extremely difficult'); whether they identify themselves as health-

conscious and concerned about the effect of what they eat on health; and perception of friends' consumption of these foods. A 10-item scale for measuring dietary restraint was included and details of parental occupation were also requested.

The questionnaire was given to pupils in the classroom and completion was supervised by the researchers who checked each questionnaire as it was completed and asked children to finish it if there was anything missing. The authors state that the questionnaire was administered to 675 pupils with no indication of whether participation was voluntary and whether any declined to complete the questionnaire. Forty eight per cent of the sample were young women, and 55% were in year seven (aged 11 to 12 years), with the remaining 45% in year 10 (aged 14 to 15 years). Data on socio-economic status of pupils are presented, but only grouped by school.

Many of the reported findings relate to the model that is being assessed (i.e. testing the applicability of the Theory of Planned Behaviour in predicting food choices), but some data on young people's attitudes towards healthy eating are presented. Half the respondents identified themselves as healthy eaters ('someone who is concerned about the effect of what I eat on my health' – 52%; 'health conscious' – 48%). Attitudes, norms, and perceptions are presented according to sex and age group.

Young women were more negative than boys about chips and sweets and more positive about fruit, viewing it as better for health and better tasting. They also found it easier to eat the amount of fruit they preferred and perceived less pressure to eat sweets, chocolate and chips and greater pressure to eat fruit than young men, although the precise nature of this pressure is not discussed.

In terms of age, the younger group perceived less pressure to eat sweets, chocolate and chips and more pressure to eat fruit than their older peers, although, curiously, the older group were more likely to find it easy not to eat sweets, chocolate and chips than the younger group.

Analysis conducted on the basis of socio-economic status found that perceived social pressure to eat unhealthy food did not differ according to class, however, the higher socio-economic groups were more likely to consider themselves to be healthy eaters.

The authors' analysis suggested that the respondents' food choice intentions were influenced by their views about their peers and by their perceptions of themselves as healthy eaters. No information is presented on what young people perceive to be barriers and facilitators to healthy eating. In their discussion, the authors suggest that attitudes and perceptions of control are significant factors in food choice decisions, as well as gender and age. Socio-economic background had little influence on attitudes or beliefs about what they eat in school.

The study was judged to meet six out of seven quality criteria for the review. It was felt that more detail could have been provided on methods used to collect and analyse the data. In spite of its generally good methodological quality the study seems to present some ethical problems. There is no mention of whether pupils were participating voluntarily, and anonymity was not a possibility because of the way that the questionnaires were checked by the researchers before they could leave the room. This raises the possibility that the pupils may

have provided socially desirable responses about their eating habits, and is thus a threat to the validity of the findings.

In a focus group study of young people aged between 11 and 14 years, **Harris (1993)** explored attitudes towards health, fitness and exercise. The study examined a number of issues including how health and fitness are perceived, and associations between the terms 'healthy' and 'not healthy'. A further objective was to explore whether perceptions varied on the basis of age and gender. The rationale for the research was recognition of the fact that interventions to promote health and fitness may be less effective as the result of limited awareness of young people's perceptions and their 'starting point'.

The study took place in 1991 in two English state secondary schools, one in Staffordshire and one in Wiltshire, drawing pupils from urban and rural areas. Sixty-one pupils (31 young women and 30 young men) took part in 14 focus groups involving between three and six pupils, some of which were mixed sex and some single sex. A pilot study was conducted to establish the appropriateness of the prompts used by the researcher, in order to reduce bias and establish suitable terminology for young people. Equal numbers of young men and young women were selected using random numbers applied to alphabetically ordered year lists (year 7 and year 9). The focus groups took place in school, during the school day and lasted between 40 and 50 minutes. They were led by the author using a series of prompts to ask about pupils' perceptions of fitness and health and about links between health, fitness and exercise. Groups were tape-recorded, the tapes transcribed and a content analysis carried out in which core variables which occurred frequently were linked, and the data compared and contrasted to generate themes. The author reports keeping notes on her reflections of conducting the focus groups in order to reduce bias.

A number of themes arising from the data were presented including the perception of health by almost all the participants as being physical rather than psychological and as being about negatives – not being fat, not smoking, not drinking too much, not being active. Furthermore, they all considered themselves to be healthy to some degree, with no-one saying that they were unhealthy, and they tended to believe that they had a reasonable degree of personal control over their health. The young people taking part tended to be more aware of the negative consequences of poor nutrition than the benefits associated with eating healthily, and their opinions are described by the author as being based on certainties. For example, chips, chocolate and crisps were viewed as bad, whereas salad, fruit and vegetables were good. The term 'not healthy' was associated primarily with food, body shape, smoking, exercise and drinking. Junk food was cited as unhealthy (e.g. chips, chocolate, crisps, sweets, not having 'proper' dinners). The young people tended to view healthy eating in relative terms as illustrated by the quote: 'having 2 cones (bags) of chips a day is not as bad as some people who have 4 cones (bags) of chips a day'. No data is presented on what the young people thought might prevent them from, or help to, lead more healthy lives.

The author proposes that teachers and health professionals should become more familiar with the way in which young people view, interpret and experience the world, in order to plan more effective interventions.

The reviewers judged that this study fulfilled five out of seven quality criteria. It was considered that details on sampling and recruitment methods were limited

and use of more direct quotations from the focus groups would have helped the reviewers to judge whether the author had moved appropriately from the data to the reported findings. Only two actual quotes are presented with the rest of the data comprising the author's categories of response developed in the content analysis, described as 'phrases used by the majority of the young people'. Despite this the study was considered useful in allowing young people's concepts of health and nutrition to be explored as a basis for more effective intervention.

A study carried out by **McDougall (1998)** in Hartlepool, in the North East of England, collected information about the awareness of, and attitudes towards, nutrition amongst 15 and 16-year-old pupils in a comprehensive school. In particular, their views on the nutritional value of meals available in school and ideas for improving them were sought.

A number of local agencies were involved in the research. The author, a health visitor with a specific interest in nutrition and young people's health, worked with local health promotion staff and a school nurse and with the support of teachers and parents to undertake the study. A health promotion initiative was already planned for the school in which the research was undertaken, and the findings of the proposed survey were perceived as being useful in its planning. One of the reasons for conducting the study was in recognition that Hartlepool has a higher than average rate of chronic illness (heart disease, stroke, diabetes), as well as concern about the dietary habits of local young people.

The sample was chosen following discussions with the school nurse and head teacher. A convenience sample of year 11 pupils was undertaken with teachers distributing self-completion questionnaires in school. The questionnaire was designed by the author following a focus group with 12 people, and was pilot tested with 15 pupils. The topics included food choices, attitudes to food and knowledge and views about healthy eating. The data collected was both qualitative and quantitative with a mixture of closed-ended questions (included to make the questionnaire more user friendly, and to make the analysis less time consuming) and open-ended questions to enable the pupils to elaborate on their answers.

The questionnaire was completed by 165 of the 170 pupils in year 11 and attending school on that day (80 girls and 85 boys). There is no other information about their socio-demographic characteristics although the school was in a relatively affluent part of town. The author notes that, based on the data reported by pupils, 40% of girls were underweight and 43% of normal weight. The pattern of meals and the types of food eaten are described. Young women generally reported eating fewer high fat or high sugar foods and ate more fruit than boys.

Knowledge of which foods are healthy did not differ much between the sexes, so that different patterns of eating may not be linked to different knowledge. Young women were more likely than young men to say that information about the nutritional content of school meals would influence their choice of food (63% vs. 21%). Pupils were asked about important reasons for eating healthy food. Half of the young men and three quarters of the young women said that health, fitness and appearance were most important (these answers appear to be combined and it is difficult to work out how the question was asked and answered). Sixty two per cent of young women and over 80% of the young men were happy with their appearance. Nearly 70% of young men and more than half of the young women said that they would choose food they liked regardless of whether or not

it was healthy. A quarter of the sample said that they thought their school offered healthy food choices, although more than half of the sample said that school meals could be improved, although views on how this might be achieved are not reported.

The findings of the survey are discussed as being similar to other surveys, and are placed in context of Department of Health guidelines on nutrition. Further research with the same sample is recommended, particularly in relation to evaluating a health education intervention in the school (e.g. after the introduction of healthy snacks in the school tuck shop).

The study satisfied six out of seven of the criteria for quality used by the reviewers. No information was provided on whether any attempts were made to establish the reliability/validity of the data analysis. Although the study was judged to be generally of good methodological quality there were some difficulties for reviewers in the way the findings were presented. For example, some categories of response were combined, and a figure of 'over 50%' cited. The study points to the gap between knowledge and behaviour with generally good awareness of healthy eating but unhealthy choices being reported particularly by young men. There is some indication that young women are unhappy about their appearance and concerned with being overweight.

A short report about the views of teenagers on diet and health is included in a report of a study carried out by **Miles and Eid (1997)**, researchers working at the Institute of Child Health, London. The article, likely to be a secondary report, is quite brief and presents only limited details of methods and results. The aim of the study was to compare what young people know about nutrition with their health-related behaviour. It was considered that their views were valid and should be reported back to decision-makers. The rationale for conducting the research was recognition of evidence from surveys suggesting poor diets of young people, as well as recognition of the importance of establishing healthy eating patterns to be maintained into adulthood. The importance of preventing obesity in adulthood is discussed. The questions posed by the study included: are young people aware of the importance of healthy eating?; do we give young people enough opportunities to learn about and discuss healthy eating?; are there healthy alternatives to sweets, crisps, and soft drinks in vending machines?; are school meal providers offering healthy diets that are attractive to young people?; are young people aware that a healthy diet can prevent diseases and promote well-being?; how influential is the media and how can we use it to improve young people's diets?

The study involved 109 pupils (55 young men and 54 young women) attending a comprehensive secondary school chosen because of its willingness to participate in the research. The location of the school is not given, but it is assumed to have been in England, and there is no information about the age, social class, ethnic background or any other characteristics of the sample. Students completed a questionnaire about school meals, views on healthy eating and ideas about ways to improve young people's diets and interviews were conducted with school personnel (although the results are not reported in the article). Consent was sought from parents, and anonymity and confidentiality were assured.

Sixty one percent of respondents said that a healthy diet was important to them (74% of young women and 47% of young men) and 50% knew that a poor diet could lead to heart disease in adulthood. A further 27% mentioned other illness

linked to a poor diet like diabetes and obesity. Students were asked what could be done to encourage a more healthy diet (it is not clear whether they were given a list of options to tick or whether they wrote in suggestions). Answers included: a reduction in the price of healthy snacks, mentioned by 67%; healthy options on the menu at take-aways (56%); healthier choices in school canteens (39%); and healthier snacks in vending machines (37%). When asked about what foods there should be more of in the school canteen, responses included salads, pasta, fruit, and sandwiches with salad. Sources of information about healthy eating included television programmes, although young women were more likely to cite magazines and talking to friends.

The authors discuss what they perceive to be the gap between young people's knowledge of nutrition, and their actual eating behaviour, and suggest that better provision of healthy food would encourage them to eat better food. Both parents and teachers are encouraged to stress the importance of nutrition to young people, particularly if young people are responsible for making their own packed lunches. Better school meal provision is also recommended, in view of the fact that only sweet snacks were available in the vending machines located in the school. A possible method of achieving these goals is proposed in which teachers, pupils and caterers engage in discussion with dieticians and dental practitioners to co-ordinate the type of food provided in schools. Wider school changes are also suggested to support teachers, including better teaching materials, and allowing more time in the curriculum to provide health education.

This report met only one of the seven quality criteria applied by reviewers, that is, a clear statement of aims was provided. It has not been possible to trace a more extensive report of the study and thus it is difficult to interpret the findings in the absence of a thorough appraisal of the study's methodological quality. For example, the characteristics of the sample and the context of the study are not described in enough detail. In addition, there are no details about the types of questions put to the young people, which makes it difficult to know what weight to give to the reported findings.

In a study of the views of young women aged between 11 to 15 years in the Northwest of England, **Roberts et al. (1999)** aimed to examine the general dieting behaviour and characteristics of young women, and to examine socio-economic characteristics. The study, funded by Liverpool John Moores University, was conducted in the light of evidence of increased dieting at younger ages, and the fact that dieting may be confused with healthy eating as a way of reducing obesity.

Schools in Merseyside and Lancashire were randomly invited to participate in the research, with six schools agreeing to take part (two independent, two comprehensive and two girls high schools). A pre-piloted self-completion questionnaire containing questions on demographics (age, height, weight) and dieting behaviour, was distributed by the teachers. The questions were mainly closed-ended, although there were some open-ended questions which were numerically coded for statistical analysis. Participation was voluntary, and due to the sensitive nature of the subject matter reasons for non-participation were not elicited.

The sample comprised 569 young women with a mean age of respondents of 12.8 years and a mean self-reported body mass index (BMI) of 19.2 kilos per meter squared (21% said they didn't know their height or weight). Dieting was measured by asking the young women if they had ever changed the way they

ate to lose weight and just over a third reported that they had dieted at some time. Those who had dieted had a slightly higher BMI (20.7 vs 18.3) but no information was given about their ages compared to non-dieters. Those who had dieted were asked questions about their views. Two thirds reported that they thought dieting was good for their health and 48% said that their parents approved of their dieting. When asked why they dieted almost all gave reasons connected with being too fat with the exception of 15% who were coded as being 'generally unhappy about their appearance' and a further 7% who wanted to 'keep fit and healthy'. There are also data reported about the timing and pattern of dieting.

The authors note that a cause for concern is the fact that two thirds of young women perceived dieting to be healthy, as well as the fact that half of them reported parental approval of diet. This suggests that misconceptions exist between dieting and healthy eating. They propose that for young women needing to lose weight (e.g. to reduce levels of obesity) a well balanced diet should be followed in combination with increased levels of exercise, as a safer option to dieting alone.

The reviewers judged that the study had met four out of seven quality criteria. An explicit theoretical framework/literature review was not provided, the aims were not explicitly stated, and details of sampling and recruitment were judged to be lacking. The findings are of limited value in terms of generalisability because details of the way the young women were selected and recruited were very limited, there are only crude proxy measures of social status and some findings are not reported fully. In addition, estimates of the proportions of young women who had ever dieted may be affected by non-response. The authors were not able to report a figure for those who declined participation.

Given these limitations, it is important to know that around a third of young women had dieted at some point and that almost all of them did this because they saw themselves as too fat or wanted to avoid being fat. The belief about dieting being healthy (expressed by two thirds of dieters) is also important. It would have been useful to know what the non-dieters thought about this. The behaviour and views of young men should also be sought, both about their own weight and about their opinions about young women's weight and appearance. Qualitative work with both sexes about dieting would be useful.

In a qualitative study carried out in a Scottish primary school, **Ross (1995)** explored children's food preferences and views about food. The study, conducted as part of the author's masters thesis, was devised in recognition of gaps between what children and young people know about nutrition and the foods they eat. It is suggested that social context is likely to be highly relevant as a predictor of healthy eating behaviour and therefore socio-cultural issues should be investigated in order to devise effective educational initiatives. The aim of the study was therefore to explore the attitudes and beliefs which underpin health-related behaviour to increase understanding of young people's food choices.

The study was carried out in June 1994 in an Edinburgh primary school chosen as it was known to the researcher (the author) which, it is reported, facilitated the process of negotiating access for the research. Focus groups were chosen as the medium of data collection because of the exploratory nature of the study, and also because they involve the active participation of respondents which, it is stated, is in accord with recognition of the need to encourage the active role of children in research. Furthermore, it is acknowledged that focus groups are

suitable for children and young people as they enable them to explore their views and thoughts in their own words. A semi structured topic guide was used during the groups, which explored a number of issues, including: food preferences, concepts of 'healthy'/'unhealthy'; good/bad foods; concepts of a proper meal; influence of friends and family; associations of foods with image, mood and health; and structural elements of food choice, such as time, availability and cost. Discussion started around the first issue, food preferences, with other topics raised during the course of the conversation. A mediator ensured that every topic was covered. The groups were video- and audio-taped and transcribed verbatim. The data were analysed using a grounded theory approach and a number of themes identified. The pupils were also observed at lunchtimes over the course of a week.

The focus groups were planned to take place over two mornings and a total of 46 children (of a possible 48) in school on those mornings were included in the study. Seven focus groups were carried out with pupils in the final year at primary school (age range 10 to 12, mean age 11 years). Numbers in the focus groups ranged from five to eight; two were mixed sex, three young women only and the other two young men only. The school drew on a catchment area that was mixed in terms of socio-economic status, and comprised mostly white young people.

Personal preferences about taste and texture of foods tended to influence food choice rather than whether or not they were perceived to be healthy. The words 'healthy'/'unhealthy' were rarely used in the focus groups, although when such terms were introduced into the discussion the young people demonstrated a sound understanding of what they meant. For example, unhealthy foods were often referred to as being 'greasy' foods. Instead of using terms to signify health properties of food, the data suggested that young people classify foods in terms of whether they were liked or disliked. Thus when asked if they were aware of eating healthy foods they tended to say that they only ate things they liked.

'Healthy foods' were associated with foods eaten in the home, and in contrast, unhealthy foods were linked to takeaway food. Furthermore, it was found that the young people viewed health through physical manifestations. People who eat healthy food were described as slim, fit, sporty and strong, whilst unhealthy foods were associated with spots, and being lazy.

Convenience emerged as an important factor influencing food choice. Quotes are presented illustrating how some young people were responsible for preparing their own meals when their parents were out. Eating 'Pot Noodles' was cited as a choice because it is quick to make, and also in at least one case because using the cooker had been forbidden. The data also suggested that young people value time to play sports rather than to devote time to preparing and consuming food. This was backed up in part by the researcher's observation of them at lunchtime in which the boys could often be seen playing football, whilst in contrast, the young women were observed sitting and eating in groups.

The young people described the strategies used by adults to encourage them to eat healthy food and their own strategies in avoiding the foods they did not like. For example, some parents stressed the importance of vegetables and served them often at meal times, and some young people reported acts of deception including feeding food to the dog, or putting food in the bin. Swapping foods was one strategy used in school, but fruit and other healthy foods could not be swapped for preferred food because they were not wanted.

When asked about school meals the young people criticised them as being cold, badly prepared and as having little choice. In one focus group it was also mentioned that healthier options such as salad were more expensive than foods such as pizza and chips. Complaints were also made about the catering staff being inattentive and not listening to the young people. In one quote presented, a respondent cites the fact that when wanting to eat a particular type of food 'half the time it's not there', indicating inconsistent provision (p.319).

The author discusses how the findings in this sample are comparable to those in similar investigations with young people, and how a dominant theme to emerge from the data is the fact that children value the ability to make choices over what they eat. Whilst they understand what is healthy/unhealthy, they are not necessarily motivated to choose healthy options, although they do acknowledge that food prepared in the home by parents is good for them. It is therefore suggested that health education initiatives might be better targeted at food providers, including health promoting schools initiatives, improving nutritional value of take-away foods, or encouraging parents to provide healthier food at home.

The study was judged by reviewers to have passed six out of seven quality criteria. It was felt that reporting of how the data were analysed, and any attempts to enhance the validity of the data analysis, was limited. It was also noted that there was no indication of whether the young people or their parents were asked to provide consent to participate. This is particularly important given that they were video taped and observed, as well as the fact that, as the author notes, some of them were uneasy with the researcher's presence. Although the themes explored in the focus groups could be interpreted to be related to barriers and facilitators around nutrition, it appears unlikely that the young people were asked directly to specify what factors inhibit or promote their ability to eat healthily. Nevertheless, the study is particularly useful in emphasising values and beliefs in the social context of eating. The qualitative approach is clearly valuable in allowing young people to talk about food without adult, or researcher imposed themes being introduced too early on in the process. This demonstrated that for these young people at least, health was not an important issue when discussing food.

Watt and Sheiham (1996) carried out a survey to explore the eating patterns of young people aged 13 to 14 years living in Camden, North London. The research was conducted in view of the fact that the development of policies to promote healthy eating amongst young people in the UK is dependent upon an understanding of their dietary behaviours and their ability to change what they eat. The aim, therefore, was to assess young people's diet, knowledge, beliefs and skills about food and health, and to identify factors that may influence their ability to change their diet. The study also sought to determine the applicability of the stages of change model to healthy eating behaviour.

The research was carried out between May and July 1994 using a self-completion questionnaire developed by the authors from existing questionnaires about diet, and tested in a pilot study. The questionnaire comprised knowledge and attitude statements to which young people had to indicate agreement or disagreement, and a healthy eating index in which they had to indicate the frequency of consumption of a range of food products. Four schools were selected at random from a list of all secondary schools in the local education

authority and all agreed to take part. All year-9 pupils in those schools were approached by a letter to requesting consent sent to parents.

In all 485 questionnaires were returned (out of an unspecified total number administered) with 479 accepted for analysis. The sample had a mean age of 14.3 years; 60% were young men; 34% lived in households classified as non-manual with 52% from manual households and 14% unclassifiable. In terms of ethnicity, the sample was described as being 'very diverse' with the majority (62%) identifying themselves as white UK, and the remaining 38% comprising 10 different minority ethnic groups. Whilst it is acknowledged, by the authors that the sample cannot be viewed as being representative at the national level, as the schools were widely located across the Borough of Camden it could be considered locally representative.

When asked what factors would be helpful in promoting future changes in diet, the most commonly cited factor was will-power (83%); followed by support from family (67%); wider availability of health foods (67%); advice from doctor (58%); cheaper health foods (53%); better nutritional labelling (50%); and support from friends (46%).

In terms of where young people go for to get information on food, family members were most commonly consulted (80%); followed by reading labels on food packages (72%); health professionals (68%); books (67%); and supermarket leaflets (59%). Friends and teachers were amongst the least common sources (35% and 34% respectively).

Those who reported reducing sugar or fat consumption in the last six months were asked the reason for the change. The most important reason, given by nearly 70% in the case of fat reduction, and 62% in the case of sugar reduction, was a desire to improve appearance (e.g. to lose weight and prevent spots). Young women were significantly more likely to cite appearance as a reason for reducing fat intake than young men. Health reasons (e.g. following advice from a doctor) were cited less often (37% and 45% respectively), as was the desire to change their daily routine and try different foods (12% and 8%), and to save money (9% and 14%). Young people from non-manual households were more likely to cite health reasons for changing sugar intakes than their peers from manual households.

