

**Healthy Eating:  
Rapid Evidence Review  
of Nutrition Social Marketing  
Interventions to  
Prevent Obesity**

Prepared for the Health Sponsorship Council

**by**  
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## Foreword

This rapid evidence review has been commissioned by HSC to inform the development of a new nation-wide Healthy Eating Programme. The programme is being developed for the Ministry of Health and contributes to its strategy Healthy Eating – Health Action - *Oranga Kai – Oranga Pumau*.

A rapid evidence review follows the principles of a systematic review, but concessions are made in order to complete reviews in a shorter time scale. In this case tight criteria were set for the inclusion of literature in the review and a comprehensive search of grey and unpublished literature was not carried out. A rapid review was undertaken because of the time available to develop the first phase of the Healthy Eating Programme. Work to develop the programme began in May 2006 and it will be launched in May 2007.

The review forms one part of the preliminary research being carried out by HSC and should not be viewed in isolation. Other key components include key informant interviews and advice from an Expert Reference Group. The findings in this report should be read and interpreted in the context of the findings from these other sources. The report on the key informant interviews and other background information is available on the Healthy Eating section of the HSC's web site – [www.hsc.org.nz](http://www.hsc.org.nz).

Further research and literature reviews to inform subsequent stages of the programme are being carried out as gaps in information and knowledge are identified.

To complete the review in the available time, it has been written by a number of authors and HSC thanks the team at Quigley and Watts for carrying out this work on its behalf. The views in this report do not necessarily represent those of the HSC. Any queries about this report should be sent to the Manager, Research and Evaluation Unit, HSC, P.O. Box 2142, Wellington.

HSC, 2007

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The HSC established a Public Health Reference Group for Improving Nutrition (the Reference Group) to guide and advise on the scope of this report, and to continue with the development of the social marketing programme.

The Reference Group members are:

- Jim Mann - **Chair** (nutrition and obesity)
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- Rachel Taylor (obesity prevention in children)
- Adrian Te Patu (Maori, public health, health promotion, communities)
- Sitaleki Finau (Pacific)
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## Executive Summary

New Zealand is experiencing a rapid rise in the rate of obesity in both adult and child populations, with significant implications for public health. Major causes of death and disease are associated with obesity, including cancer, coronary heart disease, stroke and diabetes. The burden of disease affects the whole spectrum of New Zealand society, but has a disproportionate influence on Maori, Pacific peoples, and those on low incomes.

The HSC has been contracted by the Ministry of Health to develop a social marketing programme to promote healthy nutrition practices and environments related to the maintenance of healthy weights and prevention of obesity. Social marketing is the systematic application of marketing concepts and techniques to achieve specific behavioural goals relevant to social good.

The purpose of this report is to summarise the findings of a rapid review of evidence on nutrition-related social marketing, in order to inform the development of social marketing approaches to promote healthy nutrition practices and environments. The focus of the work has been to investigate effective social marketing interventions for five known factors identified by the World Health Organization (WHO) as causally related to obesity:

- High intake of energy-dense, micronutrient-poor foods.
- High intake of sugar-sweetened soft drinks and fruit juices.
- High level of television viewing.
- Home environments that support healthy food choices for children.
- School environments that support healthy food choices for children.

This rapid evidence review was undertaken with clear research questions, a comprehensive search of the published literature using appropriate search terms and databases, revision of abstracts and sourcing of papers. Inclusion and exclusion criteria were applied, along with a standard set of questions to help decide on the quality of each paper. Three of the six categories from Andreasen's criteria of social marketing were required for the intervention to be defined as social marketing (see methodology section for further detail on the criteria).

In total, 83 social marketing papers were selected from an initial identification of 238 abstracts. There was variation in the number of references located for the various topics, with very few papers on social marketing in relation to high intake of sugar-sweetened drinks or television viewing.

Theories and models of behaviour change are used to help design effective interventions, as they provide a basis for understanding behaviours. A number of theories are presented in this review, and several could be drawn upon to inform social marketing. Importantly, environmental factors are an acknowledged influence on obesity, and are continually interacting with personal factors and behaviour. With a recent emphasis on the 'obesogenic environment', ecological and social models have been applied to obesity prevention.

The evidence for effectiveness of nutrition-related social marketing appears strong for school environments and moderate for energy-dense, micronutrient-poor foods. Evidence is limited or weak for sugar-sweetened beverages, home environments, and television viewing. For sugar-sweetened beverages and television viewing, it is more a case of lack of evidence due to small numbers of studies, rather than evidence that the approach is ineffective. Overall, the findings reflect the reality that social marketing

interventions aimed at improving nutrition are relatively new and an empirical evidence base is still emerging. There was some relatively stronger evidence for interventions targeted to low income populations in both home and school environments.

The papers reviewed show that effective nutrition-related social marketing can occur with nearly any target group (whole population, ethnic groups, children, low income) and in nearly any setting (schools, home, workplaces, churches, and the wider community). The most important aspect is not likely to be the particular 'topic chosen', but to ensure there is a quality process for developing and undertaking the programme.

A number of process factors are important for effective social marketing practices related to nutrition, as identified across the five topic areas:

- Simple messages that are tailored to a target group, culturally appropriate, and acceptable to a wide range of stakeholders and service providers.
- Use of a comprehensive approach with multiple intervention strategies and communication channels.
- Development of strong partnerships between government, industry, non-government organisations (NGOs), and communities.
- A national approach that is coordinated with, and supports, local programmes.
- Interventions that are of a sustained duration.
- Culturally specific and tailored interventions set within a population approach that includes community control, community participation and leadership.
- Monitoring and evaluation of social marketing programmes to inform and modify programmes over time.
- A focus on foods rather than nutrients.
- A focus on environmental barriers, for example through legislative, pricing and policy changes, alongside efforts to change behaviours.

The review also identified key barriers to a potential social marketing programme. Again, the environment was highlighted as crucial, with a need to restrict the marketing of unhealthy foods, especially the pervasive marketing aimed at children. Another set of barriers to address is the financial incentives for schools to offer unhealthy foods, and incentives to be part of sponsorship and fundraising schemes involving energy-dense foods.

A key population group in this review was children, and there is good evidence that social marketing can be effective with children and families, especially in school environments. Social marketing in home environments has a less developed evidence base but is potentially a setting for interventions for children and families.

Additional research could be undertaken on the many single interventions that were excluded from this review for being outside the definition of social marketing, as these may include learning that would be useful for a social marketing programme. Furthermore, this review did not include an exhaustive search for unpublished work. Once a topic area and target group/s is chosen as the focus for the HSC's social marketing campaign, a more extensive review of unpublished literature could be undertaken.



# Section 1: Introduction and Findings

## 1.1 Background

### Introduction

The Ministry of Health has contracted the HSC to develop a social marketing programme to promote healthy nutrition practices and environments. The programme will aim to improve nutrition and environments related to the maintenance of healthy weights and prevention of obesity, covering two of the three goals of the Healthy Eating - Healthy Action Strategy (HEHA).

The purpose of this report is to summarise the findings of a rapid review of evidence on nutrition-related social marketing, in order to inform the development of social marketing approaches to promote healthy nutrition practices and environments.

The focus of the work has been to investigate five factors that are known to be causally related to obesity for effective social marketing interventions:

1. High intake of energy-dense, micronutrient-poor foods.
2. High intake of sugar-sweetened soft drinks and fruit juices.
3. High level of television viewing.
4. Home environments that support healthy food choices for children.
5. School environments that support healthy food choices for children.

This is a challenging area, particularly given that population-based obesity interventions are in their infancy, and this is even more true for social marketing interventions (Bell & Swinburn, 2005; Fulton, McGuire, Caspersen, & Dietz, 2001; **McDermott, Stead, & Hastings, 2005**). The timeframe for producing the review was rapid, with nine weeks from notice of starting the contract to delivering the first draft. Despite this, comprehensive and rigorous methods were used to maintain quality, following the National Health and Medical Research Council protocols for reviews where possible (National Health and Medical Research Council, 1999).

This report contains two sections.

Section 1: Introduction and Findings includes:

**Background** – providing the aim, focus and context of the work, with a particular emphasis on the food and nutrition context within New Zealand, a brief description of social marketing, and two previous social marketing reviews on nutrition.

**Public health implications of obesity** – provides a short description of the impact of obesity on population health and wellbeing, and the prevalence of overweight and obesity in New Zealand.

**Methodology** – provides information on the five topics chosen, the definitions used in the report and the research questions. Inclusion and exclusion criteria for selecting papers are described along with the search strategy and search terms. Importantly, this section describes the criteria for defining a social marketing intervention.

**Factors associated with the maintenance of healthy weight and prevention of obesity** – summarises the evidence that suggests a causal relationship between obesity and each of the five factors chosen for this review.

***Findings on effectiveness of social marketing, attitudes, behaviours, barriers and risk/protective factors*** – presents a summary of evidence for the effectiveness of social marketing interventions for each of the five topic areas. Information is presented by setting and population group, and outlines any key features of effectiveness. Behaviours, attitudes, knowledge, and risk and protective factors within each of these areas are also discussed. While ideally each of the topics would be grouped in the same way, for example, by target audience or by dietary outcomes (fruit and vegetable consumption, fat intake) this is not the case. Because of the short time frame to complete the review different people worked on different sections of the review. The decision as to how best to group the papers logically in each section was made by the author of that section.