There was some variability in attitudes towards food and health, although views were generally positive. Thirty one per cent agreed with the statement 'as long as you are reasonably active you can eat what you like', compared to 24% who neither agreed or disagreed, 33% who disagreed and 12% who stated they didn't know. Percentages in agreement or disagreement with the statement 'I find healthy foods too boring' were 30%, compared to 25%, 39% and 6% respectively. The overall attitudes of the sample towards healthy eating were assessed through index scores for each statement, which were totalled to give a composite score. Thirty two per cent were classified as having generally 'positive' views, 49% expressed 'mixed' opinions, and 19% were classed as being 'negative' in their opinions.

In their discussion, the authors note the significance of structural and social influences on the young people's food choices. Factors such as cheaper cost and wider availability of healthy foods, and nutritional information on product labels were perceived as potential facilitating factors in healthy eating. In particular it is noted that, in contrast to previous studies, the family is a crucial

social influence, as is the health professional, more so than schools and teachers or even friends.

The reviewers judged the study to fulfil six out of the seven quality criteria. Not enough information was provided on whether any attempts had been made to enhance the reliability and validity of the data analysis. It would have been useful to know more about the structure of the questions put to the young people. For example it is not clear whether the perceived factors supporting dietary change listed in the preceding paragraph were part of a checklist type question or were derived from comments made by the respondents and coded by the authors. One other limitation of the study report is that no indication of the response rate is given.

Watt and Sheiham (1997) also conducted a qualitative study, which was carried out alongside this larger survey. Their qualitative study interviewed 81 young people about their views of food and eating. Funded and conducted at University College London, the rationale for the study was recognition that although a number of studies have assessed young people's knowledge and nutritional intake, relatively few studies have assessed the social context of eating. The aim was therefore to assess the meanings of food-associated concepts and how these fit into young people's lives.

The young people taking part were aged between 13 and 14 years old and were selected from a larger random sample of pupils at four state comprehensive schools in Camden, North London. The larger sample had taken part in the questionnaire study detailed above (see previous summary: Watt and Sheiham, 1996). They were selected to provide a balance of young men and young women, and also to include those with a range of different experiences of dietary change, based on the questionnaire data. The sample therefore comprised 81 students, 41 of which were young men and 40 young women.

The researchers elicited young people's views by using cards with the names of foods and drinks on them. They asked the respondents to arrange the cards and talk about the links between the foods and their experiences and thoughts about them. The process was tape-recorded and the tapes transcribed. Content analysis of the transcripts was done and checked independently by a second researcher. Consent to participation was sought with only one person refusing to take part.

The majority of the young people, irrespective of sex, tended to classify foods as either 'healthy food' or 'fast food'. 'Fast foods' were often described as 'greasy' or 'fatty' (e.g. chips, hamburgers, kebabs, crisps, pizza, milkshakes). Food cooked at home was usually classified as 'healthy' (e.g. fruit, vegetables, bread rolls, rice, skimmed milk, pasta, baked beans). There were some misconceptions around how healthy different meats are. It was common for meat to be classified as healthy or unhealthy depending on where it had been cooked, with meat consumed in the home generally considered to be healthy.

The social context of eating was very important and the authors draw out two dimensions of the views expressed – setting and acceptability. Healthy foods were associated with adulthood and the home while fast food was associated with people of their own age, with pleasure and friendship and with life outside the home. 'Fast food' was most commonly eaten outside the home, either at school or on the street and was described as tasting good and being quick to eat, as well as being cheap. Part of the appeal of fast food was that it was

instant, requiring little in the way of preparation. Consumption often took place in social situations with peers (i.e. during school lunch breaks, or whilst shopping). Many interviewed reported easy access to fast food at school and in shops and cafes near school, and stated that often healthy choices were not available to them. Adult disapproval of fast food was mentioned, with some young people reporting deceiving their parents about how much they had consumed. Despite finding fast food appealing and easy to access, some of the young people interviewed expressed concerns about it being fattening and causing acne.

Links between perceptions of health and life stages also emerged from the interviews, with sweets being perceived to be relevant to younger children, and healthy foods associated with adults, particularly mothers. Similarly, worrying about health was perceived to be something adults did, and that young people could keep healthy as long as they undertook physical activity, something it was suggested adults do not tend to do.

In terms of the value of healthy foods, it was found that young people perceived them to be generally unappealing, partly because they do not taste as good as 'fast foods', and partly because they were expensive and not always available outside the home. A quote from a student interviewed suggested that taste is an important factor in food choice rather than an appreciation of nutritional value: 'I love eating ice cream and hamburgers, because I like the taste of it, but people might not like skimmed milk or pasta, because, although they might be good for them they don't like it and won't eat it' (p. 344).

Whilst the authors do not consider the findings of this study to be representative of young people in different settings, they suggest that the results support previous research with this age group in the UK and beyond. One explanation for the uniformity in young people's perceptions and classifications of foods between countries is the possible influence of multi-national food corporations with global branding and availability of fast food products. The significance of young people's perceptions of the school as not providing healthy foods is also discussed, particularly in comparison to other studies where the school has been cited as promoting healthy eating. In terms of recommendations, interventions which teach young people skills training in decision making and assertiveness in relation to food choice are proposed. Such initiatives should be complemented by environmental modification to increase availability, and lower the cost of healthy food choices within and around schools.

The study was judged to have met six of the seven quality criteria for the review. It was felt that more detail could have been provided on the context in which the study was planned and conducted (e.g. any reflections by the researchers on their possible impact on the type of answers the young people gave, or on their influence on the research process in general). The exploratory method used seems to have yielded important data and the authors' present an interesting analysis and discussion of the concepts expressed by the young people when talking about food, with good use of quotes to illustrate the findings.

7. SYNTHESIS ACROSS STUDY TYPES

Outline of Chapter

This chapter synthesises the findings from the different sections of the report. This is a particularly challenging exercise, in view of the different types of research included. Specifically the chapter looks at:

- *in what ways the **barriers** to healthy eating **identified by young people** are **similar** to or **different** from those addressed by **interventions**; and*
- *the extent to which the **facilitators** of healthy eating identified by young people have been used to develop interventions aimed at promoting healthy eating amongst young people.*

The chapter will be useful to all audiences (practitioners, policy specialists, researchers, young people, their families and friends) as it draws together the evidence from the mapping exercise, and the intervention and non-intervention studies described in the previous chapters of this report to provide a composite picture of the barriers to, and facilitators of, healthy eating. In particular:

- ***practitioners, policy specialists and young people, their families and friends** are likely to find useful the examples presented of effective interventions which have addressed issues expressed by young people as either barriers or facilitators (e.g. ‘healthy food choices’ as part of multi-component whole school initiatives in section 7.1); and*
- ***researchers and policy specialists** may find useful examples of mismatches between what young people say is important for healthy eating and soundly evaluated effective interventions which have addressed such issues (e.g. nutritional labeling for school meals in section 7.3). These highlight promising interventions to build on in mental health promotion research and development.*

Key Messages

- *Effective interventions that addressed the barriers or build on the facilitators identified by young people were grouped into four areas: the school; physical and material resources; relationships with family and friends; and the self.*
- ***In schools**, young people identified barriers as: teachers, who were rarely sources of information about nutrition (Y7); and a lack of healthy choices at lunchtime and meals that could be improved (Y3, Y6, Y8). These barriers were overcome with changes to the food in school canteen: ‘healthy food choices’ or nutritional content of meals as part of multi-component whole school initiative (OE11); increasing availability and portion sizes of fruits and vegetables (OE13).*
- *Young people also recommended: healthier choices in school canteens, the counterpart of the ‘lack of healthy choices barrier addressed above (Y4); and nutritional labeling of foods (Y3). No effective interventions addressed this latter facilitator.*

- *Other facilitators addressed by effective multi-component interventions at school were: using computers to analyse the nutritional status of food (OE10) and preparing healthy food; and young people lobbying for health supporting environmental changes in school (OE14).*
- **Relationships with family and friends** presented some barriers to healthy eating. *Socialising, relaxation and pleasure were associated with eating unhealthy food (Y8) and friends were rarely sources of information about nutrition nor helpful in changing eating habits (Y7).*
- *These barriers were overcome with interventions aimed at young people and their friends and family. These included preparing healthy foods at school and home, and sharing information with friends and family; sending newsletters, recipes and coupons to parents alongside school programmes (OE13); linking a multicomponent school-based programme to youth clubs with the provision of more healthy snacks (OE10); and school-based initiatives using peer leaders to promote healthy eating, and classroom activities to explore peer and family influences on food (OE14, OE20)*
- *Young people say that healthy eating is also facilitated by the counterparts of the barriers identified above: families as the most common source of information on nutrition (Y7); families in helping changes in diet (Y7); home, which young people associate with healthy food (Y8); and young women's friends, talking about nutrition (Y4).*
- *Effective interventions addressing these facilitators included: school-based interventions linking with friends (OE10, OE14) and the home and family (OE10, OE13, OE20, OE21).*
- **Personally**, barriers to healthy eating were: *preferring the taste and texture of fast food (Y6, Y8, Y3); concerns over appearance (e.g. weight) encouraging 'dieting' (Y5). These barriers were partly overcome by 'taste-testings' with produce give-aways of fruit and vegetables as part of a wider school programme (OE13); peer-led classroom activities analysing commercial diets and setting criteria for sensible weight control (OE14); and measuring and telling students their height, weight, skinfold thickness, blood pressure and cholesterol levels, then discussing and setting behavioural goals (OE21).*
- *Young people said healthy eating is also facilitated by concerns about appearance that prompt moderate intake of fast foods/ unhealthy foods (Y6, Y8); and will power (Y7). They also recommend: information on the nutritional content of school meals (young women especially). No effective interventions addressed these facilitators.*
- **Practical and material resources** present barriers because fast food is cheap and easily available (Y8). *Healthy food is sometimes unavailable and inconvenient to prepare (Y6). These barriers have been overcome by: making healthy snacks available in youth clubs as part of a larger programme (OE10); lobbying for healthier food in school (OE14); and sending parents recipe and coupons for food items as part of a school programme (OE13).*

- *Young people say that healthy eating is facilitated by TV and magazines providing nutritional information (especially for young women) (Y4). They also recommended: healthier snacks in vending machines, healthier options on 'take-away' menus (Y4); lower prices for healthy snacks (Y4); and better labeling of food products (Y4). No effective interventions addressed these facilitators.*
- *This review has not revealed the barriers and facilitators to involving young people in consultations, developing interventions or research.*

This chapter attempts to synthesise the findings from the different sections of the report. This is a particularly challenging exercise, in view of the different types of research included. Specifically, the chapter looks at:

- In what ways the barriers to healthy eating identified by young people are similar to, or differ from, those addressed by outcome evaluations; and
- The extent to which the facilitators of healthy eating identified by young people have been used to develop interventions aimed at promoting nutrition.

The synthesis was conducted using a matrix which laid out the barriers and facilitators identified by young people alongside descriptions of the interventions included in the in-depth review of outcome evaluations (see Appendix F).

The views of young people were examined for common and distinguishing characteristics. The following four broad areas describe the realms in which the barriers and facilitators appeared to be: the school; family and friends; the self; and practical and material resources. The barriers identified by young people were grouped according to these areas, and formed the first column in the synthesis matrix. Facilitators were grouped in a similar way to create the second column, and then further grouped according to whether young people had identified them as factors that helped them eat healthily or something which could or should be done to promote healthy eating.

The four broad areas are amalgamations of the categories used to describe barriers and facilitators within this review's mapping exercise (chapter 2): 'family and friends' refers to most interpersonal and family factors; 'the self' represents psychological factors; and 'practical and material resources' describes structural factors. The final area, the 'school' incorporates a variety of barriers and facilitators associated with the self, relationships, material and physical circumstances and socio-cultural factors, and illustrates how factors arising from the individual, community, and society interrelate.

Interventions evaluated in sound outcome evaluations (N=7) as described in chapter 5 were then examined to see whether they aimed to address the barriers and facilitators identified in the studies of young people's views. When an outcome evaluation appeared to address a barrier or build on a facilitator it was listed in a third column in the synthesis matrix. The intervention evaluated and its findings were described.

When none of the interventions within the set of sound outcome evaluations appeared to address barriers or build on facilitators identified by young people, further steps were taken. The interventions within the set of outcome evaluations

judged to be not sound in the in-depth review (N=15) were scanned to see whether any matches could be identified. If so, these were listed in a fourth column in the synthesis matrix. Then, if matches within these outcome evaluations could not be identified, we searched for interventions within the set of outcome evaluations identified in the mapping exercise (described in chapter 3) but not reviewed in depth. This enabled an assessment of the extent to which intervention research addresses young people's views.

7.1 Matching young people's views to evaluated interventions: 'the school'.

Young people's experiences of school identified the ways in which it can promote and limit their ability to eat healthily. In general the barriers outweighed the facilitators, centring around provision of school meals which were described as sometimes being cold, badly prepared and lacking in choice, healthy options. This is also accompanied by the fact that unhealthy foods were in particular easily available and cheap in school canteens. In terms of suggestions for what could be done to promote healthy eating in schools, young people suggested that canteens could offer a better range of healthier foods, particularly salads or pasta, and for young women in particular, information on nutritional content of foods was mentioned as being helpful.

The issue of poor availability of healthy options in schools was addressed by some of the soundly evaluated outcome evaluations. Two studies evaluated the impact of modifying the types of foods provided in schools, and both were effective for increasing reported healthy eating. In the 'Gimme 5' programme, which aimed specifically at increasing consumption of fruits and vegetables, more variety of healthy foods was provided as well as increased portion sizes (Nicklas *et al.*, 1998). In the second 'North Karelia Youth Programme' a variety of changes were made to the menu including promotion of vegetables and fresh salads and skimmed milk (Vartiainen *et al.*, 1991). Moon *et al.* (1999a) evaluated the 'Wessex Healthy Schools Award' in which a whole school approach to health promotion was adopted with schools implementing a health education curriculum and choosing to focus on two of nine key areas, one of which was 'healthy food choices'. However, details are not provided on whether participating schools made changes to the canteen menus. The study was effective at increasing reported healthy eating particularly for young women (aged 15 to 16 years, in comparison to the young age group 12 to 13 years), although not effective for increasing knowledge (described by the authors as being high at the initiation of the study).

In one study, the 'Slice of Life' programme (Perry *et al.*, 1987) environmental changes in the school were lobbied for by the young people but it is not reported whether they were actually implemented. As part of the intervention young people interviewed fellow pupils, teachers and canteen personnel to identify environmental influences on their ability to lead healthy lifestyles. They also compared the food provided in their school to nutritional guidelines and made recommendations to school administrators on how changes could be made (Perry *et al.*, 1987). The intervention was effective for increasing reported healthy eating, teaching practical skills (e.g. reading food labels correctly), and increasing knowledge and awareness.

Only two of the outcome evaluations judged to be not sound modified the foods available to young people in school. The study by Ellison *et al.* (1989) was described by the authors as being a 'passive' intervention, in that the pupils

attending the boarding schools participating in the study did not receive any education or information. Rather, the catering staff were encouraged to reduce the fat and sodium content of foods. Outcomes measured included nutritional intake, blood pressure and the sodium and fat content of foods. The first 'North Karelia Youth Study' (Vartiainen *et al.*, 1982) modified the way school lunches were prepared with use of vegetable oils and reduction in the use of salt. Caterers supplying schools were encouraged to reduce salt content of foods. The effectiveness of these studies was judged by the reviewers to be unclear in view of the fact that they were not soundly evaluated.

Another barrier to healthy eating in schools was the fact that friends and teachers were one of the least cited sources of information on nutrition, although exactly why this is the case is not clear. Nevertheless, teachers and peers have been involved in delivering nutritional education in several studies. For example, in the second 'North Karelia Youth Programme' (Vartiainen *et al.*, 1991), students were taught how to make meals low in fat in home economics classes. As already mentioned, this intervention was effective. In the 'Know Your Body' programme (Walter I, 1989; Walter II, 1989) students received, amongst other activities, two hours a week of teacher led education about nutrition for a year, and this was found to be effective for decreasing cholesterol and blood pressure. However, it was reported by the authors that teachers were not always able to deliver the curriculum effectively, and that they sometimes lacked enthusiasm and skill. It was suggested that their training was not of sufficient duration to motivate and equip them with the necessary skills. Moreover, at least two of the sound outcome evaluations attempted to address social influences through employing peer leaders to provide classroom education, and these were generally found to be effective, and the use of peer leaders was well received (Klepp and Wilhelmsen, 1993; Perry *et al.*, 1987).

In terms of what young people think could or should be done to promote healthy eating, information on the nutritional content of foods was mentioned as something which might help in the decision process (particularly for young women). All of the soundly evaluated interventions, and the majority of those judged to be not methodologically sound provided some form of information regarding the nutritional value of different foods. In one sound study, a computer programme was used which enabled pupils to analyse the nutritional status of different foods (Klepp and Wilhelmsen, 1993). They later prepared foods at school and at home. This intervention was effective for reported healthy eating and for increasing knowledge (for young men only). Information on nutritional content of foods at the point of purchase might be particularly helpful to enable young people to understand, directly, the nutritional value of the food they are about to consume. Only one of the soundly evaluated interventions attempted to do this, the 'Gimme 5' programme which employed 'marketing stations' (colourful display boards) and point of service signs consisting of colourful placards providing nutrient information per serving size of healthy foods (Nicklas *et al.*, 1998). This intervention was found to be effective.

7.2 Matching young people's views to evaluated interventions: 'families and friends'

One of the most significant themes to arise from the studies examining young people's views was the association between healthy food, with adulthood and the home, and unhealthy food with relaxation, friendship and social environments. In terms of facilitators, the young people acknowledged that their

parents often provided them with healthy meals at home, although they did not always like them, and on occasion reported acts of deception to avoid eating them. Family members were noted as being a common source of nutritional information, and an important facilitator for changing eating habits. Four of the seven soundly evaluated outcome evaluations included activities to involve parents, with the general aim to reinforce the promotion of healthy eating in the school at home. In the 'Gimme 5' programme, parents received newsletters and brochures containing details of the programme, as well as recipes and coupons (Nicklas *et al.*, 1998). It was effective for reported healthy eating behaviour but attendance of parents at project open evenings was low. The interventions evaluated by Walter I (1989), Walter II (1989) and Klepp and Wilhemsen (1993) involved parents in a similar manner, and both were found to be effective, the former in terms of changes in cholesterol levels and blood pressure, the latter in terms of reported healthy eating. More far reaching activities took place in the second 'North Karelia Youth Programme' to involve parents, including a health education initiative conducted in the workplace of the parents of pupils receiving the school-based intervention, and the production of a television programme in which parents participated in studio discussions. These interventions were generally effective at increasing consumption of healthy foods.

Of the pool of studies judged to not be soundly evaluated, at least eight involved parents in the education of young people about nutrition. Some of these evaluated the effect of involving parents to complement school-based activities, in a similar way to some of the sound outcome evaluations discussed above (Coates *et al.*, 1985 described in two reports: Coates *et al.* (1985), and Simons-Morton *et al.* (1984) and hereafter referenced as Coates *et al.* (1985); Hopper *et al.*, 1992; Petchers *et al.*, 1987; Vandongen *et al.*, 1995), whilst others involved young people and parents learning about healthy foods together (Baranowski *et al.*, 1990a). For example, in the 'San Diego Family Health Project' parents and their children actively participated in a year long nutrition and exercise programme (Nader *et al.*, 1989). Attendance was higher for White families than for Mexican families. African American mothers and daughters participated together in a pilot community-based programme to prevent obesity, in which they were taught skills (e.g. how to read food labels, calculate fat and calorie content of foods) and were encouraged to eat low fat foods, particularly in fast food restaurants (Fitzgibbon *et al.*, 1995).

In another study families were targeted whilst shopping in supermarkets in an attempt to influence their food purchases (Wagner *et al.*, 1992). The 'Nutrition for a Lifetime System (NLS)' was an interactive information system using a computer, a video disc player, a colour monitor and a printer housed in a kiosk. The NLS monitors purchases and provides individualised feedback on nutritional value of foods. Although young people did not interact directly with the NLS it did make suggestions to parents about healthy foods suitable for them. Again it should be stressed that it is not clear whether this intervention, or any of the others from the pool of not sound outcome evaluations, was effective or not.

On the whole friends could be considered a barrier to healthy eating. Although in one study talking to friends was regarded to be a prominent source of information, particularly for young women, in another study they were one of the least cited sources of information on nutrition, and well as being one of the least mentioned factors as helpful in promoting changes in diet. It is not clear exactly why this is although one explanation might be the role of peer pressure or peer influence to eat unhealthy foods. In one study examining the views of young people, they were observed to eat similar foods to each other at lunchtime in

school, although in focus groups they said that they didn't feel it was important to eat the same foods as their friends (Ross, 1995). Rather, young people reported eating 'fast foods' whilst socialising with each other (e.g. whilst shopping, or going to and from, school), because they are readily available, cheap and taste good.

Although peer influence may not necessarily be a significant barrier to healthy eating in the studies included in this review, some of the outcome evaluations did attempt to address this issue. For example, in the 'Slice of Life' intervention, peer leaders were recruited for their popularity and some of the classroom sessions they delivered focused on social influences on eating and resisting negative peer influences (Perry *et al.*, 1987). This intervention was effective for reported eating behaviour. Peer influences were also explored in the second 'North Karelia Youth Programme' (Vartiainen *et al.*, 1991) and the study by Klepp and Wilhemsen (1993), both of which were generally found to be effective.

Some of the outcome evaluations not judged to be methodologically sound also addressed the issue of peer influence. The 'Great Sensations' programme aimed to enable young people to resist pressure from friends, family and the media to eat snacks high in salt (Coates *et al.*, 1985). The 'Learning by teaching' study (described in two reports: Holund (1990a), and Holund (1990b) and hereafter referenced as Holund (1990a)) used older peer educators (aged 14) to work with younger peers (aged 10) to influence knowledge, self-efficacy, perceived susceptibility, attitudes and dietary behaviour change. The peer educators, who, by actively taking a position in favour of healthy food in the presence of younger pupils, were expected to change their own knowledge, beliefs, attitudes and behaviour. The intervention involved marketing of healthy food products to make them attractive and acceptable to their peers. Again, as these two studies were not soundly evaluated it is not clear whether or not they were effective.