***Findings for specific groups*** – draws together work across the topics on children and families, Maori, Pacific peoples, and people on low incomes.

Section 2: Theories and Models and Other Social Marketing Interventions includes:

***Theories and models of behaviour change*** – identifies some theories and models that attempt to explain how behaviour can be changed in relation to healthy nutrition practices and environments. This section also outlines selected models of health, including Maori and Pacific models, that describe the determinants of health and therefore the spheres in which public health action can occur. Individual, interpersonal, community, and ecological models and theories are described.

***Learning from other social marketing interventions*** – describes some relevant lessons that can be learned from other New Zealand social marketing campaigns, including *SunSmart*, *Quitline*, *Like Minds Like Mine*, *Push Play* and *One Heart Many Lives*.

## **Food and nutrition context**

In general, New Zealanders are becoming increasingly overweight and obese, with some groups at greater risk of being overweight or obese than others. The results from the Adult National Nutrition Survey (Ministry of Health, 1999) and the Children's Nutrition Survey (Ministry of Health, 2003) show that ethnicity and socio-economic status are both associated with rates of overweight and obesity.

***Healthy Eating - Healthy Action: Oranga Kai - Oranga Pumau*** (HEHA) is the Government's strategy to improve nutrition, increase physical activity and reduce obesity. The HEHA Implementation Plan 2004-2010 sets out the steps required to tackle the growing problem of poor nutrition, physical inactivity and obesity.

The Plan identifies nine priority actions in a 'start here' list, with the social marketing priority highlighted in bold:

1. Develop and implement a comprehensive communication plan to ensure consistent nutrition and physical activity messages.
2. Promote nutrition, physical activity and obesity issues in preschools and schools including Kohanga Reo and Kura Kaupapa Maori.
3. Identify and develop activities for promoting nutrition and physical activity in primary health care settings.
4. Investigate options for improving food security in low-income families with children.
- 5. Initiate development and implementation of a range of social marketing strategies to facilitate behavioural changes supporting healthy eating, healthy action and healthy weight.**
6. Develop and expand community action programmes for high-need groups.
7. Develop and implement a strategy to increase capacity and capability of trained Maori and Pacific health professionals and community health workers.
8. Encourage the food and physical activity industries to implement the HEHA strategy.
9. Develop a monitoring plan.

The HEHA strategy has three goals, improving nutrition, increasing physical activity and reducing obesity. Obesity results from a mismatch of the energy balance equation – 'energy in' minus 'energy out' equals energy (im)balance. Nutrition is responsible for 'energy in', and is therefore a critical component of reducing obesity. Nutrition is also responsible for many other aspects of good health, and the consequences of poor nutrition extend far beyond those of energy imbalance, for example goitre, osteoporosis and dental decay.

Other aspects of the HEHA implementation plan are relevant in framing this evidence review and the social marketing strategy. Firstly, the plan calls for comprehensive public health action, involving a range of initiatives from individual actions to legislation. Secondly, the plan calls for a focus on reducing inequalities that exist in health and its determinants, including nutrition. Finally, the implementation plan identifies priority target groups including Maori, Pacific peoples, children and families, and lower socio-economic groups.

At the specific level of population health messages, HEHA recommends the following advice (with the ones most relevant to this review highlighted):

- **Eat a variety of nutritious foods.**
- **Eat less fatty, salty, sugary foods.**
- **Eat more fruit and vegetables.**
- **Fully breastfeed infants for at least six months.**
- Be active every day for at least 30 minutes in as many ways as possible.
- Add some vigorous exercise for extra benefit and fitness.
- Aim to maintain a healthy weight throughout life.
- **Promote and foster the development of environments that support healthy lifestyles.**

The evidence that backs up these statements relates to improvements in overall nutrition and environments, not to the maintenance of weight or prevention of obesity in isolation. The WHO has reviewed such links and has shown convincing or probable evidence for *decreased* risk of weight gain and obesity with these strategies:

- regular physical activity
- high dietary intake of non-starch polysaccharides (dietary fibre)

- home and school environments that support healthy food choices for children
- breastfeeding.

The same review shows convincing or probable evidence for *increased* risk of weight gain and obesity from:

- sedentary lifestyles
- high intake of energy-dense, micronutrient-poor foods
- heavy marketing of energy-dense foods and fast food outlets
- high intake of sugar-sweetened soft drinks and fruit juices.

It is important to note that the current knowledge base on promoting healthy nutrition is heavily weighted toward individual-level behaviour or education approaches. There are fewer studies on population-based approaches such as environmental, policy or pricing interventions (**Glanz & Hoelscher, 2004**), and even fewer that use a social marketing approach.

## **Public health implications of obesity**

A full description of the public health implications of unhealthy nutrition is beyond the scope of this review. Such a description would need to include a wide variety of nutrition issues, such as specific nutrient deficiencies, food security, the links between nutrition and school pupil performance, and the associations between sugar intake and dental decay.

Instead, the broad health impacts of obesity and overweight will be briefly described here, drawing from key international and New Zealand reviews. This section will address three questions – what are the implications of obesity for health, what is the extent of the problem, and what groups are most affected by obesity in this country? Examples from New Zealand data will highlight the groups that are most at risk of becoming overweight or obese.

The term ‘public health implications’ is used to signal a focus on how obesity affects communities and society in New Zealand, as opposed to focusing on the ‘obese’ individual.

## **Effects of obesity on health in New Zealand**

It is clear that obesity presents a significant risk to health. A strong and compelling evidence base exists for the associations of obesity with both premature death and ill-health (World Health Organization, 1998, 2003).

Obesity is implicated in a wide range of diseases and conditions, including New Zealand’s biggest causes of death – cancer, coronary heart disease and stroke. A classification of obesity or overweight has also been identified as the main modifiable risk factor for developing Type 2 diabetes. Diabetes places a particular strain on the health sector and society because of the multitude of diseases and complications that it is associated with. These include heart disease, stroke, limb amputation, kidney failure and blindness. Such diseases have both direct and indirect effects on individuals, families, businesses, communities, the economy, and our society as a whole.

The following list gives selected examples to illustrate the broad range of diseases and conditions that are linked with obesity (Ebbeling, Pawlak, & Ludwig, 2002):

|                          |  |
|--------------------------|--|
| <b>Cardiovascular</b>    | Hypertension<br>Coronary Heart Disease<br>Deep Vein Thrombosis |
| <b>Gastro-intestinal</b> | Gallstones<br>Haemorrhoids<br>Hernia<br>Colorectal cancer      |
| <b>Respiratory</b>       | Asthma<br>Breathlessness<br>Sleep apnoea                       |
| <b>Musculoskeletal</b>   | Osteoarthritis   |
| <b>Breast</b>            | Postmenopausal breast cancer                                   |
| <b>Uterus</b>            | Uterine and cervical cancer                                    |
| <b>Skin</b>              | Fungal infections<br>Cellulitis                                |
| <b>Urological</b>        | Stress incontinence  |
| <b>Metabolic</b>         | Type 2 diabetes<br>Metabolic syndrome <sup>1</sup>             |
| <b>Social</b>            | Decreased self esteem<br>Negative stereotyping<br>Depression.  |

It is estimated that 40% of all deaths in New Zealand (11,000 deaths in 1997) can be attributed to just two obesity-related risk factors, unhealthy diets and inadequate exercise. Eighty percent of diabetes mortality relates to diet and physical inactivity (Ministry of Health, 2003a).

Maori and Pacific peoples have higher rates of serious non-communicable diseases such as diabetes and heart disease, compared with New Zealand Europeans (Ministry of Health, 2004b). These groups also experience a stronger reduction in life expectancy associated with chronic diseases linked to obesity. For instance, Type 2 diabetes reduces life expectancy by approximately seven years in New Zealand Europeans, and 12 years in Maori and Pacific peoples (Ministry of Health 2002, cited in Ministry of Health 2004b).

## **Prevalence of obesity in New Zealand**

About one in three children and more than five out of ten adults are obese or overweight (Ministry of Health, 2003a). In less than one generation, childhood rates of obesity have tripled, and the rate of obesity in adults has doubled (Ministry of Health, 2003, 2004a).

Ministry of Health surveys show that:

- 35% of adults are overweight and a further 21% of adults are obese.
- the prevalence of adult obesity doubled between 1977 and 2003 (Ministry of Health, 2004a).

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<sup>1</sup> The Metabolic Syndrome denotes a clustering of highly significant risk factors for cardiovascular disease, namely: central obesity, hypertension, hyperlipidaemia, pro-coagulant state, insulin resistance, hyperinsulinaemia, glucose intolerance, accelerated arterial disease, premature death from cardiovascular disease.

Obesity among children in New Zealand is of increasing concern.

- 21.3% of children are overweight and a further 9.8% of children are obese.
- Between 1989 and 2001 the incidence of obesity in children tripled and the incidence of childhood overweight doubled (Ministry of Health, 2003).
- Type 2 diabetes was once virtually unheard of in adolescence, but now children and adolescents account for an increasing proportion of new diagnoses (Ebling, Pawlak, & Ludwig, 2002).