The 'Class of 89' programme (Kelder *et al.*, 1993) which was part of the community-wide intervention known as the 'Minnesota Heart Health Programme', also aimed to provide social support for young people to eat healthy foods. It could, in addition, have indirectly influenced family or other forms of inter-personal support through the provision of health screening and health promotion education and activities for the whole community. Again, it is not clear from the study reports how or whether this was achieved, and as the evaluation of this intervention was judged to be not sound, it is again unclear whether or not this approach is effective.

The fact that young people perceive a link between healthy foods with the home, and unhealthy foods with life outside the home, and consume 'fast foods' in their 'social space', was not widely addressed by the outcome evaluations included in this review. The school-based multi component intervention evaluated by Klepp and Wilhemsen (1993) was successful in securing the participation of a local youth group who were motivated to increase the availability of healthy snacks. The project also involved young people working in small groups to analyse the foods available in local stores, fast food outlets, youth groups and school. They were then asked to make recommendations on how food availability could be improved (N.B. this issue is also discussed below under the theme of 'practical and material resources').

7.3 Matching young people's views to evaluated interventions: 'the self'

A range of barriers and facilitators relating to the individual, or 'self' were identified in the studies included in this review, and outcome evaluations addressing these were also found. However, it is important to note that where gaps exist between views and evaluated interventions this may partly be due to the fact that the criteria for the in-depth review focused on interventions that aimed to make a change to young people's environment in addition to, or instead of, only aiming to make a change to young people's 'inner space', through for example, increasing knowledge or fostering positive attitudes.

Two main issues arose from the studies examining young people's views which relate to the 'self'. The first was about their personal preferences for 'fast foods'. Whilst recognising that fruits and vegetables are nutritious and healthy, and, despite being served these foods at home, young people did not always like to eat them. Issues such as appearance, taste and texture emerged as important influences of their food choices.

None of the sound outcome evaluations addressed the issue of young people's personal preferences for 'fast foods'. However, the 'Gimme 5' programme did involve school pupils in taste testings of fruits and vegetables, where they were able to try out different healthy foods and take some away with them (Nicklas *et al.*, 1998). This might be an effective way of enabling young people to at least try nutritious foods in an attempt to encourage them to incorporate them into their regular diet, rather than for them to simply assume that they will not like them. Taste testings were also a feature of one of the not sound outcome evaluations (Baranowski *et al.*, 1990a) in which families attending a centre based exercise and nutrition programme sampled low salt and low fat foods which they were encouraged to prepare and consume at home.

Another issue to do with the self is young people's concerns over their appearance. In one study of young people's views weight concerns were found to directly influence dieting among young women. In other studies young people perceived unhealthy food as 'greasy' and causing acne, as well as weight gain. They also saw people who eat such foods as being inactive, lazy and fat. The issue of appearance can be interpreted to be both a barrier and a facilitator. Dieting as the result of weight concerns might lead to under consumption of important vitamins, minerals, proteins and carbohydrates and therefore can be considered a barrier to healthy eating. In contrast, if young people's concerns about their appearance motivates them to replace 'fast foods' with the right balance of healthy alternatives then this might be viewed as a facilitator.

Only one of the soundly evaluated outcome evaluations addressed the issue of dieting. The 'Slice of Life' intervention, which took place over 10 classroom based sessions, included one session in which commercial diets were analysed and criteria for a sensible approach to weight control were generated (Perry *et al.*, 1987). The intervention was found to be effective for reported behaviour, practical skills, and awareness (mainly for young women) and effective for increasing knowledge (for both sexes).

Three of the not sound outcome evaluations addressed issues related to diet and healthy eating. Fitzgibbon *et al.* (1995) evaluated an initiative in which African American mothers and daughters attended a community-based obesity

prevention programme, and were taught how to identify lower fat meals in fast food restaurants. In the 'Learning by teaching' study (Holund, 1990a), one of the small group projects involved young people examining body image and its relation to healthy eating and exercise. Commercials were analysed for contradictory messages between smartness, healthiness and sweet foods. The 'Dance for Health' programme (Flores, 1995) which focused on promoting dance as a method of physical activity, also included a 25 lesson health education curriculum in which six lessons were devoted to nutrition and three lessons on obesity and unhealthy weight regulation practices. As the three interventions in these studies were not soundly evaluated it is not clear in the reviewers' judgement whether or not they were effective.

When asked about the factors that might help them make changes in diet, the majority of young people in one study mentioned 'will-power' as important. Only one of the soundly evaluated outcome evaluations addressed the issue of motivating young people to change their diet. One of the components of the 'Know Your Body' programme (Walter I 1989; Walter II 1989) was a health screening initiative in which pupils' height, weight, skinfold thickness, blood pressure, post exercise pulse rate and cholesterol levels were measured and results fed back to them which they record in a specially devised 'health passport'. Teachers discussed the results with the pupils in the classroom in terms of setting behavioural goals. The accompanying nutrition classroom curriculum was designed to enable and reinforce these goals. This study was effective for decreasing cholesterol and systolic blood pressure and improving knowledge (N.B. The effectiveness of the intervention reported in Walter II 1989, despite being soundly evaluated, was judged by the reviewers to be unclear). None of the not sound interventions evaluated motivational strategies however, two of the outcome evaluations identified in the mapping exercise (chapter 3), but not included in the in-depth review did address ways in which goal setting can be used to promote healthy eating (White and Skinner, 1988; Winnett *et al.*, 1999).

Another facilitator relating to the individual is the role of information in making food choices. As mentioned above in relation to the theme of the school, information on nutritional content of school meals was cited as something that would be helpful in making healthy food choices, particularly for young women. All of the seven outcome evaluations judged to be sound included educational components which aimed to increase knowledge and foster positive attitudes towards healthy eating. In general these studies were effective at increasing knowledge. Similarly, all but one of the outcome evaluations which were not soundly evaluated included educational components which aimed to increase knowledge and foster positive attitudes towards healthy eating. It is not clear to what extent they were effective.

7.4 Matching young people's views to evaluated interventions: 'practical and material resources'

Barriers to healthy eating which relate to young people's practical and material resources centred around issues of affordability and convenience. Young people stated that one of the attractions of 'fast foods' was the fact that, in comparison to healthy foods, they are cheap and easy to buy, being available in a variety of outlets located in settings in which they spend their social time, as well as in and around school. In some cases they found it more convenient to buy 'fast foods' than to prepare their own healthier alternatives, valuing their spare time more for socialising or playing sports than for cooking. The facilitators to healthy eating

are, in part, the opposites of the barriers. For example, healthier snacks in vending machines and healthier options on the menu at take-aways were mentioned as factors that would facilitate healthier diets, as well as a reduction in the price of healthy snacks.

As the in-depth review specifically aimed to include interventions whose goal was to support young people by making changes at the community or society level (as opposed to solely aiming to influence young people's responses to their environment), it was disappointing that few of the interventions included in the in-depth review clearly addressed barriers of a practical or material nature, or took up their suggestions on what could or should be done at a more socio-cultural or structural level. For example, none of the outcome evaluations in the in-depth review, whether sound or not sound, examined the effect of lowering the price of healthy foods to encourage young people to purchase them. The only outcome evaluation which addressed anything remotely concerning monetary aspects of healthy eating was the 'Gimme 5' programme (Nicklas *et al.*, 1998) in which, as part of a multi component intervention, parents received healthy eating brochures, recipes and coupons which, it is presumed, they were able to redeem for low price healthy foods. However, providing financial assistance to parents, whilst helping to maintain the role of the home as a facilitator for healthy eating, does not take into account young people's autonomy in purchasing foods outside of home in their social environment.

Although outcome evaluations were included in the in-depth review which increased the availability of healthy foods to young people at school, only one sound study was found which assessed the impact of modifying the foods they could buy in social environments. This was the study by Klepp and Wilhemsen (1993), mentioned above, in which local youth groups who became affiliated with the programme increased the provision of snacks. However, the main aim of the study was to evaluate a primarily school-based intervention, rather than to initiate wider community-wide changes to food provision. The changes made by the youth groups were instigated largely under their own initiative having been motivated into action through contact with the project's investigators. This underscores the need for the design and evaluation of specific environmental modification interventions in community settings such as youth groups. The Klepp and Wilhemsen study is also relevant here as, despite the effectiveness of the intervention, seasonal variations were detected in healthy eating behaviour. The reasons for this include the fact that there is reduced availability of fresh fruit and vegetables in Norway (where the study took place) during late spring, as well as the fact that young people spend more time outdoors in the spring and summer and therefore have greater potential to purchase snack foods. This clearly suggests the need for school-based interventions such as this to be complemented by wider structural programmes to reinforce the healthy eating message enabling young people to access nutritious foods.

Given the lack of interventions to increase healthy food availability in social settings, some at the very least did alert young people to environmental influences on food choices. As mentioned earlier, the 'Slice of Life' programme (Perry *et al.*, 1987) involved group projects to assess food availability in schools, grocery stores, and restaurants, as was the case in Klepp and Wilhemsen (1993). One of the outcome evaluations not judged sound, the 'Learning by teaching' study (Holund 1990a), involved group projects to study how the environment influences 'free choice', with young people visiting supermarkets to examine food supply.

In terms of what young people think could or should be done to promote healthy eating, better food labelling was mentioned in one study as being important, with labels being a significant source of information. None of the sound outcome evaluations addressed this, but one of the not sound studies did examine such issues. The community-wide 'Minnesota Heart Health Programme' (Kelder *et al.*, 1993) included components which sought to effect better nutritional food labelling at restaurants ('Dining a la Heart') and grocery stores ('Shop Smart for your Heart'). Again, as this study was judged to not be methodologically sound there is uncertainty about its effects.

7.5 Matching young people's views to developing, delivering and evaluating interventions

Matching the findings of studies focusing on young people's views with reports of evaluated interventions leaves an important gap in our knowledge. It does not address how best to capture young people's views, nor the barriers and facilitators to involving young people in consultations, developing interventions or research.

7.6 Summary

The synthesis of studies examining young people's views with studies evaluating interventions to illustrate the extent to which there have been attempts to tackle barriers, and build on factors which facilitate healthy eating. The majority of the evidence used to match up barriers and facilitators to outcome evaluations came from the in-depth review in this report.

In terms of the four themes discussed in this chapter, generally there are sufficient matches between barriers/facilitators and evaluated interventions in the area of the 'school' and 'family and friends', although less so for some of the barriers relating to 'the self'. There are a number of gaps in relation to the theme 'practical and material resources', where barriers have largely not been addressed.

In the realm of the school, the barriers, to a greater extent, have been addressed by interventions. One barrier was the fact that healthy choices are not always available in schools. This has been addressed by at least two sound outcome evaluations (found to be effective) which increased availability of nutritious foods, and by two outcome evaluations judged to not be sound (their effectiveness unclear). Another barrier was that teachers were not always regarded as a common source of information on nutrition, yet they have been employed to teach nutrition in several outcome evaluations that have had some degree of effectiveness. Likewise, peers are not a common source of information, however, two of the sound outcome evaluations used peer leaders to provide education and to explore social influences on diet, and were found to be effective.

In terms of the influence of family and friends on healthy eating, parents were generally regarded as a facilitator. Half of the sound outcome evaluations included parents in some way to reinforce school-based nutrition education, and generally were effective. At least eight of the outcome evaluations judged to be not sound also involved parents in programmes to promote healthy eating with young people. In contrast, friends were considered to be a barrier to healthy eating, although it is not clear exactly why. Negative peer influences might

explain this barrier, with three of the sound outcome evaluations, and three of the outcome evaluations judged not sound addressing this issue.

Barriers relating to the individual, or the 'self', included personal preferences for 'fast foods' on grounds of taste. Generally, this has not been addressed by interventions, except where young people are given the opportunity to taste- test foods, as was the case in one sound, and one not sound outcome evaluation. Dieting due to concerns over appearance was an issue which could be considered both a barrier and a facilitator. Healthy dieting practices were a feature in only one of the sound outcome evaluations (which was generally effective) in comparison to three of the outcome evaluations judged not sound which examined this issue. A facilitator relating to the self included will-power, addressed by only one sound outcome evaluation (in terms of setting motivational goals), which was found to be effective, and examined by at least two of the studies identified in the mapping exercise in this review. Another facilitator was information on nutrition, which could help young people make food choices. All of the sound outcome evaluations, and the majority of the outcome evaluations judged not sound included educational components to provide information on nutritious foods.

In terms of material and practical resources, barriers included the relative high costs of healthy foods, and the fact that they are convenient and easy to purchase, particularly in young people's social environments. In general these barriers have not been addressed by evaluated interventions included in this review. Increased provision of healthy snacks in social situations was achieved in only one sound outcome evaluation, and in none of the pool of outcome evaluations considered not sound. However, two sound outcome evaluations did attempt to alert young people to environmental influences on food choice and availability (which were generally effective), as did one study judged not sound. Better food labelling was one suggested strategy for improving nutrition and only one outcome evaluation, which was judged to not be soundly evaluated, attempted to achieve this.

8. DISCUSSION

Outline of Chapter

This chapter considers the implications of the findings of the review for current policy and practice and future research, setting the context for the conclusions and recommendations of the review. It ends with reflection on the methods used to conduct this review and a consideration of their implications for conducting future systematic reviews.

The chapter will be useful to all audiences (practitioners, policy specialists, researchers, health care consumers), particularly section 8.1 which discusses what initiatives have been found to work, through high quality evaluations, in the promotion of healthy eating. More specifically:

- ***Researchers** and others may be interested in the discussion of the extent to which young people have been consulted in the development of interventions and services; and in including our reflections on the methodology used to conduct the review, the strategies developed for the critical appraisal and data extraction of young people's views studies, and the integration of findings from diverse study types (sections 8.3 - 8.5).*
- *For **policy specialists** and **practitioners** section 8.2 will be the most relevant as it contains explicit discussion of the findings of the review in terms of current policy and practice.*
- ***Practitioners** and **young people** and their families may also be interested in section 8.2.*

8.1 Can interventions be effective in promoting healthy eating?

The evidence reviewed in this report sheds light on how effective interventions to promote healthy eating can be. However, as will be discussed, there is no clear picture about what specific factors contribute towards effectiveness for different groups of young people.

The outcome evaluations included in the in-depth review which were judged to be methodologically sound assessed multi-component school-based interventions which aimed to influence knowledge of, and attitudes towards, nutrition as well as to increase consumption of healthy foods and/or influence cardiovascular clinical risk factors. In general these interventions were effective at achieving their aims. All but two measured changes in behaviour, and all of these detected increased reported consumption of healthy foods, such as fruit and vegetables. Where changes in clinical risk factors were measured (in 3 outcome evaluations) results were mixed, with some reductions in systolic blood pressure, but little impact on cholesterol levels. Questions arise over the disparity between improvements in behaviour and the modest changes observed

in clinical risk factors. One explanation might be the possibility that young people reported socially desirable answers, thus over-estimating the extent to which they actually eat healthy foods. Whether or not confidentiality or anonymity was assured to the young people taking part in the evaluation was generally not reported. In one study, although confidentiality was promised, some young people reported feeling uncomfortable with teachers insisting on reading their completed questionnaires (Moon *et al.*, 1999a). Other explanations include the possibility that the instruments used to measure changes in clinical risk factors were not sensitive enough to detect change, or that the trials were not adequately powered to detect statistically significant results. Few studies reported conducting sample size power calculations.

All of the interventions provided some form of education about the nutritional content of foods and the benefits of following a healthy diet, and were generally effective in changing knowledge as an outcome, although as discussed in chapter 1, knowledge alone is insufficient to influence consumption of healthy foods. Nevertheless, efforts to reinforce the provision of information through the teaching of skills, and instigating changes to the school environment were found to be effective. For example, in one study improvements were detected in the ability of young people to read and interpret food labels correctly. In another changes in school food provision was measured as an outcome, specifically, whether or not caterers reduced the fat content of school meals, and the intervention was effective in achieving this. A whole school approach to health education, in which changes were instigated not only to the curriculum, but also to school organisation, was also found to be effective. These are encouraging signs that interventions can successfully operate at a number of levels to encourage young people as *individuals* to eat healthy foods, and to provide a *structure* which enables them to make healthy food choices.

An important issue to take into account when interpreting the effectiveness of the interventions is their duration, and the length of time taken to measure outcomes. There was variability in the duration of the programmes, with the shortest being between three and six months, and the longest up to five years. It was not possible to discern any pattern of effectiveness according to length of intervention, however, it is likely that longer more intense interventions will enable young people to sustain changes in diet, rather than 'one-off' or time limited initiatives which encourage short term changes in behaviour, but do not provide support to make such changes a routine part of their lives. The longest intervention included in the in-depth review was the 'Know Your Body' programme, evaluated in two localities in New York, which was associated with some improvements in clinical risk factors and knowledge (although in one location the effects were unclear). One of the merits of this programme was the fact that it began during the onset of adolescence and continued into their mid to late teens, thus reinforcing good nutrition over a period in which attitudes are developing and when behaviours start to become routine.

The length of follow-up can also shed light upon maintenance of healthy eating. For the outcome evaluations included in the in-depth review the duration of follow-up was generally short, with the longest period being two years after the end of the intervention. Similar findings have been reported in other systematic reviews. In a review of sexual health interventions with young people, Oakley *et al.* (1995c) found that of the 65 studies included, only 15 (23%) had a follow up interval of 12 months or more, and in 25 (38%) the follow up interval was three months or less. It was recommended that future evaluations should follow-up participants over five to 10 years. Without long term interventions with

evaluations of sufficient length it is not possible to be conclusive about young people's ability to maintain healthy eating behaviours into adulthood. It is crucial to establish sound evidence of the lasting effects of initiatives to promote healthy lifestyles given the importance of tackling the root causes of diet related chronic diseases which manifest themselves in adulthood.

In one study, evidence suggested that the impact of the interventions also varied according to age. In the evaluation of the 'Wessex Healthy Schools Award' (Moon *et al.*, 1999a) the intervention had a greater impact on young people in the 15 to 16 age range (particularly on young women) in comparison to those aged 12 to 13 years, although possible reasons for this are not discussed. The fact that children and younger teenagers might have different dietary requirements from their older peers, and that dietary influences may vary across the age span commonly referred to as 'adolescence', suggests that interventions directed at this group, particularly in secondary school settings, should tailor messages accordingly. For example, it is likely that older teenagers (aged 15 to 16 years) are more susceptible to peer influences, given that they have greater autonomy to buy and consume foods whilst socialising with friends outside the home.

A distinct gender effect was observed in the impact of the interventions reviewed in-depth here. In general, young women were more likely to demonstrate improved knowledge and report increased consumption of healthy foods than young men. This was the case in four of the seven outcome evaluations (in which analysis was broken down by gender). For example, in the study by Klepp and Wilhemsen (1993) an increase in reported healthy eating behaviour amongst young men was observed at the first follow-up measurement (5 months after the intervention), but this had dissipated at the second measurement (1 year after the intervention), in comparison to sustained changes reported by young women. The intervention was effective at increasing levels of knowledge for young men, but not for young women who had high levels of knowledge at baseline, thus supporting the assertion that young women are comparatively better informed about health issues in general, and nutrition in particular.

Perry *et al.* (1987) discuss likely explanations for similar results observed in the 'Slice of Life' intervention. A special attempt was made to enhance the appeal of the intervention to young men as their previous work had identified gender differences. When recruiting peer leaders to deliver the classroom component of the programme attempts were made to create an even distribution of male peer leaders amongst the groups taking part so that the young men targeted could identify with someone of the same sex. Again, the intervention was more effective amongst young women, who also rated it as more enjoyable than the young men. Possible explanations for the lack of impact upon young men include the emphasis of the intervention on healthy weight management which, it is suggested, was more likely to appeal to young women. It was proposed that interventions directed at young men should stress the benefits of nutrition on strength, physical endurance and physical activity, particularly to appeal to those who play exercise and play sports. Tailoring the intervention to take account of gender is therefore a crucial imperative to ensure that interventions are as relevant and meaningful as possible.

Previous systematic reviews of interventions to promote healthy eating (which included at least some studies with young people fitting the age range of this review) show mixed results. The findings of these reviews, whilst not directly comparable, seem to offer some support for the findings of this review. The main

message is that whilst there is some evidence to suggest effectiveness, the evidence base is limited, with relatively short follow up intervals, and a particular lack of studies conducted in the UK.

Roe *et al.* (1997) produced a systematic review on health promotion interventions to promote healthy eating in all ages, commissioned by the Health Education Authority (HEA). Randomised controlled trials and cohort studies with concurrent control groups published between 1985 and 1996 were included, whilst observational studies and process evaluations were excluded. Included studies were rated against criteria to ascertain their methodological quality. Good quality studies had to have included a comparison group, demonstrated equivalence of study groups at baseline (or adjusted for non-equivalence), have used validated measures of dietary behaviour, and have relatively low rates of attrition. Studies not meeting these criteria were considered to be either of moderate or poor quality.

A total of 71 interventions (or studies) were included. Relatively few involved young people, or lower income or ethnic minority populations. The review is structured according to interventions located in various settings (e.g. school, workplace). Twenty-one studies were conducted in educational settings (from primary school through to university), seven of which were judged to be of good quality, eight of moderate quality and six of poor quality. Four of the seven good quality studies demonstrated small effects on dietary fat intake or blood cholesterol. Interventions judged to be effective tended to focus on diet alone or diet and exercise. No age differences were identified in effectiveness, although school-based interventions were effective across a variety of ethnic and socio-economic population groups. There were 11 studies which included young people broadly within the age range 11 to 16 years (the range of interest to this report) and none of these were conducted in the UK. Of this 11, six were common to the in-depth review described in this report. There was a slight discrepancy in terms of methodological judgements of quality of studies common to both reviews. For example, the 'San Diego Family Health Project' by Nader *et al.* (1989) was judged to be of good quality, whereas in this report it was not considered methodologically sound. It is likely that this is an artefact of the different criteria employed to assess the quality of study methods.