National nutrition surveys show that New Zealanders have differing rates of overweight and obesity depending on their ethnicity (Ministry of Health, 2004b). Maori and Pacific populations are the groups with the highest rates of obesity and overweight.

For example:

- 60% of adult Maori women and 76% of adult Pacific women are either overweight or obese, compared with 46% of New Zealand European women (Ministry of Health, 2003).
- 31% of Pacific girls and 16.7% of Maori girls are classified as obese, compared with just 6% of New Zealand European girls (Ministry of Health, 2004b).

These disproportionate rates of obesity and overweight are reflected in health and mortality indicators, with Maori and Pacific peoples experiencing a greater burden of ill-health and mortality associated with obesity. There are also relatively higher rates of obesity among people living in the most deprived areas (Ministry of Health, 2003a).

To conclude, this section has briefly presented the major implications of obesity for health. It has summarised the extent of the obesity problem in New Zealand, and indicated that Maori and Pacific peoples and those living in the most deprived areas experience relatively higher rates of obesity and associated impacts on health and wellbeing, compared with the general population. There has also been a considerable rise in the prevalence of obesity among children in this country.

## **Social marketing context**

There is growing interest in social marketing interventions for healthy nutrition both in New Zealand and internationally, although the emergence of evidence to support social marketing in the nutrition arena is relatively recent.

Social marketing is, at its simplest, the use of commercial marketing techniques to achieve socially desirable goals. Compared with commercial marketers who aim to sell products or services, social marketers aim to persuade people to voluntarily change behaviour or behaviours that will improve their welfare or the welfare of society; for example undertaking 30 minutes of physical activity each day to benefit their health.

For the purposes of this review, a set of definitions is taken from the United Kingdom's (UK) national review of social marketing (National Social Marketing Centre, 2006):

Social marketing is the systematic application of marketing concepts and techniques to achieve specific behavioural goals relevant to social good.

Health-related social marketing is the systematic application of marketing concepts and techniques to achieve specific behavioural goals relevant to improving health and reducing health inequalities.

An important aspect that is often overlooked is that social marketing can also target 'upstream' approaches, such as changing environments, which is critical for public health and nutrition. As described by Bell and Swinburn (2005), "to alter behaviours from unhealthy to healthy, the successful sun protection and injury prevention programmes have shown that a strong central policy is required as a backbone, complemented by ongoing social marketing and implementation programmes that are both supported and coordinated" (Bell & Swinburn, 2005). This is expanded in another definition (Donovan, 2005) which suggests that social marketing can operate on the following levels:

- Identifies and targets individuals to change their behaviour via information and persuasion.
- Identifies and targets environmental factors that minimise harm.
- Identifies and targets those in power to make structural changes that remove barriers, give individuals the capacity and resources for change and facilitate the adoption of desired behaviours.
- Seeks changes in structures in society that inhibit attaining human rights.

As reflected in the above definitions, social marketing is much more than solely mass media or public education campaigns. Although they have similar goals, the key distinction between social marketing and other public health efforts is the systematic application of marketing principles and techniques.

Similarly, social marketing differs from commercial marketing in the following ways:

- The underlying motivations are different.
- Social marketing is likely to be more complex.
- Social marketers want to move large segments of the population (not just increase sales by a few percent).
- The benefits of social marketing may take years to materialise.
- The budgets available to social marketing are small by comparison with some commercial marketing budgets.

A fundamental concept of social marketing is the exchange concept, which means people receive valued benefits in return for their efforts and changed behaviours. The challenge for social marketers, therefore, is to maximise the perceived benefits and minimise the perceived costs faced by the target audiences (Andreasen, 2002).

Social marketing facilitates the acceptance, rejection, modification, abandonment or maintenance of particular voluntary behaviours (Grier & Bryant, 2005). Kline considers a different notion regarding this voluntary criterion and speculates that as the decision to alter lifestyles must be voluntary, prohibiting items may be counter-productive. Instead he recommends making the risks known and making the alternative if not 'cool', then at least an acceptable choice within peer groups. He suggests the challenge is to persuade people to change their behaviours without giving up activities they truly value (Kline, 2005).

The first of Andreasen's benchmark criteria for social marketing is that the intervention seeks to change behaviour and has specific measurable behavioural objectives. These approaches to behaviour change should always be underpinned by one or more theories of behaviour change. Relevant theories of behaviour change are discussed in section 2 of this report. In New Zealand different cultural understandings and models of health are of central importance to behaviour change. Section 2 also discusses Maori and Pacific models of health.