A further five studies included in the review-evaluated initiatives in school cafeterias, four of which were in elementary (primary) schools. Two of these five were judged to be of good quality, with a small reduction in fat intake (in one study) and a small increase in choice of low fat meals observed. The one study which evaluated an intervention in a secondary school was also included in this review (Ellison *et al.*, 1989). It was considered to be of 'good' methodological quality, although in our review it was not judged sound.

There are two further relevant reports from the same series of systematic reviews commissioned by the HEA, both focusing on UK minority ethnic groups. Bush *et al.* (1997) assessed opportunities for and barriers to good nutritional health and White *et al.* (1998) reviewed relevant intervention studies. The former was divided into three main sections to cover people of South Asian, African-Caribbean and Irish origin, with information for each about the social and demographic context. Research evidence about health and diet was summarised, where it existed, followed by a review of studies of food choice. The authors then looked at barriers and opportunities on the basis of the evidence (e.g. potential role of vegetarianism in some South Asian communities) and made suggestions for research and policy. Studies were not excluded on

methodological grounds. The authors note the substantial gaps in research evidence and draw attention to the potential impact on food choices of the relative poverty of many in minority ethnic groups. Another issue particularly relevant to people of South Asian origin is the limited access to appropriate food in institutional settings. None of the studies, though, looked at this in relation to school meals.

The review of intervention studies to promote healthy eating in people from minority ethnic groups by White *et al.* (1998) was hampered by the lack of UK studies and the general poor quality of methods and reporting of results in many of the studies included. The authors hesitate in drawing policy conclusions and indicate that much of the evidence they found was not applicable to the UK context. They draw attention to the need for methodological rigour and longer follow-up of participants. The lack of analysis of the interaction of ethnicity with social disadvantage was also a problem in many of the studies they included and it is recommended that any UK research should take this into account.

The difficulty of assembling the evidence for the effectiveness of interventions to promote healthy eating interventions is illustrated by a review of reviews of health promotion in schools (Lister-Sharp *et al.*, 1999). The authors looked for reviews that met minimum standards. Of the 215 reviews that they found, 32 met the inclusion criteria. The authors then divided up the included reviews by theme. Eight of these 32 reviews dealt with nutrition and exercise, and covered a total of 107 primary studies. Only 30 of the 107 primary studies were included in more than one review. The authors had scored the reviews for quality (maximum possible score 16) and the reviews relevant to nutrition and exercise received scores ranging from 16 (for Roe *et al.* above) to four. The authors conclude that education-based interventions on nutrition and exercise generally have positive effects, though of limited magnitude, and that evidence about the most effective strategies and the intensity of the intervention are lacking. They draw attention to the problem of consent for participation and the lack of reporting of a role for young people in designing the interventions.

Alongside this review of reviews the authors also conducted a review of primary studies of 'health promoting schools'. These studies were defined as 'evaluating interventions involving health promotion activity in each of three areas: i) the school ethos and/or environment; ii) the curriculum and iii) the family and/ or community. Schemes must also include active participation by the school. They found twelve studies that met their criteria, four of which were evaluations of an explicit 'health promoting school' approach. Only two of the 12 studies were adequately powered RCTs. They conclude that on the basis of the limited evidence, the approach is promising and may be important in promoting social and psychological, as well as physical well-being.

A Cochrane review of strategies for preventing obesity in children/young people under 18 identified seven relevant studies (Campbell *et al.*, 2001). These were diverse in terms of age group, type of intervention and length of follow-up and were not combined quantitatively in the review. Initially the reviewers adopted a criterion of one-year follow-up for inclusion in the review which limited the number of studies to only three. Despite the evidence that effects can be short lived, the criteria were relaxed to allow for shorter follow-up (three months). It was concluded that there is a dearth of good quality evidence on the effectiveness of these interventions, and that well-designed trials should be conducted. The review also discusses the complexities of defining obesity in childhood, and the possible facets of the relevant interventions including attempts to change diet and

strategies to increase activity or reduce TV viewing. The possibility that interventions may do harm, by increasing extreme dieting behaviour for example, is also raised. One of the studies included in their review suggests that this might not necessarily be the case. This was an RCT conducted in the US which tested a school-based intervention involving the promotion of physical activity and healthy eating in children of grades six to eight (Gortmaker *et al.*, 1999). The trial did not find evidence of an increase in harmful dieting as a result of the intervention.

A review of interventions in all ages to prevent weight gain (Hardeman *et al.*, 2000) will not be described further here since the studies of children in the relevant age ranges are covered in the above Cochrane review.

8.2. Implications for current policy and practice

The results of this review have implications for current policy and practice initiatives. These are discussed according to the four themes applied in the synthesis between study types (chapter 7), that is: the school; family and friends; the self; and practical and material resources.

The school

The fact that all of the interventions included in this review took place in schools, and were generally effective at promoting healthy eating behaviour provides some support for recent policy initiatives in education and health.

Young people suggested that school meals were sometimes unappealing, with a lack of healthy options, and with healthy meals sometimes being expensive. The evidence from this review shows that interventions to modify the nutritional content of school meals, and increase the range of healthy options, can be effective. Attempts to market healthy foods by using bright and colourful promotional material around the school appear to be effective, and popular (Nicklas *et al.*, 1998).

New legislation came into place from 2001 requiring school lunches to meet minimum nutritional standards (DfEE, 2000). Guidance issued to help schools implement this policy suggests strategies to improve the appeal of school meals, such as attractive packaging and reasonable pricing. The legislation should address concerns about the provision of healthier choices in schools, and the guidance, if implemented, may enhance their appeal.

Whole school approaches to health promotion are becoming increasingly popular (Lister-Sharp *et al.*, 1999), and implementation of such approaches is being requested. For example, the 'National Healthy School Standard', part of the DfEE and the DoH 'Healthy Schools Programme' (DfEE, 1999) stipulates that participating schools should adopt whole school approaches. The formation of a Schools Nutrition Action Group (SNAG) might be one way to achieve this, as this aims to bring together all members of the school community to devise and implement a school nutrition policy (Passmore and Harvey, 1994). Evidence from the in-depth review also provides some support for these initiatives, albeit from only one study. The whole school approach to health education, evaluated by Moon *et al.* (1999a) was effective at encouraging healthy eating behaviour (primarily amongst young women) and instigating changes to the functioning of schools (in terms of promoting health throughout the school). However it is not apparent from the reports available, which specific activities took place in schools to promote healthy eating and so it is not yet clear what are the key

features for the success of such an approach in leading to sustained healthy eating patterns amongst young people, or whether it is effective for all groups of young people.

Healthy tuck shops providing fruit snacks might be another component of a whole school approach to nutrition, reinforcing the curriculum, and complementing modifications made to the nutritional content of lunchtime school meals (HDA, 2000). Bowker *et al.* (1998) describe some of the nutrition related initiatives adopted by schools participating in the European Network of Health Promoting Schools (ENHPS), including fruit only tuck shops. Although such an initiative has been reported to be successful in a primary school in Wales, it is unclear whether the claim is based on evidence from a rigorous evaluation of the scheme.

The effectiveness of the 'Gimme 5' intervention (Nicklas *et al.*, 1998) at increasing daily consumption of fruit and vegetables supports the implementation of initiatives that focus specifically on promoting consumption of fruit, such as fruit only tuck shops, as well as the 'National School Fruit Scheme'. Although aimed at primary school children (and thus not in the age range for this review), the scheme which is currently being piloted, will need to establish effective ways to encourage children to eat the fruit supplied to them on a daily basis. Using brightly coloured promotional material (e.g. posters, and 'marketing stations'), as employed in the 'Gimme 5' programme, might be an effective way to achieve this.

It is worth noting that although the school-based programmes have been effective, difficulties have been experienced during their implementation, particularly securing the participation of key stakeholders (e.g. teachers, school administrators). In the study by Moon *et al.* (1999a) a number of practical problems are reported (see chapter 5) including correcting teachers' misconceptions about the research process, and overcoming suspicion of evaluation as a means of teacher assessment. They note that in some schools it is doubtful whether a whole school approach was completely achieved (see chapter 5). Walter I (1989) and Walter II (1989) who evaluated the 'Know Your Body' programme also experienced problems in finding enough time to train and motivate teachers. This suggests that practitioners and programme developers should ensure effective communication between all parties when working with schools, and ensure adequate time and resources are available for implementation and programme development.

Family and friends

The studies examining the views of young people illustrated how parents and the home were associated with healthy foods, whilst outside the home young people tended to eat snacks and 'fast foods', particularly with their friends in social environments. This is confirmed by a study of young people's food intake, in which 30% of total energy intake came from food consumed outside the home (Adamson *et al.*, 1996). Interestingly, the young people's lifestyle survey in the West Midlands found that their main meal of the day was not consumed at school (Sheratt *et al.*, 1996). It is therefore presumed that young people will be eating a substantial healthy meal at home with their families. There remains, however, a need to address the issue of consumption of snacks and 'fast foods' in leisure time, which may include journeys to and from school. The evidence from effective interventions which address this issue is limited, with only one soundly evaluated intervention achieving an increase in provision of healthy

foods in young people's social environments (Klepp and Wilhemsen, 1993). Breakfast and after school clubs are potential solutions to this problem, as they aim to prevent young people 'grazing' on unhealthy snacks and encourage consumption of well balanced nutritious meals. The effectiveness of these clubs is currently being evaluated.

Another issue to arise from the studies eliciting young people's views was the fact that, on occasions, they were responsible for preparing their own meals, and often forfeited healthy options for convenience foods, citing a lack of time as a reason. One soundly evaluated intervention included in the in-depth review aimed to teach cooking skills and motivate young people to prepare nutritious meals at school and in the home (Klepp and Wilhemsen, 1993). The study by Vartiainen *et al.* (1991) also taught young people how to prepare meals which were low in fat. This was effective for increasing consumption of healthy foods, as well as for reducing blood pressure. Evidence from these two studies provides some support for schemes such as the DfEE/DoH 'Cooking for kids initiative' which aims to teach practical cookery skills to school pupils, employing celebrity chefs to emphasise the fun aspects of cooking.

The self

Issues to emerge from this review relating to individual level influences on healthy eating include the fact that personal preferences often guided food choices. In some of the studies examining young people's views it was mentioned that, despite appreciating the value of healthy foods, they liked the taste of 'fast foods' better. The majority of young men, and over half of the young women participating in one of the studies stated that they would choose to eat their preferred foods irrespective of its nutritional content (McDougall, 1998). Furthermore, perceptions that particular kinds of food and drinks are healthy might prompt the assumption that it will be less appealing in terms of taste, as was the case in a recent study with children (Wardle and Huon, 2000) and one of the studies of young people's views included in this review (Watt and Sheiham, 1997). This implies that less emphasis should be placed on advertising the nutritional value of healthy foods, in favour of enhancing and promoting their taste properties. The importance of influencing personal preferences has implications for initiatives such as the 'National School Fruit Scheme', (aimed at primary school children) which will only realise their full potential if children become familiar with the taste of fruit, come to like it, and consume it regularly. Familiarisation with, and enjoyment of, healthy foods from an early age may potentially influence preferences in teenage years and adulthood.

However, as mentioned in chapter 7, the issue of personal preferences was not addressed in the main by any of the outcome evaluations included in the in-depth review. The only strategy tested which might influence personal preference for foods was the organisation of taste testings of fruits and vegetables, as undertaken in schools by Nicklas *et al.* (1998). Whilst the intervention was found to be effective in terms of improving knowledge and behaviour, it is not possible to isolate the extent to which such activities contributed to increased consumption of fruit and vegetables, given the multi-component nature of the programme. Further evaluation of this approach is therefore warranted. As mentioned in chapter 1, the FSA in collaboration with the DoH is conducting research into food acceptability and choice, to encourage greater consumption of fruit and vegetables. This might identify new strategies which could be incorporated into interventions which can then be evaluated.

Practical and material resources

An important structural issue influencing the ability to eat healthy foods is affordability and availability. The recent guidance which accompanies the DfEE regulations for nutritional content of school meals encourages schools to lower the price of healthy foods in recognition that young people, particularly those who are able to leave school premises at lunchtimes, have opportunities to buy food from other outlets. The fact that healthy foods are sometimes expensive was mentioned in at least three of the studies examining young people's views. For example, nearly two thirds of young people in the study by Miles and Eid (1997) agreed that a reduction in the price of healthy snacks could be one way to encourage a more healthy diet. It is therefore disappointing that no studies were identified which rigorously (or otherwise) evaluated interventions seeking to make nutritious foods more affordable.

There have been community-based schemes in the UK to increase the availability of affordable foods, although the extent to which these are effective, or involve young people is not clear. For example, community cafes have been set up on a 'not for profit' basis specifically to provide meals in a sociable setting for those who may be socially isolated. However, the main aim is not necessarily to provide healthy foods, and there has been little evaluation of this approach (HDA, 2000). Community based initiatives are recommended in the NHS Plan (DoH, 2000b) to improve access to fruit and vegetables in localities where supplies of inexpensive food are lacking. Results of evaluation of schemes in east London are reported to be encouraging (HDA, 2000). Such programmes may enable young people in deprived areas to afford healthy snacks (e.g. fruit bars, low fat milkshakes), particularly if co-operatives are located in settings where they socialise. One option might be to extend the scheme, where feasible, into youth groups, or even into schools (e.g. as school tuck-shops). Evaluation of its impact on young people would be necessary.

Not all of the interventions assessed in the in-depth review attempted to instigate changes to the wider socio-economic environment, however, they did at least alert young people to structural factors which might act as barriers to healthy eating. For example, in the 'Slice of Life' intervention (Perry *et al.*, 1987), young people interviewed school catering staff and assessed the availability of healthy foods in the school. There were improvements in awareness, practical skills, intentions and behaviour, mostly for young women.

In a similar intervention evaluated by Klepp and Wilhemsen (1993) young people visited local grocery stores to look at food availability. It was noted that despite the success of the intervention (which took place in Norway) in encouraging healthy eating, fresh fruit produce was in short supply at certain times of the year. Whilst the same might not necessarily be true in the UK, it highlights the necessity to put into place policies to ensure that the various governmental sectors and agencies work together to ensure availability of nutritious foods to all. It is noteworthy that one of the pilot sites in the 5 a day programme, Sandwell in the West Midlands, is preparing a 'food map', of the area which will illustrate the price and availability of foods in local shops. Raising awareness of environmental constraints on healthy eating, and motivating young people to locate shops where they can buy nutritious foods might be a way of empowering them to take some positive action to improve their health.

Our mapping exercise highlighted that there has been very little research on healthy eating which attends to the diversity of young people according to key

axes of inequalities. Although a number of studies have evaluated interventions which are tailored for particular ethnic groups, these have all been conducted in the US. The fact that the majority of studies identified in this review were conducted in school settings also raises questions about their relevance to young people who are excluded from school. Thus more research is warranted to both explore the meanings of healthy eating in the lives of socially excluded young people or those at risk of social exclusion and to work out the best way to effectively intervene. Such research has been given a boost from the current focus of UK health and wider government policy on tackling inequalities in health and social exclusion. Some of this on-going research has been highlighted here. We therefore recommend conducting an update to this review in two years time, during which it is likely that more research findings will be available.

8.3 Methodological issues: evaluating effectiveness

One of the main methodological findings of this review is that there is a considerable lack of rigorous evaluation of effectiveness in the area of promoting healthy eating. Of the 22 outcome evaluations which were included in the in-depth review, only seven were deemed to be of sufficient methodological quality to produce reliable results about the effectiveness of an intervention. Encouragingly one of these was from the UK. However, only five (7%) of the 75 outcome evaluations identified for the mapping exercise were conducted in the UK suggesting that outcome evaluations of initiatives to promote healthy eating with young people (rigorous or otherwise) are rarely undertaken in this country, or that they are undertaken but not publicly accessible.

Although there is a growing consensus of the need for outcome evaluations with integral process evaluations, only 11 of the 75 outcome evaluations identified in the mapping exercise of this review also conducted a process evaluation. For the in-depth review too, only a small percentage of outcome evaluations also evaluated process. There is therefore an urgent need for evaluations to incorporate both process and outcomes.

Common problems with outcome evaluations were employment of non-equivalent control or comparison groups and failure to report all pre-intervention data. These findings are similar to those of other systematic reviews examining a variety of different approaches to health promotion amongst young people. For example, previous reviews of peer-delivered health promotion, sexual health interventions for young people and for men who have sex with men and a review of the effectiveness of workplace health promotion, have found similar proportions of outcome evaluations to be 'sound', and a similar scarcity of sound outcome evaluations conducted in the UK (Harden *et al.*, 1999a; Oakley *et al.*, 1996; Peersman *et al.*, 1996; Peersman *et al.*, 1998). Recent reviews in the HEA's effectiveness series (e.g. Tilford *et al.*, 1997; White and Pitts, 1997) have come to similar conclusions.

As the evidence-base is small, a key part of policy and practice surrounding promoting young people's healthy eating in the future will therefore be concerned with creating opportunities for promising or newly developed interventions to be rigorously evaluated according to both process and outcome as part of a co-ordinated research programme. One way to meet this challenge is for services to work in partnership with researchers to build the evidence base. These need to be supported by an appropriate infrastructure to increase opportunities for practitioners, policy-makers, researchers and young people (and when appropriate their families) to collaborate; initiatives to increase the

research capacity of social and public health scientists in evaluation techniques; and adequate sources of funding which allow for long-term follow-up and samples of sufficient quantity for studies to be adequately powered to detect intervention effects.

Another main finding of this review is that there have been few attempts to evaluate the impact of addressing the wider structural determinants of physical activity such as increasing access to facilities for active recreation and providing more cycle lanes. Whilst it is important to attempt to evaluate such initiatives in a rigorous way, there is a debate about the role of the RCT in such evaluations. Some have suggested that this is not an appropriate evaluation method and it may be better to make the best use of before and after assessments of 'naturally occurring experiments' (Nutbeam, 2001). A crucial challenge therefore is to reach some consensus on the issue of the feasibility of using RCTs to evaluate the impact of such interventions.

The problems associated with evaluating structural interventions were discussed by the scientific advisory group appointed to assist the preparation of the Acheson report. The group's role was to examine the strength of the evidence used to support recommendations on reducing health inequalities (Macintyre, 2001). The policy recommendations submitted to the group by experts in the field were seldom supported by sound evidence for effectiveness. Nevertheless, sound evidence generated by RCTs does exist in some areas. The need for better evidence is all the more necessary because some initiatives might actually increase health inequalities, or do other harm (Davey Smith *et al.*, 2001). Macintyre and Petticrew (2000) explore some of the misconceptions about evidence-based policy and practice, including the assumption that the real world is too complex to evaluate using experimental methods and that social and public health interventions cannot do harm (see also Oakley and Fullerton, 1996; Oakley, 2000). Macintyre (2001) also provides examples of commonly used 'popular' interventions which are exposed as being ineffective or even harmful when the evidence from sound evaluations is taken into account. For example, the 'Scared Straight' intervention which aims to deter young people from crime is widely used in the US, but evidence from seven RCTs found that it actually increased delinquency rates (Petrosino *et al.*, 2000) Rather than adopting a defeatist attitude to evaluation using experimental methods, Macintyre argues that ingenuity should be employed to resolve some of the difficulties in assessing the impact of efforts to tackle the wider determinants of social and health problems. The establishment of several UK and international initiatives focusing on systematically reviewing the effectiveness of social interventions in fields such as education, criminology and social policy have the potential to stimulate methodological innovation and generate the 'ingenuity' required (e.g. Davies and Boruch, 2001; Oakley and Gough, 2000; Oliver and Peersman, 2001).

8.4 Methodological issues: gathering young people's views

The decision to privilege young people's own views about the barriers to, and facilitators of, healthy eating has highlighted a number of useful lessons for the planning and development of future interventions. However, this decision has also posed a series of challenges for this systematic review and for systematic reviews of social interventions more generally, where these incorporate a wider range of 'evidence' than is traditionally considered. Different challenges occurred at each stage of the review process. In terms of searching, we found that routine

methods of literature searching (e.g. bibliographic databases) were not very fruitful for locating studies of young people's views. Many were found in the 'grey' literature (i.e. literature not formally published). This required making extensive use of personal contacts, which was significantly more labour intensive. Often several phone calls had to be made in order to track down one report and, quite often it was only when we received a copy of the report that it became clear that it did not fit our inclusion criteria.

As there was no existing standardised way of extracting data and assessing the quality of these types of studies, we were required to develop new tools. The studies usually employed cross-sectional survey methods using various types of quantitative and qualitative data collection and analysis methods. Thus we built upon previous to develop criteria to assess the quality of non-experimental research. In common with other study types (e.g. outcome evaluations and the systematic reviews) data extraction was often made difficult due to lack of detail on, for example, study sample, methods used and findings. This was often compounded by the fact that for some studies the only publicly accessible reports of the research were summaries written for practice audiences. Although the quality of the studies varied enormously, and the quality assessment criteria distinguished studies of different quality, only two of the studies met all seven of the criteria. Common problems were a lack of detail given on the methods used to recruit the sample; characteristics of the sample obtained; methods used to elicit young people's views (data collection); and methods used to analyse the data. All of these are needed to enable the reader to judge two things: firstly, to what extent the findings may be an artefact of the methods used; and secondly, to determine the parameters within which the findings are applicable (e.g. 'type' of young people represented and not represented in the sample).

The systematic examination and synthesis of the findings of these studies also offered considerable insight into different ways of eliciting young people's views and ways of involving young people in the development of efforts to promote healthy eating. For example, the aims, approach and methods used in some of the studies meant that they could only draw very general conclusions about perceptions. These studies often simply asked young people to rate a list of pre-determined statements with no indication of how they were derived (e.g. whether the language used was meaningful to young people). Although the findings of the studies provide a starting point for deciding which areas of possible concern to address, because these kinds of perceptions are presented somewhat out of context the study leaves lots of unanswered questions for the practitioner wanting to develop interventions. The findings do not tell us why young people hold a particular attitude to healthy eating, or how these attitudes relate to everyday aspects of young people's lives.