Social marketing, like most population-based public health interventions, is often a complex long-term approach that requires a long-term vision rather than short-term or one-off campaigns (MacFadyen, Stead, & Hastings, 1999). Social marketing is not a communications campaign, but instead a comprehensive intervention that integrates the full marketing mix of product, price, place and promotion. New Zealand is in a strong position with the HSC in a lead role, as it has an understanding of the broad nature of social marketing, and has the capacity to advocate for the sustainable resources that are necessary for success.

## Previous social marketing reviews on nutrition

Internationally, two major reviews have been undertaken of social marketing interventions that aim to improve nutrition.

A recent systematic review was conducted by the Institute for Social Marketing for the National Social Marketing Centre (NSMC) in the UK (McDermott, Stead, Gordon, Angus, & Hastings, 2006). The report is still in draft form, and at the time of writing was available for comment on the NSMC's website.<sup>2</sup> The review of nutrition-based social marketing was part of a wider independent review of health-related campaigns and social marketing in England, commissioned by the Department of Health as part of its commitments in the 'Choosing Health' White Paper. The review will inform a national strategy on social marketing for health in the UK.

The NSMC review included 31 studies, and was an update of a previous review conducted in 2005. It used a systematic, transparent methodology with a detailed definition of social marketing. Interventions included in the review were required to meet all six of Andreasen's criteria for social marketing:

- specific *behavioural goals*
- use of *consumer research* to understand the target audience
- consideration of ways of *segmenting* the population and tailoring the intervention appropriately
- consideration of what would motivate people to change (*'exchange'*)
- use of a combination of channels and activities that make up the *marketing mix*, and
- the addressing of *competition* or barriers to behaviour change (Andreasen, 2002).

Overall, the review found strong evidence that social marketing nutrition interventions can be effective. Of the 31 interventions, 24 produced at least one significant positive effect on nutrition behaviour. Only three studies were ineffective at influencing nutrition behaviour (McDermott, Stead, Gordon, Angus, & Hastings, 2006).

The review found that interventions were equally effective at influencing behaviour, knowledge and psychosocial variables such as self-efficacy. Interestingly, the review also found evidence that social marketing can influence several variables simultaneously. For instance, interventions which sought to alter several domains (eg, fruit and vegetable consumption, fat intake) were just as effective as those that sought to influence only one domain. The authors highlighted this as an important finding because nutritional goals require multi-faceted behaviour change, and there are implications for cost-effectiveness. The review concluded that social marketing could

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<sup>2</sup> National Social Marketing Centre website [www.nsms.org.uk](http://www.nsms.org.uk), accessed 26 September 2006



be effective in a range of settings, such as schools, workplaces, churches, the family, and the wider community (McDermott, Stead, Gordon, Angus, & Hastings, 2006).

The authors acknowledged a range of potential methodological limitations with this review, however, and emphasised that the findings should be considered with the limitations in mind. For example, many studies allocated participants to intervention or control groups at a population level (eg, school or city), but analysed the findings at an individual level. Several studies also found baseline differences between intervention and control groups, and some studies had problems with attrition. The authors observed that it was difficult to compare the effects of various components of social marketing interventions (McDermott, Stead, Gordon, Angus, & Hastings, 2006).

United States (US) researchers conducted an earlier review of nutrition-related social marketing (Alcalay & Bell, 2000). This review was not systematic, and the criteria for inclusion were less rigorous than those used in the NSMC review. For instance, the review included interventions that promoted changes in nutritional and/or physical activity practices, employed multiple 'health promotion' activities, used more than one channel of communication, and tailored materials accordingly. The review did not require all six of Andreasen's criteria of social marketing to be met.

The US review considered studies of 50 interventions, and represented the most comprehensive review of social marketing at the time. The authors stated that in most interventions, change efforts tended to focus on individual behaviours rather than family practices or community norms. Interventions were also more likely to target adults rather than children or young people (Alcalay & Bell, 2000).

In contrast to the 2006 report, the US review found limited success of interventions, particularly in earlier campaigns. Interventions in the review typically increased participants' knowledge about nutrition, but rarely produced effects on behaviour. The only significant behaviour changes were small and short-term (Alcalay & Bell, 2000).

Despite a general finding of limited effectiveness, the reviewers noted that social marketing may be effective at preventing adoption of unhealthy behaviours, as opposed to changing 'ingrained' behaviour. Therefore, social marketing was viewed as potentially useful for interventions with children (Alcalay & Bell, 2000).