There is also a question about to what extent the studies included in this review have really engaged with young people's own views about healthy eating. This requires a thoughtful approach to choosing and developing data collection methods which will illuminate not only the main barriers to, and facilitators of, healthy eating, but also why and under what circumstances these act as barriers or facilitators.

Finally, the studies of young people's views also raised the issue of at what level research which aims to inform the development of health promotion for young people is really involving them in the planning and decision-making processes. Only three of the studies actually directly asked young people what they thought could or should be done to promote healthy eating (McDougall, 1998; Miles and

Eid, 1997; Watt and Sheiham, 1996). The methods used in these studies could be used as a starting point when trying to work in partnership with young people. All the other studies inferred what should be done indirectly from what young people said. Furthermore, in many cases young people were presented with structured questionnaires devised by researchers, which casts doubt on how meaningful the questions were to them.

8.5 Methodological issues: synthesising different types of evidence

This review has attempted to map the literature to, extract detailed data, quality assess, and synthesise, the findings from a range of different types of research evidence on the barriers to, and facilitators of, healthy eating with young people. This has represented a significant challenge for the traditional model of systematic reviews, which usually only include evidence generated from well-designed experimental research. In undertaking this challenge we have been able to build on a descriptive mapping of health promotion for young people undertaken by Peersman (1996); two systematic reviews which aimed to integrate studies evaluating processes as well as outcomes in the area of smoking cessation for pregnant women (Oliver, 2001) and peer-delivered health promotion for young people (Harden *et al.*, 1999a); and on the first review in this series on mental health (Harden *et al.*, 2001). This has involved firstly, applying explicit and transparent methodology to the data extraction and quality assessment of 'non-intervention' research, and secondly, to the synthesis of findings from this research with findings from 'intervention' research. As such this piece of work represents a model for how the lessons learned from rigorous research which evaluates the effectiveness of interventions, can be combined with the those from research which aims to examine what the public needs and wants, to inform policy, practice and further research in health promotion.

This has proved to be especially useful in the light of finding few soundly evaluated studies examining effectiveness. Systematically integrating young people's views on barriers and facilitators has allowed for detailed recommendations on interventions which need to be developed and evaluated further. These are outlined in the final chapter of this report.

9. CONCLUSIONS AND RECOMMENDATIONS

The aim of the review described in this report was to survey what is known about the barriers to, and facilitators of, healthy eating amongst young people with a view to drawing out the implications for policy and practice. The review has mapped and quality screened the extant research in this area, and brought together the findings from evaluations of interventions aiming to promote healthy eating and studies that have elicited young people's views.

A first major finding is, whilst there has been a significant amount of research activity in this area, there is relatively little good quality research evaluating the effectiveness of interventions to promote healthy eating, particularly in the UK. There has been much less research in this area than topics such as sexual health, drugs, smoking prevention or mental health (Peersman, 1996). Out of the 22 outcome evaluations which were included in the in-depth review, only around a third (N=7) were judged to be methodologically sound, upon which we can base judgements of effectiveness. Only one of these studies was conducted in the UK.

We also identified relatively few studies examining the views of young people (half the number identified for our review of the promotion of physical activity). In general, young people were not asked explicitly about barriers and facilitators, however, some of the responses they gave to other questions shed light on factors which influence their ability to eat healthily. These provide an important source of information that needs to be considered in any attempts to promote nutrition. When considered in conjunction with findings about effectiveness, such views highlight a number of promising ways in which to develop and test future interventions. Currently, interventions evaluated by good quality research do not always target what young people themselves see as the main barriers to healthy eating and do not always build upon what they see as the main facilitators. A major discrepancy in this respect is that, whilst practical and material resources are seen by young people as being an important influence on their eating behaviour, there are few evaluated interventions which have targeted such structural factors at a community or societal level.

A third major finding is that there is currently little soundly evaluated research on the promotion of healthy eating amongst socially excluded groups. This is a significant research gap since current health policy in the UK has a clear commitment to tackling the wider determinants of health and inequalities in health.

Whilst the evidence base is limited, a number of specific conclusions and recommendations for policy and practice and the future development of interventions to promote healthy eating with young people can be spelt out. It is also possible to suggest improvements in evaluation studies in this area, and ways of involving young people in research.

9.1 Recommendations for policy makers

This set of recommendations is based on the review's findings from **the seven sound outcome evaluations**:

- An intervention which aimed to support a 'whole school' approach to promoting health by encouraging schools to make changes in their organisational structure and philosophy was found to be effective for reported healthy eating behaviour, particularly in young women (aged 15 to 16 years), but less effective for increasing knowledge levels. The precise nature of the activities employed to promote healthy eating in the participating schools is not clear. A lack of time and school resources were factors which impeded the implementation of the award scheme in a number of schools. ***A 'whole school' approach (i.e. one involving all members of the school community in developing and implementing health-promoting changes in school organisation and structure) can be an effective way of promoting healthy eating. Further research could be conducted to evaluate specific activities to promote healthy eating as part of a whole school approach, such as fruit only tuck shops. Schools wishing to implement such an initiative should consider practical and resource implications as barriers to implementation have been reported.***
- Two interventions made changes to the availability of healthy foods in secondary schools. Both included classroom activities to provide information on the benefits of nutrition and the nutritional value of different foods, as well as, in one case, a school-wide media campaign to promote fruits and vegetables, and in another, a local television campaign. Both were effective at increasing reported healthy eating behaviour. In the study which measured the impact on clinical risk factors, the intervention was effective for reducing systolic blood pressure, but not cholesterol levels or diastolic blood pressure. ***Increasing the availability of healthy foods in the school, complemented by classroom activities and media campaigns, can be an effective way of promoting nutrition in the school.***
- Two interventions comprised classroom based initiatives to promote healthy eating (e.g. small group discussions, peer-led activities), complemented by activities in which young people analysed environmental influences affecting healthy eating in the school and beyond (e.g. comparing school canteen foods to nutritional guidelines and making recommendations for change; visiting local grocery stores to analyse food availability). These studies were generally effective for reported healthy eating, particularly among young women, and both were effective for increasing levels of knowledge (although in one study this was more effective for young women). ***School-based interventions which educate young people about nutrition and which alert them to environmental influences upon their ability to eat healthy foods can be effective, although there is inconsistency in effects between sexes.***
- One intervention (evaluated in two separate outcome evaluations) included a health screening initiative alongside classroom based educational activities, as well as initiatives to involve parents (e.g.

brochures and recipes sent home to encourage parents to cook healthy meals). The results of the screening were fed-back to young people who were encouraged to set behavioural goals. This intervention was judged by the reviewers to be effective for cholesterol levels, blood pressure and dietary intake only in one of the studies in which it was evaluated (in the other the effects were judged unclear). Problems were encountered implementing the programme, particularly with ensuring the teachers were adequately skilled and motivated to teach the nutrition curriculum, and ensuring normal school activities were not disrupted by the risk factor screening component. **Multi-component school-based initiatives which involve classroom activities, parental involvement and risk factor screening can be effective for certain clinical risk factors. Successful implementation is likely to require adequate training and motivation of teachers to lead the classroom component, and attention should be paid to incorporating the risk factor examination component into the school structure with ease.**

9.2 Recommendations for the future development and evaluation of interventions to promote healthy eating

This set of recommendations is based on interventions included in this review which look 'promising' but have not been soundly evaluated or were identified in the mapping exercise (but not reviewed by us in-depth). These latter interventions need to be developed and evaluated further. In addition, recommendations are made where gaps have been identified in terms of interventions that are yet to be evaluated. 'Promising' interventions have been identified from those which match young people's views about the main barriers to, and facilitators of, healthy eating, and gaps have been identified from mismatches between interventions and young people's views. These all clearly highlight **the need for researchers and practitioners to work in partnership to develop and rigorously evaluate interventions for their effectiveness and appropriateness.**

- **Interventions in supermarkets which inform families about the nutritional value of their food purchases (e.g. computer programmes which provide individualised feedback on chosen foods) and which encourage them to buy healthy foods require further evaluation.** Such initiatives could take place in outlets where young people themselves are likely to be making their own food purchases, given their increasing financial autonomy.
- **Interventions which aim to influence young people's personal preferences for 'fast foods' (e.g. because they taste good) need to be developed and evaluated further.** In particular, the use of 'taste-testings' which encourage young people to try healthy foods and familiarise themselves with their taste could do with further development and evaluation. Another option might be for food manufacturers to attempt to make healthy foods more appealing in terms of taste.
- **Interventions which seek to encourage healthy dietary behaviours to achieve weight loss, or prevent obesity need further evaluation.** Programmes should emphasise the negative aspects of unhealthy

dieting, and inform young people about positive actions they can take if they wish to achieve weight loss (e.g. identifying lower fat options in food outlets, integrating exercise into their lifestyle).

- ***Interventions which attempt to help young people set behavioural goals for healthy eating should be further developed and evaluated.*** Young people felt that will power is an important aspect of maintaining healthy eating. Goal setting following risk factor screening in schools has been one approach which has been tested and shown to be effective, however, given the problems associated with implementing this approach (in terms of practicality) there is a need to devise alternative ways of motivating young people. An individualised intervention focusing on goal setting might be reinforced by complementary initiatives which address family, social and structural influences on eating.
- ***There is a need for interventions which assess the effect of lowering the price of healthy foods (e.g. in schools, shops) and increasing their availability.*** Young people said that healthy foods were often expensive, and not always available in the settings in which they socialise. Schemes to encourage proprietors of fast food outlets to offer healthy alternatives on menus at reasonable prices might be one way to achieve this.
- ***Interventions which encourage better labelling of food products need further development and evaluation.*** Young people stated that labelling that enabled them to assess the nutritional value of foods, was an important source of information about nutrition.
- ***Consideration needs to be given to the inter-relationships between healthy eating, physical activity and mental health.*** Interventions to promote healthy eating are not always conducted in isolation from those aiming to promote exercise as both can contribute to the prevention of cardiovascular disease and promote an overall sense of well-being. For example, interventions to improve self-esteem (particularly in relation to physical appearance) could include participation in physical activity and maintaining healthy diets. Researchers considering developing and testing new interventions might want to explore whether they can be successfully integrated.
- ***Gender issues need to be given important consideration in any future developments of efforts to promote healthy eating.*** Strong differences according to gender emerged across the findings of the outcome evaluations and young people's views' studies. Young women were more likely to use information on nutritional content of foods to make food choices, were more likely to learn about nutrition from magazines and through talking to friends, and also were more concerned with their appearance than young men. These issues need to be carefully considered and used to inform the development of tailored interventions for young men and women.

9.3 Recommendations for involving young people in the development of interventions

This set of recommendations gives guidance for how practitioners and researchers can work in partnership with young people to develop interventions to promote healthy eating:

- **Young people's views should be the starting point for any future developments of efforts to promote healthy eating.** In particular, there needs to be more investigation into the barriers to and facilitators of healthy eating with young people being asked to specify, in their own words, the factors which inhibit or which help them to eat healthy foods.
- **Young people should always be consulted on matters concerning the promotion of their healthy eating.** This is not only an ethical imperative but also crucial in the development of potentially effective and acceptable interventions. Currently, from the information provided about the majority of evaluated interventions, young people have generally not been consulted either in intervention development or in the evaluation of intervention processes.
- **Young people should, therefore, be involved as equal stakeholders in future agenda-setting for the promotion of healthy eating.** Young people have valuable knowledge about the barriers to and facilitators of healthy eating and require relevant, correct information and advice delivered in an appropriate and acceptable manner.
- The views of socially excluded groups such as those from households on low incomes, from minority ethnic groups, those excluded from school and those with disabilities need to be sought. **All of the studies found in this review involved samples of young people attending school and none focused on any excluded group.**

9.4 Recommendations for conducting and reporting research

- ***When possible, outcome evaluations should be conducted using the design of a randomised controlled trial using either individuals, families, schools, geographical areas or Local Education Authorities as units of allocation.*** Whilst it is recognised that there are circumstances when this might not be possible, there are currently many missed opportunities for employing this design to evaluating effectiveness. Researchers need to work with practitioners (e.g. teachers, health promoters, Local Education Authority officials) to make use of opportunities to evaluate interventions in this way and policy-makers and research commissioners need to allocate sufficient funds to support this.
- ***Outcome evaluations should assess the impact of interventions in the long term, following up young people as they enter adulthood.*** Although long-term evaluation might be costly, and present practical difficulties for researchers who need to maintain contact with participants, there is currently little evidence that programmes to promote healthy

eating with young people in their teens can have a lasting effect (beyond two years following intervention).

- **Outcome evaluations should always attempt to conduct integral process evaluations.** Only 10% of the outcome evaluations included in our mapping and quality assessment exercise did this. Without such evaluation the ability to implement programmes effectively is limited.
- **Key aspects of the methodology and results of outcome evaluations need to be reported in a detailed and consistent manner to promote confidence in their rigour.** Outcome evaluations reviewed here did not consistently report pre-test and post-test data of all participants as recruited into the study; establish the equivalence of intervention and control groups; or report the impact of the intervention for all outcomes targeted. These key aspects need to be reported as a minimum benchmark of quality. Where publication word limits will allow, further information should be provided on the aims of the study; information on the method of randomisation where used; complete reporting of numbers of participants assigned to intervention and control groups; thorough enough reporting of interventions and evaluation to allow replicability; and complete reporting of attrition rates.
- **Studies examining young people's views need to engage young people in a dialogue which is meaningful to them.** Studies often used checklists of pre-determined statements for young people to respond to with no details of whether these were derived from what young people see as important or whether they found the language used appropriate.
- **Studies examining young people's views need to seek informed consent and assure confidentiality/anonymity of responses.** Aside from being an ethical imperative, such actions may encourage young people to provide more honest responses and thus increase the validity of the findings.
- **The reporting of studies of young people's views and process evaluations also need to be more complete, as basic data are often missing.** Detailed descriptions of the selection and recruitment of the sample; the methods used to collect and analyse data; and sample characteristics should always be presented. In addition, attempts to ensure the reliability and validity of the data collection and data analysis methods need to be made. An outline of how the study's findings contribute to the existing knowledge base should also be included.

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APPENDIX A: Search strategies

MEDLINE

Implemented on PubMed for 1995 - September 2000. For the search strategy used to search for studies prior to 1995 see the section 'BiblioMap' below.

A. Search terms for adolescents and young people:

young people[TI] OR young people[AB] OR young adult*[TI] OR young adult*[AB] OR youth[TI] OR youth[AB] OR juvenile[TI] OR juvenile[AB] OR teenager*[TI] OR teenager*[AB] OR adolescent*[TI] OR adolescent*[AB] OR school student*[TI] OR school student[AB] OR dropout*[TI] OR dropout*[AB] OR pupil*[TI] OR pupil*[AB]

B. Search terms for health promotion / illness prevention:

prevent*[TI] OR reduc* [TI] OR promot* [TI] OR increase*[TI] OR intervention*[TI] OR program*[TI] OR curriculum*[TI] OR educat*[TI] OR project*[TI] OR campaign*[TI] OR impact*[TI] OR risk factor*[TI] OR vulnerability[TI] OR resilien*[TI] OR protect*[TI] OR factors associated[TI] OR correlates[TI] OR predict*[TI] OR determin*[TI]

C. Search terms for health promotion and determinants of physical health or physical ill health:

risk[MH] OR risk factors[MH] OR culture[MH] OR lifestyle[MH] OR risk-taking[MH] OR knowledge, -attitudes, -practice[MH] OR adolescent-behavior[MH] OR adolescent-psychology[MH] OR cross-cultural-comparison[MH] OR comparative study[MH] OR socioeconomic factors[MH] OR race-relations[MH] OR cultural-deprivation[MH] OR urban-population[MH] OR student-dropouts[MH] OR juvenile-delinquency[MH] OR homeless-youth[MH] OR health-promotion[MH] OR health-education[MH] OR primary-prevention[MH] OR behavior-modification[MH] OR behavior-therapy[MH] OR program-evaluation[MH] OR intervention-studies[MH] OR outcome-assessment-health-care[MH] OR single-parent[MH] OR poverty[MH] OR unemployment[MH] OR minority groups[MH] OR attitude[MH] OR attitude to health[MH]

D. Search terms for physical activity:

(((((("sports"[MeSH Terms] OR "exercise"[MeSH Terms] OR exercise[Text Word]) OR ("exertion"[MeSH Terms] OR exertion[Text Word])) OR ("physical education and training"[MeSH Terms] OR physical-education-and-training[Text Word])) OR ("physical endurance"[MeSH Terms] OR physical endurance[Text Word])) OR ("physical fitness"[MeSH Terms] OR physical

fitness[Text Word])) OR ("leisure activities"[MeSH Terms] OR leisure activities[Text Word])) OR "physical activity"[All Fields] OR "physical exercise"[All Fields] OR (physical[All Fields] AND inactivity[All Fields])) AND notpubref[sb])

E. Search terms for healthy eating:

diet therapy OR nutrition/ education[mh] OR obesity/pc[mh] OR obesity/px[mh] OR obesity/th[mh] OR weight loss OR food preferences OR feeding behavior OR food habits OR diet, reducing OR diet[mh] OR healthy eating OR adolescent-nutrition OR diet-surveys OR diet records OR health food OR diet fads OR nutrition surveys OR nutrition assessment

F. Final result

A AND (B OR C) AND (D OR E)

EMBASE

Implemented from 1995 - September 2000. For the search strategy used to search for studies prior to 1995 see the section 'BiblioMap' below.

A: Search terms for physical activity, physical inactivity or mediators of physical activity

breathing exercise OR dynamic exercise OR exercise OR exercise tolerance OR fitness OR leisure OR physical activities (expl) OR physical education OR recreation OR sports

B. Search terms for healthy eating

obesity/ all subheadings OR body weight/ all subheadings OR weight reduction/ all subheadings OR hypertension/ all subheadings OR nutrition/ all subheadings OR diet/ all subheadings OR dietary intake/ all subheadings OR feeding behavior/ all subheadings OR eating habit/ all subheadings OR food preference/ all subheadings OR nutritional health/ all subheadings OR nutritional status/ all subheadings OR nutritional value/ all subheadings OR eating/ all subheadings OR cholesterol blood level/ all subheadings OR cardiovascular disease/ all subheadings OR hypercholesterolemia/ all subheadings

C: Search terms for prevention/promotion and barriers/opportunities

(prevent* in TI) OR (reduc* in TI) OR (promot* in TI) OR (increase* in TI) OR (intervention* in TI) OR (program* in TI) OR (curriculum* in TI) OR (educat* in TI) OR (project* in TI) OR (campaign* in TI) OR (impact* in TI) OR (risk factor* in TI) OR (vulnerability in TI) OR (resilien* in TI) OR (protect* in TI) OR (factors associated in TI) OR (correlates in TI) OR (predict* in TI) OR (determinant* in TI)

OR

HEALTH-EDUCATION / all subheadings OR HEALTH-PROMOTION / all subheadings OR EDUCATION / all subheadings OR EDUCATION-PROGRAM / all subheadings OR HEALTH-PROGRAM / all subheadings OR BEHAVIOR-THERAPY / all subheadings OR BEHAVIOR-MODIFICATION / all subheadings OR EVALUATION-AND-FOLLOW-UP / all subheadings OR EVALUATION / all subheadings OR PREVENTIVE-MEDICINE / all subheadings OR LIFESTYLE-AND-RELATED-PHENOMENA / all subheadings OR LIFESTYLE / all subheadings OR LIFE-EVENT / all subheadings OR RISK / all subheadings OR RISK-ASSESSMENT / all subheadings OR RISK-FACTOR / all subheadings OR HIGH-RISK-POPULATION / all subheadings OR PREVENTION / all subheadings OR PREVENTION-AND-CONTROL / all subheadings OR PRIMARY-PREVENTION / all subheadings OR CURRICULUM / all subheadings OR COGNITIVE-THERAPY / all subheadings OR ETHNIC-OR-RACIAL-ASPECTS / all subheadings OR PROTECTION / all subheadings OR UNEMPLOYMENT / all subheadings OR SOCIAL-PROBLEM / all subheadings OR CULTURAL-DEPRIVATION / all subheadings OR HOMELESSNESS / all subheadings OR CULTURAL-ANTHROPOLOGY / all subheadings OR PSYCHOLOGICAL-ASPECT / all subheadings OR SOCIAL-ASPECT / all subheadings OR ECONOMIC-ASPECT / all subheadings OR SOCIAL-CLASS / all subheadings OR DISABILITY / all subheadings OR LEARNING-DISORDER / all subheadings OR URBAN-POPULATION / all subheadings OR URBAN-RURAL-DIFFERENCE / all subheadings OR HUMAN-RELATION / all subheadings OR FAMILY-LIFE / all subheadings OR CONFLICT / all subheadings

D: Search terms for young people or adolescents

(young people in TI) OR (young people in AB) OR (young adult* in TI) OR (young adult* in AB) OR (youth in TI) OR (youth in AB) OR (youth in DEM) OR (juvenile* in TI) OR (juvenile* in AB) OR (juvenile* in DEM) OR (teenager* in TI) OR (teenager* in AB) OR (adolescent* in TI) OR (adolescent* in AB) OR (adolescent* in DEM) OR (school student* in TI) OR (school student* in AB) OR (school student* in DEM) OR (dropout* in TI) OR (dropout* in AB) OR (pupil* in TI) OR (pupil* in AB)

E. Final result

(A OR B) AND C AND D

Psycinfo

Implemented via WinSpirs for 1967 - October 2000.

Search terms for adolescents or young people:

- #1 young people in TI, AB
- #2 young adult* in TI, AB
- #3 youth in TI, AB
- #4 youth in DE
- #5 juvenile* in TI, AB
- #6 juvenile* in DE
- #7 teenager* in TI, AB
- #8 adolescent* in TI, AB
- #9 adolescent* in DE
- #10 school student* in TI, AB
- #11 school student* in DE
- #12 dropout* in TI, AB
- #13 dropout* in DE
- #14 pupil* in TI, AB
- #15 pupil* in DE
- #16 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10
or #11 or #12 or #13 or #14 or #15

Search terms for health promotion / illness prevention and determinants of physical health or physical ill health:

- #17 self esteem in ti
- #18 self concept in ti
- #19 empower* in ti
- #20 prevent* in ti
- #21 promot* in ti
- #22 intervention* in ti
- #23 program* in ti
- #24 curriculum* in ti
- #25 educat* in ti
- #26 campaign* in ti
- #27 impact* in ti
- #28 risk factor* in ti
- #29 stress management in de
- #30 ethnic identity in de
- #31 sociocultural-factors in de
- #32 health education in de
- #33 lifestyle-changes in de
- #34 prevention in de
- #35 educational-therapy in de
- #36 program evaluation in de
- #37 at-risk-populations in de
- #38 dropouts in de
- #39 potential dropouts in de
- #40 school dropouts in de
- #41 social deprivation in de
- #42 disadvantaged in de
- #43 homeless in de
- #44 juvenile-delinquents in de
- #45 disadvantaged in de
- #46 poverty in de
- #47 disabled in de

#48 #17 or #18 or #19 or #20 or #21 or #22 or #23 or #24 or #25 or #26 or #27 or #28 or #29 or #30 or #31 or #32 or #33 or #34 or #35 or #36 or #37 or #38 or #39 or #40 or #41 or #42 or #43 or #44 or #45 or #46 or #47

Search terms for physical activity

#49 Sports in de
#50 Sports in ti, ab
#51 Exercise in de
#52 Exercise in ti, ab
#53 Physical-Education in de
#54 Physical-Fitness in de
#55 Physical-Endurance in de
#56 Leisure-Time in de
#57 Leisure-Time in ti, ab
#58 Physical activity in ti, ab
#59 Recreation in de
#60 Recreation in ti, ab

#61 #49 or #50 or #51 or #52 or #53 or #54 or #55 or #56 or #57 or #58 or #59 or #60

Search terms for healthy eating:

#62 Nutrition in ti, ab
#63 Nutrition in de
#64 Diets- in de
#65 Diet in ti, ab
#66 Obesity in de
#67 Obesity in ti, ab
#68 Food intake in de
#69 Food preferences in de
#70 Food in ti, ab
#71 Eating in de
#72 Eating attitudes in de
#73 Eating in ti, ab

#74 #62 or #63 or #64 or #65 or #66 or #67 or #68 or #69 or #70 or #71 or #72 or #73

Final result

#75 #16 and #48 and (#61 or #74)

ERIC

Implemented via Ovid/BIDS for 1984 - June 2000.

A. Search terms for adolescents and young people:

youth.ti,ab. or teenagers.ti,ab. or young people.ti,ab. or young adults.ti,ab. or adolescents.ti,ab. or Adolescents/

B. Search terms for health promotion / illness prevention:

Health activities/ or Health education/ or Health programs/ or Health promotion/ OR Health materials/ OR Behavior change/ or Behavior modification/ or Intervention/ OR Crime prevention/ or Dropout prevention/ or Prevention/ or Preventive medicine/ or Risk management/ or Evaluation/ or Formative evaluation/ or Needs assessment/ or Summative evaluation/ or Outcome based education/ or Outcomes of education/ or Program effectiveness/ or promot\$.ti. or increas\$.ti. or prevent\$.ti. or intervention\$.ti. or program\$.ti. or curriculum.ti. or health educat\$.ti. or project\$.ti. or campaign\$.ti. or impact.ti. or reduc\$.ti.

C. Search terms for health promotion and determinants of physical health or physical ill health:

Disadvantaged/ or Disadvantaged environment/ or Educationally disadvantaged/ or Poverty/ or Poverty areas/ or Unemployment/ or Economically disadvantaged/ or Homeless people/ or Low income groups/ or Low income/ or Lower class/ or Poverty programs/ or Dropout characteristics/ or Dropout prevention/ or Dropout programs/ or Dropouts/ or Out of school youth/ or Potential dropouts/ or Truancy/ or Ethnic stereotypes/ or Racial attitudes/ or Racial discrimination/ or Black stereotypes/ or Cultural differences/ or Ethnicity/ or Disability discrimination/ or Learning disabilities/ or Ghettos/ or Urban population/ or Urban youth/ or risk/ or Delinquency/ or Delinquency prevention/ or Delinquency causes/ or Runaways/ or Youth problems/ or "Adjustment (to environment)"/ or Coping/ or Life satisfaction/ or Happiness/ or Well being/ or Emotional adjustment/ or Social adjustment/ or Social isolation/ or Stress management/ or Stress variables/ or Daily living skills/ or Self esteem/ or Alienation/ or Cultural isolation/ or Student alienation/ or risk factor\$.ti. or vulnerab\$.ti. or resilien\$.ti. or (factor\$ adj protect\$).ti. or protect\$ factor\$.ti. or factors associated.ti. or correlat\$.ti. or predict\$.ti. or predictors.ti. or determinant\$.ti. or self esteem.ti. or self concept.ti. or coping.ti. or well being.ti. or social support.ti. or social support.ti. or empower.ti. or empower\$.ti.

D. Search terms for physical activity:

Exp adapted physical education/ or exp health activities/ or exp physical activities/ or exp physical education/ or exp physical recreation programs/ or exp playground activities/ or exp recreational activities/ or exp exercise/ or exp health related fitness/ or exp physical fitness/ or exp physical fitness tests/ or exp physical health/ or exp athletics/ or exp extracurricular activities/ or exp physical activity level/ or exp leisure education

E. Search terms for healthy eating:

Exp breakfast programs/ or exp dietetics/ or exp eating habits/ or exp food/ or exp health/ or exp lunch programs/ or exp nutrition/ or exp nutrition instruction/ or exp "recipes (food)"/ or exp vending machines/ or exp obesity

F. Final result

A AND (B OR C) AND (D OR E)

Social Science Citation Index

Implemented via Web of Science for 1981 - September 2000.

A. Search terms for adolescents and young people:

(youth OR teenagers OR young people OR young adults OR adolescen*)

B. Search terms for health promotion and determinants of physical health or physical ill health:

(promot* OR increas* OR prevent* OR intervention* OR program* OR curriculum* OR educat* OR campaign* OR impact* OR effect* OR prevent* OR reduc* OR risk factor* OR factors associated OR correlat* OR predict* OR determinant* OR disadvantage* OR inequalities OR social class OR working class OR high risk OR depriv* OR gender OR low income OR ethnic OR disabilit*)

C. Search terms for healthy eating or physical activity

(eating OR nutrition* OR food OR diet* OR fat OR supermarket* OR cafeteria* OR canteen* OR cholesterol OR physical activity OR exercise OR leisure OR sport* OR fitness OR physical education OR recreation*)

D. Final result

A AND B AND C

CINAHL

Implemented via WebSpirs for 1982 - July 2000.

A. Search terms for adolescents and young people:

(young people in TI) OR (young people in AB) OR (young adult* in TI) OR (young adult* in AB) OR (youth in TI) OR (youth in AB) OR (youth in DE) OR (juvenile* in TI) OR (juvenile* in AB) OR (juvenile* in DE) OR (teenager* in TI) OR (teenager* in AB) OR (adolescent* in TI) OR (adolescent* in AB) OR (adolescent* in DE) OR (school student* in TI) OR (school student* in AB) OR (school student* in DE) OR (dropout* in TI) OR (dropout* in AB) OR (pupil* in TI) OR (pupil* in AB)

B. Search terms for health promotion / illness prevention:

(prevent* in TI) OR (prevent* in AB) OR (reduc* in TI) OR (reduc* in AB) OR (promot* in TI) OR (promot* in AB) OR (increase* in TI) OR (increase* in AB) OR (intervention* in TI) OR (intervention* in AB) OR (program* in TI) OR (program* in AB) OR (curriculum* in TI) OR (curriculum* in AB) OR (educat* in TI) OR (educat* in AB) OR (project* in TI) OR (project* in AB) OR (campaign* in TI) OR (campaign* in AB) OR (impact* in TI) OR (impact* in AB) OR (risk factor* in TI) OR (risk factor* in AB) OR (vulnerability in TI) OR (vulnerability in AB) OR (resilien* in TI) OR (resilien* in AB) OR (protect* in TI) OR (protect* in AB) OR (factors associated in TI) OR (factors associated in AB) OR (correlates in TI) OR (correlates in AB) OR (predict* in TI) OR (predict* in AB) OR (determinant* in TI) OR (determinant* in AB)

C. Search terms for health promotion and determinants of physical health or physical ill health:

(risk in TI) OR (risk in AB) OR (risk factors in TI) OR (risk factors in AB) OR (culture in TI) OR (culture in AB) OR (lifestyle in TI) OR (lifestyle in AB) OR (risk-taking in TI) OR (risk-taking in AB) OR (knowledge in TI) OR (knowledge in AB) OR (attitude* in TI) OR (attitude* in AB) OR (practice in TI) OR (practice in AB) OR (adolescent behavior in TI) OR (adolescent behavior in AB) OR (adolescent psychology in TI) OR (adolescent psychology in AB) OR (comparative study in TI) OR (comparative study in AB) OR (socioeconomic factors in TI) OR (socioeconomic factors in AB) OR (race relations in TI) OR (race relations in AB) OR (cultural deprivation in TI) OR (cultural deprivation in AB) OR (urban population in TI) OR (urban population in AB) OR (student dropouts in TI) OR (student dropouts in AB) OR (juvenile delinquency in TI) OR (juvenile delinquency in AB) OR (homeless youth in TI) OR (homeless youth in AB) OR (health promotion in TI) OR (health promotion in AB) OR (health education in TI) OR (health education in AB) OR (primary prevention in TI) OR (primary prevention in AB) OR (behavior modification in TI) OR (behavior modification in AB) OR (behavior therapy in TI) OR (behavior therapy in AB) OR (program evaluation in TI) OR (program evaluation in AB) OR (intervention studies in TI) OR (intervention studies in AB) OR (outcome-assessment-health-care in TI) OR (outcome-assessment-health-care in AB) OR (single parent in TI) OR (single parent in AB) OR (poverty in TI) OR (poverty in AB) OR (unemployment in TI) OR (unemployment in AB) OR (minority groups in TI) OR (minority groups in AB) OR (attitude to health in TI) OR (attitude to health in AB)

D. Search terms for physical activity:

(sports in TI) OR (sports in AB) OR (exercise in TI) OR (exercise in AB) OR (exertion in TI) OR (exertion in AB) OR (physical education and training in TI) OR (physical education and training in AB) OR (physical endurance in TI) OR (physical endurance in AB) OR (physical fitness in TI) OR (physical fitness in AB) OR (leisure activities in TI) OR (leisure activities in AB) OR (physical activity in TI) OR (physical activity in AB) OR (physical exercise in TI) OR

(physical exercise in AB) OR (physical inactivity in TI) OR (physical inactivity in AB)

E. Search terms for healthy eating:

(diet therapy in TI) OR (diet therapy in AB) OR (nutrition in TI) OR (nutrition in AB) OR (obesity in TI) OR (obesity in AB) OR (weight loss in TI) OR (weight loss in AB) OR (food preferences in TI) OR (food preferences in AB) OR (feeding behavior in TI) OR (feeding behavior in AB) OR (food habits in TI) OR (food habits in AB) OR (reducing diet in TI) OR (reducing diet in AB) OR (diet in TI) OR (diet in AB) OR (healthy eating in TI) OR (healthy eating in AB) OR (adolescent nutrition in DE) OR (diet surveys in DE) OR (diet records in TI) OR (diet records in AB) OR (health food in TI) OR (health food in AB) OR (diet fads in TI) OR (diet fads in AB) OR (nutrition surveys in DE) OR (nutrition assessment in TI) OR (nutrition assessment in AB)

F. Final result.

A AND (B OR C) AND (D OR E)

BiblioMap

#01 YOUNG PEOPLE
#02 HEALTHY EATING
#03 #1 AND #2
#04 #03 AND NOT PHYSICAL ACTIVITY
#05 ACTIVITY
#06 PHYSICAL ACTIVITY
#07 LEISURE
#08 #05 OR #06 OR #07
#09 #08 AND YOUNG PEOPLE

Final result

#10 #04 OR #09

The following earlier searches of Medline and EMBASE were carried out in 1995 and results held on BiblioMap

MEDLINE

A. Search terms for population

adolescence OR adolescent-behavior OR adolescent-health-services OR schools OR school-health-services OR students

B. Search terms for health promotion

attitude-to-health OR health-behavior OR health-education OR health-promotion OR knowledge-attitudes-practice OR life-style OR

patient-education OR primary-prevention OR risk-management OR risk-taking

C. Search terms for healthy eating

adolescent-nutrition OR diet-surveys OR diet-records OR diet-reducing OR feeding-behavior OR food-habits OR food-preferences OR nutrition-surveys

D. Search terms for physical activity

exercise OR leisure-activities OR physical-education-and-training OR physical-fitness OR recreation OR sports

E. Final result

A AND B AND (C OR D)

EMBASE

A. Search terms for population

adolescence (expl) OR adolescent (expl) OR child behavior (expl) OR college OR college student OR high school OR school (expl) OR school health service OR student OR university

B. Search terms for health promotion

behavior modification OR health behavior (expl) OR health education (expl) OR health promotion OR heart prevention OR infection prevention OR primary prevention OR risk management

C. Search terms for healthy eating

child nutrition OR body image OR eating habit OR feeding behavior OR weight reduction

D. Search terms for physical activity

breathing exercise OR dynamic exercise OR exercise tolerance OR fitness OR leisure OR physical activities (expl) OR physical education OR recreation

E. Final result

A AND B AND (C OR D)

HealthPromis

A. Search terms for healthy eating

General: healthy eating AND nutrition

B. Search terms for adolescents and young people

General: adolescents OR young people OR young adult OR children

Final result

A AND B

Health Promotion Library Scotland Catalogue

#01 General: healthy eating AND nutrition

#02 General: adolescents OR young people OR young adult OR children

#03 #01 AND #02

#04 General: exercise OR physical activity OR sport OR fitness OR leisure

#05 General: adolescent\$

#06 #04 and #05

Final result

#03 OR #06

The Cochrane Library

Implemented via Cochrane Library Issue 3, 2000 (CD ROM)

Search terms for adolescents and young people:

#1 HOMELESS-YOUTH*:ME

#2 ADOLESCENCE:ME

#3 JUVENILE-DELINQUENCY*:ME

#4 YOUNG near PEOPLE

#5 YOUNG near ADULT*

#6 JUVENILE*

#7 TEENAGER*

#8 PUPIL*

#9 SCHOOL and STUDENT*

#10 YOUTH*

#11 ADOLESCENT*

#12 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10
or #11

Search terms for health promotion / illness prevention:

#13 PREVENT*

#14 REDUC*

#15 PROMOT*

#16 INCREASE*

#17 INTERVENTION*

#18 PROGRAM*

#19 CURRICULUM*

- #20 EDUCAT*
- #21 PROJECT*
- #22 CAMPAIGN*
- #23 IMPACT*
- #24 RISK and FACTOR*
- #25 VULNERABILITY
- #26 RESILIENT*
- #27 PROTECT*
- #28 PREDICT*
- #29 DETERMIN*

- #30 #13 OR #14 OR #15 OR #16 OR #17 OR #18 OR #19 OR
#20 OR #21 OR #22 OR #23 OR #24 OR #25 OR #26 OR
#27 OR #28 OR #29

Search terms for health promotion and determinants of physical health or physical ill health:

- #31 RISK-FACTORS*:ME
- #32 CULTURE*:ME
- #33 RISK-TAKING*:ME
- #34 KNOWLEDGE-ATTITUDES-PRACTICE*:ME
- #35 ADOLESCENT-BEHAVIOR*:ME
- #36 ADOLESCENT-PSYCHOLOGY*:ME
- #37 CROSS-CULTURAL-COMPARISON*:ME
- #38 COMPARATIVE STUDY*:ME
- #39 SOCIOECONOMIC FACTORS*:ME
- #40 RACE-RELATIONS*:ME
- #41 CULTURAL-DEPRIVATION*:ME
- #42 URBAN-POPULATION*:ME
- #43 STUDENT-DROPOUTS*:ME

- #44 JUVENILE-DELINQUENCY*:ME
- #45 HOMELESS-YOUTH*:ME
- #46 HEALTH-PROMOTION*:ME
- #47 HEALTH-EDUCATION*:ME
- #48 PRIMARY-PREVENTION*:ME
- #49 BEHAVIOR-MODIFICATION*:ME
- #50 BEHAVIOR-THERAPY*:ME
- #51 PROGRAM-EVALUATION*:ME
- #52 INTERVENTION-STUDIES*:ME
- #53 OUTCOME-ASSESSMENT-HEALTH-CARE*:ME
- #54 SINGLE-PARENT*:ME
- #55 POVERTY*:ME
- #56 UNEMPLOYMENT*:ME
- #57 MINORITY and GROUPS*:ME
- #58 ATTITUDE*:ME
- #59 ATTITUDE TO HEALTH*:ME

- #60 #31 or #32 or #33 or #34 or #35 or #36 or #37 or #38 or
#39 or #40 or #41 or #42 or #43 or #44 or #45 or #46 or
#47 or #48 or #49 or #50 or #51 or #52 or #53 or #54 or
#55 or #56 or #57 or #58 or #59

Search terms for physical activity:

#61 EXERCISE*:ME
#62 PHYSICAL-EDUCATION-AND-TRAINING*:ME
#63 PHYSICAL-FITNESS:ME
#64 PHYSICAL-ENDURANCE:ME
#65 LEISURE-ACTIVITIES*:ME
#66 SPORTS*:ME

Search terms for healthy eating:

#67 DIET*:ME
#68 DIET-SURVEYS:ME
#69 ADOLESCENT-NUTRITION*:ME
#70 OBESITY*:ME
#71 WEIGHT-LOSS*:ME
#72 WEIGHT-GAIN:ME
#73 FOOD-SERVICES*:ME
#74 FOOD-HABITS*:ME
#75 FOOD-PREFERENCES*:ME
#76 NUTRITION-ASSESSMENT*:ME
#77 NUTRITION*:ME

#78 #61 or #62 or #63 or #64 or #65 or #66
#79 #67 or #68 or #69 or #70 or #71 or #72 or #73 or #74 or
#75 or #76 or #77
#80 #12 and (#30 or #63) and (#78 or #79)
#81 #46 or #47 or #48

Final result

#83 #80 and #81

HTA database

Nutrition /All fields AND young(w)people /All fields OR
adolescent/All fields
OR
Nutrition/All fields OR healthy(w)eating/All fields AND promotion/All
fields

APPENDIX B: Details of sound outcome evaluations: methodology

Author	Design	Number of conditions / Sample size	Follow-up interval	Participation rate/ Attrition	Authors' judgement about effects on healthy eating outcomes	Reviewers' judgement about effect
Klepp and Wilhelmsen (1993)	CT	2 groups: (i) Intervention group (ii) Control group	5 month and 1 year follow-up	Approximately 15%	* Effective for reported healthy eating behaviour for young men (first follow-up) and young women (both follow-ups). Healthy eating was measured by the frequency of consumption of foods low in fat and sugar (e.g. skimmed milk, fruit and vegetables, whole wheat bread, fish) or high in fat or sugar (e.g. butter, whole-fat milk, white bread, cakes) * Effective for knowledge of healthy eating for young men (both follow-ups) but not young women	Agree with authors
Moon <i>et al.</i> (1999a)	CT	2 groups: (i) Wessex Healthy Schools Award (WHSA) (n=11) (ii) Control group (n=5)	Within three months of the end of the intervention	1 school dropped out of the intervention group	* Effective for reported behaviour for older young women (aged 15 to 16 years) including: eating healthier snacks at breaktime and choosing fruit and vegetables as healthy. Ineffective for young men and younger women (12 to 13 years) * Ineffective for knowledge, but with most marked changes amongst Year 11 (15 to 16 year olds) students * Effective for health promotion organisation and functioning within schools, but ineffective for 'physical activities' and 'taking responsibility for oneself'	Agree with authors
Niklas <i>et al.</i> (1998)	RCT	2 groups: (i) Intervention Group (6 schools, estimated n= 1100 pupils) (ii) Control group (6 schools, estimated n= 1100 pupils)	3 year intervention with yearly outcome measurements	All schools remained in the evaluation. 81% of the original cohort participated for four years.	* Effective for knowledge (higher among young women) * Ineffective for attitudes (self efficacy) * Effective for reported healthy eating behaviour (fruit and vegetable consumption) only for first two years of the intervention	Agree with authors

APPENDIX B: Details of sound outcome evaluations: methodology (cont'd)

<p>Perry <i>et al.</i> (1987)</p>	<p>RCT</p>	<p>2 groups randomised by class</p> <p>Intervention group (6 classes, n= 173 students)</p> <p>Control group (4 classes, n=95 students)</p>	<p>Immediately after the intervention</p>	<p>Not reported</p>	<p>* More effective for healthy eating behaviour for young women in the intervention group than the comparison group. A 'heart-healthy eating score' was calculated based on usual snacks, breakfast and main meal. The intervention was effective at decreasing the use of salt by both sexes.</p> <p>* Effective at increasing awareness of healthy eating for young women only</p> <p>* Effective for practical skills (e.g. reading and interpreting food labels correctly) for young women</p> <p>* Effective for knowledge of nutrition for both sexes</p> <p>* Effective for intentions to eat healthily for young women only</p>	<p>Agree with authors</p>
<p>Vartiainen <i>et al.</i> (1991)</p>	<p>RCT</p>	<p>'Direct programme' group (8 schools, n=832 students)</p> <p>'Teacher-led' group (16 schools, n=1755)</p> <p>'Administrative programme' group (8 schools, n=887 students)</p> <p>Control group (8 schools, n=779 students)</p>	<p>2 years after the intervention</p>	<p>Not applicable as design involves a cross sectional follow-up survey</p>	<p>* Effective for reducing fat intake with greatest changes in the 'direct programme' group and the 'teacher-led' group.</p> <p>* Ineffective for reducing cholesterol levels (reduction was similar across all groups)</p> <p>* Effective for reducing systolic blood pressure (faster reduction in the direct programme group than other groups)</p> <p>* Ineffective for changing diastolic blood pressure</p> <p>* Effective for modifying fat content of school meals ('direct programme' group as compared to the control group)</p>	<p>Agree with authors</p>

APPENDIX B: Details of sound outcome evaluations: methodology (cont'd)