The authors listed several explanations for the limited impact, such as inadequate design and implementation of social marketing, inappropriate expectations for change, and complexity of marketing nutrition messages (Alcalay & Bell, 2000). They made a set of recommendations to improve social marketing practice, including:

- set realistic specific, measurable objectives
- embed social marketing concepts as an integral aspect of the campaign, including audience segmentation and research
- a major thrust should be altering the environment and modifying environmental policies (Alcalay & Bell, 2000).

In comparing the contrasting findings of the two reviews, the later review has several features which should be highlighted. The 2006 review is clearly more recent than the earlier one, so will include a greater range of studies and more recent forms of social marketing practice. The 2006 review also used a systematic approach with a rigorous definition of social marketing. It is possible that the earlier review included some interventions that would fall outside the tighter definition of social marketing.

As described by Swinburn and others, 'there is widespread agreement that action [on obesity] is needed urgently, that this should be comprehensive and sustained, and that it should be evidence based' (Swinburn, Gill, & Kumanyika, 2005).

## Purpose of the Review

This review was commissioned as part of a formative research programme to inform the development of HSC's Healthy Eating Programme. The review focuses, therefore, on nutrition-related social marketing interventions and not interventions that use other approaches.

HSC plans its programmes to address a health issue (the goal) and associated objectives that define what the programme will achieve and/or change to address this issue. The objectives link to the factors that put people at risk of, and protect them from, behaviours that have adverse effects on their health. Social marketing strategies are then identified that, over time, will achieve the objectives and goal. The formative research also aims to identify the barriers to behaviour change, and the group or groups that will benefit most from the programme – the market segments.

To provide the information required to develop the first phase of the programme, the review addressed the following research questions.

## Research Questions

1. What is the evidence for *social marketing interventions* in encouraging healthy nutrition practices and environments, and what are the key features of these interventions in facilitating behavioural and environmental change? (i.e., what works and why?)
2. What are the *attitudes and behaviours* that underpin nutrition practices and environments that maintain a healthy weight and prevent obesity, based on New Zealand data?
3. What are the *real and perceived barriers* that might prevent the maintenance of a healthy weight or enhance the risk of obesity, based on New Zealand data?
4. What are the *risk and protective factors* for healthy nutrition practices and environments that maintain a healthy weight and prevent obesity at individual, community and environmental levels, based on New Zealand data?
5. What are the possible market segments, groups, and 'influencers' that are likely to benefit most from a social marketing programme to promote healthy nutrition practices and environments to maintain a healthy weight or prevent obesity?
6. What are the information gaps where further research may be required to support a social marketing programme in the short and medium term?
7. What is the strength/quality of the evidence in this area?

The review also looked at other social marketing interventions addressing health issues in New Zealand to see what lessons might be learned from these other interventions. The interventions selected were those likely to fill gaps in the evidence available from the nutrition-related interventions and included social marketing programmes for tobacco control, physical activity, cardiovascular health, and mental health.

This review is one part of the evidence informing HSC's approach. Other evidence, including the informed opinion of stakeholders and expert advice, is informing the direction and scope of the social marketing programme.

## 1.2 Methodology

Quigley and Watts Ltd was commissioned to undertake this work, and developed a project plan from the initial proposal to HSC. The HSC and the Reference Group further refined the scope prior to the work being undertaken. Critically, this included agreeing that the topics be based on evidence of causation for obesity/overweight, and agreeing to use the factors identified in the WHO report (World Health Organization, 2003) that had convincing or probable evidence for either promoting or protecting against obesity as the benchmark for this evidence. Quigley and Watts Ltd had nine weeks to undertake the review from notification of the contract to producing the first draft.

The five topics covered in this review are:

- 1) High intake of energy-dense, micronutrient-poor (with heavy marketing of energy-dense foods and fast food outlets included as a risk factor for high intake of such foods).
- 2) High intake of sugar-sweetened soft drinks and fruit juices.
- 3) High level of television viewing.
- 4) Home environments that support healthy food choices for children.
- 5) School environments that support healthy food choices for children.

Factors one, two, four and five were selected from the WHO's review. The other factors in the WHO work were not covered in this review, as they were either included in other New Zealand work (eg, breastfeeding), or considered within the five topics (eg, adverse socio-economic conditions). The third factor, a high level of TV viewing, was included because recent evidence has affirmed the links between TV viewing and obesity (Scragg, Quigley, & Taylor, 2006).

## Definitions

**Social marketing intervention:** In the first instance, this review required that interventions included used *all six* of Andreasen's components of social marketing interventions. However, as it was difficult to find enough studies for some topics using this strict definition, it was agreed that a second level of studies would be included, which met *at least three* of the six criteria – a specific behavioural goal, use of consumer research, and use of more than one element of the 'marketing mix'. Appendices 3-7 show which of Andreasen's components were present for each paper reviewed.