<p>Walter I (1989)</p> <p><i>'Know Your Body' programme (Bronx, New York)</i></p>	<p>RCT</p>	<p>2 groups randomised by school</p> <p>Intervention group (n=15 schools, n= 1590 students)</p> <p>Control group (n=8 schools; n= 693 students)</p>	<p>5 year intervention with yearly outcome measurements</p>	<p>All schools remained in the evaluation</p> <p>1036 students (66.3%) qualified for data analysis after 5 years</p>	<p>* Partially effective for clinical risk factors (cholesterol levels and blood pressure) and for fat and salt intake.</p> <p>* Effective for knowledge about preventing coronary heart disease.</p>	<p>Agree with authors</p>
<p>Walter II (1989)</p> <p><i>'Know Your Body' programme (Westchester County, New York)</i></p>	<p>RCT</p>	<p>2 groups randomised by district</p> <p>Intervention group (n= 2 districts, n= 8 schools, n= 485 students)</p> <p>Control group (n= 2 districts, n= 7 schools, n= 620 students)</p>	<p>5 year intervention with yearly outcome measurements</p>	<p>All schools remained in the evaluation</p> <p>733 pupils (80.5%) qualified for data analysis after 5 years</p>	<p>* Effective for clinical risk factors (cholesterol levels and blood pressure) and for fat and salt intake.</p> <p>* Effective for knowledge about preventing coronary heart disease (significantly more effective for young women)</p>	<p>Disagree with authors</p>

RCT = Randomised Controlled Trial

CT = Controlled trial (without randomisation to study groups)

APPENDIX C: Details of sound outcome evaluations: study characteristics

Author	Country	Population	Setting	Objectives	Providers	Programme Content
Klepp and Wilhelmsen (1993)	Norway	Seventh grade (13 year old) students	Secondary schools	* To increase the consumption of fresh fruits, vegetables, whole wheat bread and low fat dairy products, and decrease the consumption of high sugar and high fat snack foods.	Teachers and peer educators	<p>* Small group classroom discussion to identify healthy and unhealthy food, the consequences of diet and rationales for choosing healthy foods, identifying healthy alternative snacks, and discussing presentation of food by the media.</p> <p>* A computer program allowed students to analyse the nutritional status of various foods.</p> <p>* Students analysed food items available in local stores, their homes and local youth organisations.</p> <p>* Peer educators led classroom group-work and role-plays.</p> <p>* Students prepared healthy foods at school and home, and shared information with friends and families.</p>
Moon <i>et al.</i> (1999a)	UK	Year 8 and year 11 pupils (aged 11 to 16 years)	Secondary schools in Wessex Region	<p>Objective of the intervention: * To help schools become health promoting.</p> <p>Objective of study: * To evaluate the impact on levels of health promotion activity, organisation and functioning of participating schools, and all staff, and to determine the effects on pupils' health related knowledge, attitudes and behaviour.</p>	Teachers and key school staff, as well as all members of the school community ('holistic' approach)	<p>The 'Wessex Healthy Schools Award'</p> <p>* The award scheme provides structured frameworks, health related targets and external support to help schools become health promoting.</p> <p>* The scheme covers 9 key areas: 1/ the curriculum; 2/ links with the wider community; 3/ a smoke-free school; 4/ healthy food choices; 5/ physical activity; 6/ responsibility for health; 7/ health promoting workplace; 8/ environment; and 9/ equal opportunities and access to health.</p>

APPENDIX C: Details of sound outcome evaluations: study characteristics (cont'd)

Niklas <i>et al.</i> (1998)	USA	9 th Grade (Age range 14-15 years) at start. 3 year longitudinal cohort intervention	High schools	Objective of the 'Gimme 5' intervention * To promote changes in knowledge, attitudes and behaviours in relation to daily consumption of fruit and vegetables. Objective of the parent programme '5 a Day For Better Health': * To promote a per capita intake of five servings of fruits and vegetables a day.	Teachers, health educators and school catering personnel	The 'Gimme 5' programme * 3 year multi-component intervention incorporating a school-wide media marketing campaign (posters, public address announcements, marketing stations) classroom activities (teacher or health educator led workshops), parental involvement (newsletters, brochures sent home) and changes to the content of school meals (increased availability and portion sizes of fruits and vegetables).
Perry <i>et al.</i> (1987)	USA	9th Grade (14-15 year old pupils)	Suburban high school	*To establish positive eating and physical activity patterns and behavioural goals. *To decrease salt and saturated fat intake and increase intake of complex carbohydrates. *To increase level of physical activity.	Teachers administered the programme in general, with 30 class elected peer leaders leading the class based sessions	The 'Slice of Life' programme * 10 session high school curriculum designed to promote health eating and physical activity patterns amongst young people. * Intervention covered knowledge about benefits of fitness; characteristics of a heart healthy diet; social influences on eating and exercise habits, and issues to do with weight control. Environmental influences (e.g. provision of health food options in school canteen) were identified and strategies for improvement were presented to school personnel.
Vartiainen <i>et al.</i> (1991)	Finland	12 to 16 year old students	Secondary schools in the Karelia and Kuopio regions of Finland	* To prevent smoking and abuse of alcohol, to improve nutrition, to promote physically active lifestyles, to promote positive social relations with peers and adults, and to improve problem solving and coping skills.	Health educators, school nurses, peer educators, school teachers	The second 'North Karelia Youth Programme' * Multi-component intervention featuring: classroom educational activities, media campaign (production of a television programme), changes to the nutritional content of school meals, health screening activities, and a health education initiative in the workplaces of the parents.

APPENDIX C: Details of sound outcome evaluations: study characteristics (cont'd)

<p>Walter I and II (1989)</p> <p><i>N.B. separate evaluations of same intervention in two populations in New York (the Bronx and Westchester County)</i></p>	<p>USA</p>	<p>4th grade (Mean age 9 years at start)</p> <p>5 year longitudinal cohort intervention</p>	<p>Elementary and junior high schools</p>	<p>* To favourably modify the population distributions of risk factors for CHD and cancer (hypercholesterolaemia, hypertension, exposure to cigarette smoke, obesity, and poor physical fitness) through changes in behavioural antecedents of the risk factors (diet, physical activity, use of cigarettes).</p>	<p>Teachers delivered the classroom component</p> <p>Health and education professionals conducted risk factor examination screening</p>	<p>The 'Know Your Body' programme</p> <p>* Classroom component 2 hours a week of education on healthy eating, promotion of physical activity, and targeting of beliefs and attitudes around smoking.</p> <p>* Parental involvement component Parents receive newsletters about their children's activities; take part in food surveys and family exercise days, as well as evening seminars.</p> <p>* Risk factor examination component Students' height, weight, skinfold thickness, blood pressure, post exercise pulse rate and cholesterol levels were measured and results fed back to them. Teachers discuss the results with the pupils in the classroom in terms of setting behavioural goals.</p>
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APPENDIX D: Details of studies of young people's views: methodology

Study	Quality Criteria Met	Sampling (identification, selection and recruitment)	Data collection (instrument/ setting/ reliability/ validity)	Data analysis (approach/ reliability/ validity)	Participation (in research process, consent)
Dennison and Shepherd (1995)	A, B, C, E, G	<ul style="list-style-type: none"> * Schools that used the same catering company were used to identify groups of young people to sample * Eight schools were chosen, all state funded * Selection of young people to take part made by schools * Children selected in year 7 (age 11 to 12) and year 10 (age 14 to 15). * No details on recruitment given 	<ul style="list-style-type: none"> * Self-completion questionnaire following the Theory of Planned Behaviour. * Questionnaire, completed in classrooms, covered beliefs; attitudes, subject norms, intentions, perceived control over food choice and dietary restraint with 7 point scales. * Pre-pilot unstructured interviews carried out with 21 young people not included in main study to identify salient factors related to food choice to help construct questionnaire (which subsequently focused on eating chocolates and sweets, chips and fruit). * Questionnaire pilot tested on a further 21 young people aged 11 to 12 - psychometric properties were tested and are given for some questions. 	<ul style="list-style-type: none"> * Hierarchical regression was used to test the Theory of Planned Behaviour but it is not described in detail. * Analysis of variance used to look for age and gender effects. * No details on reliability/validity of analysis given. 	<ul style="list-style-type: none"> * No details of consent. * Confidentiality appeared to be compromised by the way the questionnaire was checked by the researcher and given back to the respondent if any info was missing. * Extensive piloting meant that young people had a say in the kinds of questions asked.
Harris (1993)	A, B, C, E, F	<ul style="list-style-type: none"> * Two schools selected to identify young people (no details of how schools were selected) * Equal numbers boys and girls selected using random numbers applied to alphabetically ordered year lists 	<ul style="list-style-type: none"> * 14 focus group interviews (most mixed, some single sex) of three to six participants. * Examples of questions: what do you think a fit person looks like and how do they feel? what comes into your mind when you think of the word 'health'? * Author carried out group interviews in school. * No details on reliability/validity. * No mention of confidentiality. 	<ul style="list-style-type: none"> * Thematic areas covered by interviews prompt sheets appear to have been used for analysis. * Content analysis used to compare and contrast data to identify patterns and themes. * Researchers thinking processes documented throughout analysis. 	No details

* Key

- A. Does the study give an explicit account of theoretical framework and/ or include a literature review?
- B. Did the report explicitly and clearly state the aims of the study?
- C. Did the report adequately describe the context of the study?
- D. Did the report provide clear details of the sample used and how the sample was recruited?
- E. Did the report provide a clear description of the methods used in the study including methods used to collect data and methods of data analysis?
- F. Are there attempts made to establish the reliability and/or validity of the data analysis?
- G. Were sufficient original data included to mediate between data and interpretation?

APPENDIX D: Details of studies of young people's views: methodology (cont'd)

Study	Quality Criteria Met	Sampling (identification, selection and recruitment)	Data collection (instrument/ setting/ reliability/ validity)	Data analysis (approach/ reliability/ validity)	Participation (in research process, consent)
McDougall (1998)	A, B, C, D, E, G	<p>* One secondary school identified through school nurse who expressed an interest in working in partnership with the health visitor (who conducted this study) to raise pupils' awareness of healthy eating</p> <p>*All pupils in Year 11 selected to take part (age 15 to 16)</p> <p>*No details on recruitment given</p>	<p>* A self-completion questionnaire was designed by the researcher.</p> <p>* Contained a mixture of closed and open questions; specific examples of questions can only be inferred from the presentation of results (e.g. eating patterns; type of foods consumed; knowledge of healthy eating; factors influencing choice of school meals).</p> <p>* Prior focus group with 12 young people conducted by the author and school nurse identified salient issues to incorporate into the questionnaire.</p> <p>* After approval by school nurse and head-teacher, questionnaire piloted with 15 pupils who suggested several modifications. Five of these were asked to complete the questionnaire again to assess reliability.</p>	<p>* Author states 'Results from the questionnaires were analysed by entering the raw data onto spreadsheets.' (p63)</p> <p>* No further information about analysis given.</p>	<p>* School staff and parents were interested in healthy eating and supported the research.</p> <p>* Extensive piloting meant that young people had a say in the kinds of questions asked.</p> <p>* No details of the consent process are given.</p>
Miles and Eid (1997)	B	<p>* One secondary school, described as willing to co-operate with a small scale project, was selected to identify young people to recruit into the study</p> <p>* Pupils in six classes at three different educational levels took part in the study</p> <p>* No details on how these were selected or recruited are given</p>	<p>* Self-completion questionnaire.</p> <p>* Specific examples of questions and response choices are not given but authors give examples of the questions they were trying to answer through the survey (e.g. 'Are young people aware of the importance of healthy eating?'; 'Are school meal providers offering healthy diets that are attractive to young people?').</p> <p>* No details presented on reliability or validity of the questionnaire.</p>	<p>* No information presented on analysis.</p>	<p>* Head teachers asked parent for consent but no information about whether pupils were asked.</p>

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APPENDIX D: Details of studies of young people's views: methodology (cont'd)

Study	Quality Criteria Met	Sampling (identification, selection and recruitment)	Data collection (instrument/ setting/ reliability/ validity)	Data analysis (approach/ reliability/ validity)	Participation (in research process, consent)
Roberts <i>et al.</i> (1999)	C, G	<ul style="list-style-type: none"> * Schools in Merseyside and Lancashire were randomly invited to take part. Six schools agreed (total number of schools invited not given) * No details of how girls were selected for the study within the school * No details given on how participants were recruited 	<ul style="list-style-type: none"> * Self-completion questionnaire specially designed for the study and covering dieting behaviour. * No examples of the questions are given, but it was composed mainly of closed questions. * The authors state that 'content and face validity were established by conducting a pilot' (p63) but no details are given on what these were or whether and how the questionnaire changed as a result. * Teachers, who were briefed about the study, administered questionnaires. 	<ul style="list-style-type: none"> * No details of the analysis are given except that for the open-ended questions answers were grouped and numerically coded for statistical analysis. 	<ul style="list-style-type: none"> * Participation was voluntary. * Authors report that those who declined to take part were not asked for their reason why in order to respect the confidentiality of girls.
Ross (1995)	A, B, C, D, E, G	<ul style="list-style-type: none"> * One school was chosen on the basis that it was known to the researcher * All children in primary 7 (aged 10 to 12) were selected for the study as this age group were considered to be "well able to express themselves in discussion" (p314) * No details given on recruitment 	<ul style="list-style-type: none"> * Seven focus groups (consisting of between 5 to 8 pupils per group) were conducted by the researcher: 2 mixed sex ; 2 male only; 3 female only 3 girls only. * A topic guide was used which covered: food preferences; concepts of healthy/unhealthy foods; concepts of a healthy meal; influence of family and friends; associations of foods with image, mood and health; structural elements of food choice such as time, availability and cost. * Sessions were audio and video recorded (video used to help identify respondents). * Focus groups conducted in senior teachers room. * No details on reliability or validity. 	<ul style="list-style-type: none"> * Focus group transcripts were analysed using what author describes as a grounded theory approach. * Themes were drawn out and then checked with data again. * No other approaches to ensuring validity of analysis are described. 	No details given.

*** Key**

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APPENDIX D: Details of studies of young people's views: methodology (cont'd)

Study	Quality Criteria Met	Sampling (identification, selection and recruitment)	Data collection (instrument/ setting/ reliability/ validity)	Data analysis (approach/ reliability/ validity)	Participation (in research process, consent)
Watt and Sheiham (1997)	A, B, D, E, F, G	<ul style="list-style-type: none"> * Young people identified from a larger random sample of young people selected to take part in larger survey (see Watt and Sheiham 1996, Watt 1997 below) * Sub-group selected from larger sample purposively to: ensure a mix of males and females; include young people who had reported changing their eating habits * No details given on how this sub-group were recruited into the study 	<ul style="list-style-type: none"> * Individual interviews using a card-sorting task * Young people presented with cards with a different food or drink on each. They were asked to arrange them in groups which linked the food items together. The reasons why participants had grouped the card in this way were explored (e.g. feelings, experiences, thoughts towards the food and drink items). * Interviews carried out in school and were tape-recorded. * Interview and card-sorting task based on procedures used in a previous study. * No other details on reliability or validity presented. 	<ul style="list-style-type: none"> * Content analysis of the transcripts undertaken (no details of how this was done given). * Technique applied to a selection of transcripts by a second researcher to assess quality of analysis. 	<ul style="list-style-type: none"> *Young people could refuse to take part or refuse to have interviews tape-recorded.
Watt and Sheiham (1996) Watt (1997)	A, B, C, D, E, G	<ul style="list-style-type: none"> * Four schools were randomly selected from all Camden state secondary schools. All agreed to participate * All year 9 pupils in each school were approached by a letter to parents * No student refused to participate. 	<ul style="list-style-type: none"> * Self-completion questionnaire developed by the researchers. * Specific examples of questions not given but covered reasons for reducing fat and sugar consumption (e.g. change in circumstances at home); sources of information on food used (e.g. teachers, food labels); and factors helpful in promoting future diet change. * Questionnaires were distributed during May-June 1994. * Authors report that the questionnaire was developed on the basis of a number of other questionnaires used in dietary surveys amongst young people and upon a pilot study which used semi-structured interviews with young people. 	<ul style="list-style-type: none"> * Simple descriptive statistics with chi-square used to determine any differences according to gender and social class. * No details given on reliability or validity. 	<ul style="list-style-type: none"> * Parents were asked for consent. * The author states that none of the young people refused to participate.

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APPENDIX E: Details of studies of young people's views: study characteristics

Study	Aims and Objectives	Sample Characteristics	Key findings reported by authors	Reviewers' conclusions on young people's views
Dennison and Shepherd (1995)	<p>*To increase understanding of the factors affecting food choice decisions.</p> <p>* To build a theoretical model through which existing research into the factors influencing adolescent food choice can be integrated.</p>	<p>Location: English secondary schools Sample number: 675 Age range: 11 to 12 (55%), 14 to 15 (45%) Gender: Mixed Class: Majority of students in classes A, B, C1 and C2 Other information: Researcher and classroom assistant on-hand to help students who had a problem with reading Exclusions: None specified but those who were absent from school when data collected would not have been able to take part</p>	<p>* 52% saw themselves as 'someone who is concerned about the effect of what I eat on my health'. * 48% saw themselves as 'health conscious'. * Young women were more negative than young men about chips and sweets and more positive about fruit, viewing it as better for health and better tasting. * Young women find it easier to eat fruit and perceive less pressure to eat unhealthy foods. * Younger age group perceive less pressure to eat unhealthy food, and more pressure to eat fruit than their older peers. * Older age group more likely to find it easy not to eat sweets, chocolate and chips than the younger group. * No effect of socio-economic status on perceived pressure to eat unhealthily.</p>	<p>Perceptions of/meaning of healthy eating: Generally, young women had more positive attitudes about health foods than boys</p> <p>Barriers: Not directly assessed by study, but see 'key findings' in previous column, particularly issues to do with 'pressure to eat foods', which could be interpreted as barriers/facilitators</p> <p>Facilitators: Not directly assessed by study, but see 'key findings' in previous column, particularly issues to do with 'pressure to eat foods', which could be interpreted as barriers/facilitators</p>
Harris (1994)	<p>*To explore young people's attitudes, views and beliefs with respect to health, fitness and exercise. *To explore whether perceptions varied on the basis of age and gender.</p>	<p>Location: Two large comprehensive schools in Staffordshire and Wiltshire Sample number: 61 Age range: 11 and 13 years Gender: Mixed sex Class: Not stated - aim was for a mix of socio-economic backgrounds Ethnicity: Not stated Other information: None Exclusions: None specified but those who were absent from school when data collected would not have been able to take part</p>	<p>* All of the young people considered themselves to be healthy. Use of relative terms were common (e.g. eating 2 bags of chips per day is not as bad as eating 4 bags). * Young people primarily associate the term 'health' with food and exercise. They also associate not smoking, not drinking too much, not being fat, having lots of energy, being a vegetarian and taking vitamin tablets with health. * Young people seem to be more aware of negative aspects of health than positive aspects (e.g. to be healthy you must not eat junk food). They also find it easier to describe negative effects of unhealthy foods, rather than positive effects of healthy foods. * Overweight people are viewed as unhealthy because they eat excessively. * Young people have a limited bio-medical view of health which excludes social and psychological dimensions.</p>	<p>Perceptions of/meaning of healthy eating: * Perceptions of health are often linked to negatives, such as not eating junk food rather than eating more fruit *Young people felt that being unhealthy was to do with being fat, eating too much of the wrong food, smoking, not being good at sport, being lazy and drinking too much. Fitness was mainly about being good at sport and being thin *Most young people considered themselves to be quite fit and evaluations of own fitness were relative: young people compared themselves to their peers</p> <p>Barriers: Not directly assessed by study</p> <p>Facilitators: Not directly assessed by study</p>

APPENDIX E: Details of studies of young people's views: study characteristics (cont'd)

Study	Aims and Objectives	Sample Characteristics	Key findings reported by authors	Reviewers' conclusions on young people's views
<p>McDougall (1998)</p>	<p>*To examine awareness of and attitudes towards nutrition among year 11 pupils in a local comprehensive school.</p> <p>*To look at the types of food they eat.</p> <p>*Focus on pupils' views of the nutritional value of meals available in schools and their ideas for improving those meals.</p>	<p>Location: Secondary school, Hartlepool, NE England Sample number: 165 Age range: 15 to 16 Gender: F = 80 M = 85 Class: School was in a relatively affluent part of town Ethnicity: Not stated Other information: 40% of girls reported to be underweight; 43% normal weight. Equivalent data not presented for boys Exclusions: Those who did not attend school on that day (20%)</p>	<p>* Important reasons for eating healthy food: health, fitness and appearance (75% young women, 50% young men); appearance only (6% young men, 9% young women). * Happy with appearance (80% young men, 62% young women). * Information on nutritional content of school meals would help make choices (63% young women, 21% young men). * Would choose food they liked whether or not it was healthy (70% young men, "over half" young women). * Approximately 25% thought their school offered healthy food choices, although more than half said that school meals could be improved.</p>	<p>Perceptions of/meaning of healthy eating: Reasons for eating healthy food discussed but findings presented in aggregate, so hard to understand</p> <p>Barriers: Not directly assessed by study, but certain factors stand out as barriers (see 'key findings' in previous column), particularly :</p> <ul style="list-style-type: none"> • issue of poor school meal provision • personal preferences for unhealthy food <p>Facilitators: Not directly assessed by study, but certain factors stand out as facilitators (see 'key findings' in previous column), particularly :</p> <ul style="list-style-type: none"> • provision of information
<p>Miles and Eid (1997)</p>	<p>*To compare young people's knowledge of healthy eating with their behaviour.</p> <p>*To elicit young people's views on healthy eating and to feed them back to 'decision-makers'.</p>	<p>Location: Comprehensive school in unspecified part of England Sample number: 109 Age range: Not stated (young people in secondary school) Gender: M = 55, F = 54 Class: Not stated Ethnicity: Not stated Other information: None Exclusions: None specified but those who were absent from school when data collected would not have been able to take part</p>	<p>* 61% said a healthy diet was important to them (74% of young women and 47% of young men). * "What could be done to encourage a more healthy diet?" : reduction in the price of healthy snacks (67%); healthy options on the menu at take-aways (56%); healthier choices in school canteens (39%) ; healthier snacks in vending machines (37%). * "What foods should there be more of in the school canteen?": salads, pasta, fruit and sandwiches with salad. * Sources of information on nutrition: television programmes; magazines and through talking to friends prominent sources for young women.</p>	<p>Perceptions of/meaning of healthy eating: gender differences important in this study - (see 'key findings' in previous column)</p> <p>Barriers: Not directly assessed by study</p> <p>Facilitators: Agree with authors (see 'key findings' in previous column)</p>

APPENDIX E: Details of studies of young people's views: study characteristics (cont'd)

Study	Aims and Objectives	Sample Characteristics	Key findings reported by authors	Reviewers' conclusions on young people's views
<p>Roberts <i>et al</i> (1999)</p>	<p>*To examine the general dieting behaviour and characteristics of young women in the UK.</p> <p>*To examine the socio-economic characteristics and to address other dieting behaviours.</p>	<p>Location: Six schools in England – Merseyside and Lancashire Sample number: 569 Age range: 11 to 15 (mean age 12.8 yrs) Gender: Girls only Class: School type used as proxy for social class: 2 comprehensive schools; 2 independent schools; and 2 high schools. Ethnicity: Not stated Other information: 41% premenarcheal Mean Body Mass Index 19.2 Exclusions: Those absent from school on day or who declined to take part (estimated to be 15% of eligible sample)</p>	<p>* A third of young women reported that they had dieted at some time. Of these, 66% thought that dieting was good for their health and 48% said that their parents approved of it. * Almost all the dieters said that they dieted because of concerns about being overweight.</p>	<p>Perceptions of/meaning of healthy eating: Only the views of those who reported ever having dieted are reported (see 'key findings' in previous column).</p> <p>Barriers: Not directly assessed by study, but certain factors stand out as facilitators (see 'key findings' in previous column), particularly: worries about weight leading to dieting</p> <p>Facilitators: Not directly assessed by study</p>
<p>Ross (1995)</p>	<p>* To explore the attitudes and beliefs which underpin health related behaviour to increase understanding young people's food choices.</p>	<p>Location: Scotland, small primary school in Edinburgh Sample number: 46 Age range:10-12 (mean age 11) Gender: Mixed – no numbers given Class: School located in area with residents of mixed socio-economic background Ethnicity: Authors report sample to be predominantly white Other information: No Exclusions: The two children who were absent from school when data collected</p>	<p>* Personal preferences about taste and texture of foods influence food choice rather than whether or not food is perceived healthy. Words 'healthy'/'unhealthy' rarely used. * Young people classify foods in terms of whether they are liked or disliked * 'Healthy foods' associated with foods eaten at home, unhealthy foods linked to takeaway food. * Convenience an important factor influencing food choice. When preparing their own food young people often forsake healthy meals for less healthy snacks * Young people sometimes used deceptive strategies to avoid eating healthy food prepared by their parents * School meals viewed as being cold, badly prepared, with little choice, and healthy options sometimes expensive.</p>	<p>Perceptions of/meaning of health eating: Health aspects of food not mentioned by children spontaneously. Idea of healthy food, when discussed, was understood by children. They preferred unhealthy foods. Healthy foods associated with home cooking and with adult preferences. Eating healthy food associated with slimness and fitness.</p> <p>Barriers: Not directly assessed by study, but certain factors stand out as facilitators (see 'key findings' in previous column), particularly :</p> <ul style="list-style-type: none"> • poor school meal provision • personal preferences for unhealthy food (taste) <p>Facilitators: Not directly assessed by study, but certain factors stand out as facilitators (see 'key findings' in previous column), particularly :</p> <ul style="list-style-type: none"> • healthy food provided at home

APPENDIX E: Details of studies of young people's views: study characteristics (cont'd)

Study	Aims and Objectives	Sample Characteristics	Key findings reported by authors	Reviewers' conclusions on young people's views
<p>Watt and Sheiham (1996)</p>	<p>*To assess dietary patterns and experiences of change of a sample of 469 young people aged 13-14 in inner city London. *To investigate knowledge, skills, and beliefs about food and health. *To determine applicability of "stages of change" model and assess factors that may influence young people's ability to change eating patterns.</p>	<p>Location: England, four schools in Camden, London Sample number: 479 Age range: 13 to 14 (mean 14.3) Gender: 40% girls; 60% boys Class: 34% non-manual, 52% manual 14% unclassifiable Ethnicity: 62% White, 38% from 10 diverse minority ethnic groups Other information: 37% lived with single parent Exclusions: None specified but those who were absent from school when data collected would not have been able to take part.</p>	<p>* Young women more likely than young men to be trying to reduce fat and/or sugar intake. * Reasons for reducing fat and sugar intake mainly to do with appearance, 70% and 62% respectively. * Facilitating factors in promoting diet change: will-power (83%); wider availability of healthy foods (67%); support from family (67%); advice from doctor (58%); cheaper healthy foods (53%); better labelling of foods (50%); support from friends (46%) * Sources of information about food: family members (80%); labels on food packages (72%); health professionals (68%); books (67%); supermarket leaflets (59%). Friends and teachers were amongst the least common sources (35% and 34% respectively). * 32% classified as having generally 'positive' views on food and health, 49% had 'mixed' opinions, and 19% classed as being 'negative' in their opinions.</p>	<p>Perceptions of/meaning of health eating: (see 'key findings' in previous column) Barriers: Not directly assessed by study. Facilitators: Agree with authors (see 'key findings' in previous column)</p>

APPENDIX E: Details of studies of young people's views: study characteristics (cont'd)

Study	Aims and Objectives	Sample Characteristics	Key findings reported by authors	Reviewers' conclusions on young people's views
<p>Watt and Sheiham (1997)</p>	<p>*To assess the meanings of food-associated concepts for young people, and how they fit into their lives.</p>	<p>Location: England, four state secondary schools located in Camden. London Sample number: 81 Age range: 13 to 14 Gender: 41 young men, 40 young women Class: Not stated Ethnicity: Not stated Other information: None Exclusions: One student refused to take part</p>	<p>* Majority, irrespective of sex, tended to classify foods as either 'healthy food' or 'fast food'. * Healthy foods were associated with adulthood and the home while 'fast food' was associated with people of their own age, pleasure and friendship, and life outside the home (including school). * 'Fast food' tastes good, is quick to eat, is cheap and convenient. * 'Fast food' is easy to access at school, shops and cafes near school. Healthy choices often not available. * Adults disapprove of 'fast food', with some young people reporting deceiving their parents about consumption. * Some young people were concerned about becoming fat and getting acne if they ate 'fast food'. * Health concerns were perceived to be the responsibility of adults. Some young people thought they could keep healthy as long as they undertook physical activity. * Taste is an important influence on food choice. Healthy foods perceived to be generally unappealing.</p>	<p>Perceptions of/meaning of healthy eating: Healthy eating associated with adults and with lack of choice by young people. Home cooked food was seen as healthy. Concern about health was seen as an adult thing. Eating too much or eating wrong kinds of food could be counteracted by exercise - you burn it off</p> <p>Barriers: Not directly assessed by study, but certain factors stand out as facilitators (see 'key findings' in previous column), particularly:</p> <ul style="list-style-type: none"> • 'fast food' cheap and available at and near school • personal preferences for foods (taste) • unhealthy foods consumed when young people socialise <p>Facilitators: Not directly assessed by study, but certain factors stand out as facilitators (see 'key findings' in previous column), particularly:</p> <ul style="list-style-type: none"> • healthy food provided at home • concerns over appearance discourages eating unhealthily

APPENDIX F: Synthesis Matrix

Healthy eating and the school

Young people's views on barriers and facilitators		Interventions (included in in-depth review) which address barriers or build on facilitators identified by young people	
Barriers	Facilitators	Soundly evaluated interventions	Not soundly evaluated interventions
<p>That prevent healthy eating</p> <p>* Schools do not offer healthy choices at lunchtime; school meals could be improved. (Y3, Y6, Y8)</p> <p>* Friends and teachers one of the least cited sources of information on nutrition. (Y7)</p>	<p>That young people think could or should be done</p> <p>* Healthier choices in school canteens (e.g. salads, pasta, sandwiches with salad). (Y4)</p> <p>* Information on nutritional content of foods (for young women especially). (Y3)</p>	<p>* The evaluation of the 'Wessex Healthy School Award' (which aimed to support a 'whole school' approach to health promotion) included 'healthy food choices' as one of the key areas that schools could adopt. It is not clear to what extent food availability was modified during the intervention. Effective for reported healthy eating behaviour mainly for young women (aged 15 to 16 years, rather than younger year group 12 to 13 years). Not effective at increasing levels of knowledge (described as being high anyway). (OE11)</p> <p>* In the 'Gimme 5' programme, changes were made to the content of school meals (increased availability and portion sizes of fruits and vegetables). Effective for reported healthy eating behaviour. (OE13)</p> <p>* In the second 'North Karelia Youth Programme', changes to the nutritional content of school meals were part of a multi-component school wide initiative, Effective for healthy eating behaviour, reducing systolic blood pressure and for modifying fat content of school meals. (OE20)</p> <p>* A school based multi-component intervention used a computer programme which allowed students to analyse the nutritional status of various foods. Students also prepared healthy foods at school and home. Effective for reported behaviour (for both sexes) and knowledge (only for young men). (OE10)</p> <p>* In the 'Slice of Life' intervention young people lobbied for health supporting environmental changes in their schools (e.g changes to nutritional content of school foods). It is not clear whether these changes were implemented. However, the intervention was found to be effective for reported behaviour, practical skills, and awareness (mainly for young women) and effective for increasing knowledge (both sexes). (OE14)</p>	<p>* An intervention targeted at catering staff at boarding schools to reduce sodium and fat levels of school meals was evaluated. Outcome measures included nutrient intake, blood pressure and sodium and fat content of foods. (OE4)</p> <p>* The first 'North Karelia Youth Study' included modification of school lunches: changes to cooking practices (e.g. use of vegetable oils, reduction in use of salt). Caters supplying schools were encouraged to reduce salt content of foods. (OE19)</p>

Key to young people's views studies
 (Y1) Dennison and Shepherd (1995)
 (Y2) Harris (1993)
 (Y3) McDougall (1998)
 (Y4) Miles and Eid (1997)
 (Y5) Roberts *et al.* (1999)
 (Y6) Ross (1995)
 (Y7) Watt and Sheiham (1996)
 (Y8) Watt and Sheiham (1997)

Key to intervention studies - *denotes a sound outcome evaluation
 (OE1) Baranowski (1990a)
 (OE4) Ellison *et al.* (1989)
 (OE7) Hooper *et al.* (1993)
 (OE10) Klepp and Wilhemsen (1993)*
 (OE13) Nicklas *et al.* (1998)*
 (OE16) Schinke *et al.* (1996)
 (OE19) Vartianen *et al.* (1982)
 (OE22) Walter II (1989)*
 (OE2) Bush *et al.* (1989a)
 (OE5) Flores (1995)
 (OE8) Holund (1990a)
 (OE11) Moon *et al.* (1999a)*
 (OE14) Perry *et al.* (1987)*
 (OE17) Wagner *et al.* (1992)
 (OE20) Vartianen *et al.* (1991)*

(OE3) Coates *et al.* (1985)
 (OE6) Fitzgibbon *et al.* (1995)
 (OE9) Kelder *et al.* (1993)
 (OE12) Nader *et al.* (1989)
 (OE15) Petchers *et al.* (1987)
 (OE18) Vandongen *et al.* (1995)
 (OE21) Walter I (1989)*

APPENDIX F: Synthesis Matrix (cont'd)

Healthy eating, family and friends

Young people's views on barriers and facilitators		Interventions (included in in-depth review) which remove/reduce barriers or build on facilitators identified by young people	
Barriers	Facilitators	Soundly evaluated interventions	Not soundly evaluated interventions
<p>That prevent healthy eating</p> <p>* Young people associate unhealthy food with life outside home, and with friendship, pleasure and relaxation. In this 'social space' snacks and fast food are eaten. (Y8)</p> <p>* Friends and teachers are one of the least cited sources of information on nutrition. (Y7)</p> <p>* Friends are one of the least cited factors as helpful in promoting diet change. (Y7)</p>	<p>That promote healthy eating</p> <p>* Family members the most common source of information on nutrition. (Y7)</p> <p>* Support from family one of the most cited factors as helpful in promoting diet change. (Y7)</p> <p>* Young people associate home with healthy foods (Y6) as well as with adulthood. (Y8)</p> <p>* Talking to friends a prominent source of information on nutrition for young women. (Y4)</p>	<p>* A school based multi-component intervention, in which students prepared healthy foods at school and home, and shared information with friends and families was effective for reported behaviour (for both sexes), and knowledge (only for young men). (OE10)</p> <p>* In the school wide 'Gimme 5' programme, parents were sent newsletters and brochures informing them of the project, and recipes and coupons. The intervention was effective for reported healthy eating behaviour, however, attendance of parents at open evenings was low. (OE13).</p> <p>* The 'Know Your Body' Programme included teacher-led classroom education, as well as a parental component. Parents received newsletters about their children's activities; and took part in food surveys and evening seminars. This study was effective for decreasing cholesterol and systolic blood pressure. (OE21). <i>N.B. OE21 and OE22 are separate evaluations of the same intervention, however, the effects in OE22 were judged by the reviewers to be unclear.</i></p> <p>* A school based multi-component intervention also involved local youth groups who increased provision of healthy snacks available to young people. The programme was effective for reported behaviour (for both sexes) and knowledge (only for young men). (OE10)</p>	<p>* A pilot program to prevent obesity among African American mothers and daughters taught them how to eat reduced fat food in fast food restaurants. (OE6)</p> <p>* The 'Learning by teaching' study used older peer educators to work with younger peers to influence knowledge, self-efficacy, perceived susceptibility, attitudes and dietary behaviour change. The intervention involved marketing of healthy food products to make them attractive and acceptable to their peers. (OE8).</p> <p>* The 'Great Sensations' programme aimed to enable young people to resist pressure from friends, family, and the media to eat snacks high in salt. Parents were encouraged to buy low salt snacks for their children. Outcomes included changes in consumption of snack foods. (OE3)</p>

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 (OE18) Vandongen *et al.* (1995)
 (OE21) Walter I (1989)*

APPENDIX F: Synthesis Matrix (cont'd)

Healthy eating, family and friends (cont'd)

Young people's views on barriers and facilitators		Interventions (included in in-depth review) which remove/reduce barriers or build on facilitators identified by young people	
Barriers	Facilitators	Soundly evaluated interventions	Not soundly evaluated interventions
		<p>* The 'Slice of Life' intervention recruited peer leaders, chosen for their popularity, to deliver information about nutrition. One of the peer led sessions focused on social influences on eating, including methods for resisting negative influences. The intervention was found to be effective for reported behaviour, practical skills, and awareness (mainly for young women) and effective for increasing knowledge (both sexes). Having peer leaders deliver the programme was also well received. Young women tended to enjoy the intervention more than the young men. (OE14)</p> <p>* The second 'North Karelia Youth Programme', a multi-component school wide initiative, included classroom sessions to explore peer pressure and family influences on health. It was effective for healthy eating behaviour, reducing systolic blood pressure and for modifying fat content of school meals. (OE 20)</p>	<p>* A study evaluated the impact of a centre based exercise and nutrition programme for Black American families. Tastings took place of low salt and low fat food. The programme suffered from low attendance. (OE1)</p> <p>* One of the primary aim's of the 'Chicago Heart Health Curriculum' study was to evaluate the effect of parent participation in conjunction with school based activities. (OE 15) (see also OE7)</p> <p>* A project to improve cardiovascular health complemented school based activities with material sent home to parents to encourage them to prepare healthy recipes. (OE 18)</p> <p>* The 'San Diego Family Health Project' involved parents and their children actively participating together in a year long nutrition and exercise programme.</p> <p>* The 'Class of 89' programme which was part of the community-wide intervention known as the 'Minnesota Heart Health Program', aimed to provide social support for young people to eat healthily. (OE 9)</p>

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 (Y3) McDougall (1998)
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 (OE12) Nader *et al.* (1989)
 (OE15) Petchers *et al.* (1987)
 (OE18) Vandongen *et al.* (1995)
 (OE21) Walter I (1989)*

APPENDIX F: Synthesis Matrix (cont'd)

Healthy eating and the self

Young people's views on barriers and facilitators		Interventions (included in in-depth review) which remove/reduce barriers or build on facilitators identified by young people	
Barriers	Facilitators	Soundly evaluated interventions	Not soundly evaluated interventions
<p>That prevent healthy eating</p> <p>* Preferences for fast foods influence choice of foods (e.g. taste/ texture). (Y6), (Y8), (Y3)</p> <p>* Concerns over appearance (e.g. being overweight) influences dieting. (Y5)</p>	<p>That promote healthy eating</p> <p>* Concerns over appearance (e.g. being overweight, acne) may prompt young people to moderate their intake of fast foods/unhealthy foods. (Y6), (Y8)</p> <p>* Will power cited as a major factor that helps diet change. (Y7)</p> <p>That young people think could or should be done</p> <p>* Information on nutritional content of school meals would help to make food choices (particularly for young women). (Y3)</p>	<p>* The school wide 'Gimme 5' programme included 'taste-testings' with produce give-aways of fruits and vegetables. The intervention was effective for reported healthy eating behaviour. (OE 13)</p> <p>* The 'Slice of Life' intervention which involved peer led classroom activities over 10 sessions, included a session in which commercial diets were analysed and criteria for a sensible approach to weight control were generated. The intervention was found to be effective for reported behaviour, practical skills, and awareness (mainly for young women) and effective for increasing knowledge (both sexes). (OE14)</p> <p>* In the 'Know Your Body' programme, students' height, weight, skinfold thickness, blood pressure, and cholesterol levels were measured and results fed back to them. Teachers discussed the results with the pupils in the classroom in terms of setting behavioural goals. This study was effective for decreasing cholesterol and systolic blood pressure. (OE21) <i>N.B. OE21 and OE22 are separate evaluations of the same intervention, however, the effects in OE22 were judged by the reviewers to be unclear.</i></p> <p>* All of the outcome evaluations judged to be sound included educational components which aim to increase knowledge and foster positive attitudes towards healthy eating. In general these studies were effective at increasing knowledge of nutrition.</p>	<p>* A pilot program to prevent obesity among African American mothers and daughters taught them how to read and interpret food labels, how to use low-fat foods in menu planning, and how to eat reduced fat food in 'fast food' restaurants. (OE6)</p> <p>* The peer-led 'Learning by teaching' study involved a number of small group projects, one of which involved examining body image and its relation to healthy eating and exercise. Commercials were analysed for contradictory messages between smartness, healthiness and sweet foods. (OE8)</p> <p>* The 'Dance for Health' intervention included a health education component which included lessons focusing on, amongst other things, obesity and unhealthy weight regulation practices. (OE5)</p> <p>* All but one of the interventions (OE4) judged to be not sound included educational components which aim to increase knowledge and foster positive attitudes towards exercise. It is not clear to what extent they were effective.</p>

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 (Y1) Dennison and Shepherd (1995)
 (Y2) Harris (1993)
 (Y3) McDougall (1998)
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 (OE15) Petchers *et al.* (1987)
 (OE18) Vandongen *et al.* (1995)
 (OE21) Walter I (1989)*

APPENDIX F: Synthesis Matrix (cont'd)

Healthy eating and practical and material resources

Young people's views on barriers and facilitators		Interventions (included in in-depth review) which remove/reduce barriers or build on facilitators identified by young people	
Barriers	Facilitators	Soundly evaluated interventions	Not soundly evaluated interventions
<p>That prevent healthy eating</p> <p>* Fast food is cheap and easy to buy (e.g. at or around school premises). (Y8)</p> <p>* Healthy food sometimes too expensive (e.g. at school). (Y6)</p> <p>* Healthy food is not always convenient/takes too long to prepare/time could be spent socialising. (Y6)</p>	<p>That promote healthy eating</p> <p>* TV and magazines a source of information on nutrition for young women. (Y4)</p> <p>That young people think could or should be done</p> <p>* Healthier snacks in vending machines; healthier options on the menu at take-aways. (Y4)</p> <p>* Reduction in the price of healthy snacks. (Y4)</p> <p>* Better labelling of food products. (Y7)</p>	<p>* A school based multi-component intervention also involved local youth groups who increased provision of healthy snacks available to young people. The programme was effective for reported behaviour (for both sexes) and knowledge (only for young men). (OE10)</p> <p>* In the 'Slice of Life' intervention young people analysed food available in local supermarkets, and in their school. They lobbied for health supporting environmental changes in their schools (e.g changes to nutritional content of school foods). It is not clear whether these changes were implemented. However, the intervention was found to be effective for reported behaviour, practical skills, and awareness (mainly for young women) and effective for increasing knowledge (both sexes). (OE 14)</p> <p>* In the school wide 'Gimme 5' programme parents were sent and recipes and coupons for food items. The intervention was effective for reported healthy eating behaviour, however, attendance of parents at open evenings was low. (OE13).</p> <p>* No outcome evaluations evaluated the effects of lowering the price of healthy foods/increasing the price of fast food.</p> <p>* No outcome evaluations assessed changing nutritional labelling on foods.</p> <p>* No outcome evaluations assessed changing food availability in vending machines, or take-aways.</p>	<p>* The peer-led 'Learning by teaching' study involved a number of small group projects, one of which involved studying how the environment influences young people's 'free choice'. This involved visiting supermarkets to examine food supply.</p> <p>* No interventions evaluated the effects of lowering the price of healthy foods/increasing the price of fast food.</p> <p>* The community wide 'Minnesota Heart Health Programme' included components which sought to effect better nutritional food labelling at restaurants ('Dining a la Heart') and grocery stores ('Shop Smart for your Heart'). (OE9)</p> <p>* No interventions evaluated changing food availability in vending machines, or take-aways.</p>

Key to young people's views studies
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 (Y2) Harris (1993)
 (Y3) McDougall (1998)
 (Y4) Miles and Eid (1997)
 (Y5) Roberts *et al.* (1999)
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