**Outcome:** The main outcome of interest in the review was 'nutrition practices and environments that contribute to the maintenance of healthy weights and prevention of obesity'.

**Population groups:** The review was focused on the population as a whole, as well as on the four priority target groups in the HEHA Strategy:

- Children and families
- Maori
- Pacific
- Lower socio-economic groups.

## Inclusion criteria

- Papers published between 1996 and 2006.
- Included papers had to report intervention methods (however brief).
- Quantitative and qualitative work was included.
- Theoretical work was included for the section on theories and models.
- The focus was on including interventions aimed at groups/populations, one-to-one interventions were included only when they were an element of a wider social marketing strategy.
- Included papers had to have a specific focus on the identified five topics, but also could include some information about other topics, such as fruit and vegetable consumption or physical activity. The review only included physical activity interventions where the *primary* focus was on healthy eating.
- Grey (unpublished) literature from New Zealand relevant to the topics or social marketing was included.

## Exclusion criteria

- Opinion and editorial work was not included in the review.
- Theoretical work was excluded, apart from in the section on theories and models. For this section, models that are clinic-based or one-to-one were excluded.
- Evidence on management and treatment of obesity was excluded, as the focus is on obesity prevention.
- Grey literature from overseas was excluded.
- Physical activity interventions were excluded, unless they were combined with interventions that had healthy eating as the primary focus.

## Search strategy

The project team carried out an initial scan of the literature and discussed the resulting references with the HSC. The search strategy was developed in consultation with the Senior Librarian at the Wellington Medical School Library. An example of the search strategy is provided in Appendix 1.

Extensive data searching was undertaken using a comprehensive search of the following databases and sources:

*New Zealand databases and surveys*  
Index New Zealand  
AMI (Australian and New Zealand medical index)  
Te Puna (National Library database)  
New Zealand Nutrition Survey  
National Children's Nutrition Survey

*International bibliographic databases*

Medline (1966 onwards)  
CINAHL (1982 onwards)  
PsycINFO (1967 onwards)  
EMBASE (1988 onwards)  
AMED (1985 onwards)  
ProQuest  
Web of Knowledge

*Review databases*

All EBM Reviews (containing Cochrane Database of Systematic Reviews, ACP Journal Club, DARE Database of Abstracts of Reviews of Effects and CCTR Cochrane Central Register of Controlled Trials)

A systematic and comprehensive search for grey literature was beyond the scope of this project; however well-known websites and Google-searching were used to identify relevant New Zealand and overseas non-academic publications by governments and key NGOs.

Well known, seminal publications and additional references were identified by looking for papers and reports frequently cited in publications already sourced, by searching reference lists of already sourced publications for promising titles and by relying on the experience of the authors and the Reference Group.

**Search terms**

It was agreed to use the following generic keywords and subject headings. Keywords were determined by the authors following discussion with the HSC to define the topics further.

**Interventions** [Nutrition or obesity or food or energy balance]

AND [Intervention or campaign or programme or mass media or health promotion or advertising]

AND

**Types of studies/evaluations of effectiveness**

Intervention studies or evaluation studies or evaluation or effectiveness or programme evaluation or clinical trials

AND

**Criteria for social marketing interventions**

Behaviour (or social behaviour or mass behaviour or social conformity or social desirability) or audience or pretesting or segment or consumer or target or exchange or communication or persuasive communication

AND

**Australasian studies** (note: also searched without these terms to get international literature)

Australasia or New Zealand or Australia or Pacific.

In addition, searches for each topic combined the above search terms with topic-specific words, such as 'fat intake', 'marketing', 'sugary drinks', 'school-based programmes' etc.

## Selecting papers for inclusion in the review

The decision regarding what evidence should or should not be included is the most complex component of a review. In this case, because of the breadth and scope of the topic, and the time available to complete the project, the decision was based on the inclusion and exclusion criteria that were agreed in consultation with the HSC, and the authors' personal experience with this topic area. The authors have considerable experience in assessing the relevance, quality, and rigour of evidence in such situations. A standard set of questions to trigger the reviewer was used.

The decision on selection of papers for research question one was particularly challenging. Social marketing is a new term, and is used (incorrectly) in some papers to describe interventions that are not social marketing. Other papers that did include social marketing interventions did not use the term 'social marketing'. The review used Andreasen's six categories as the benchmark for deciding whether the intervention was social marketing (Andreasen, 2002).

Meeting all six criteria was rare, and so a short list of numbers 1, 2 and 4 (below) was the minimum criteria for inclusion, also '*and/or*' was included within each of the criteria as appropriate to provide additional clarity:

1. *Behaviour change*. Intervention seeks to change behaviour and has specific measurable behavioural objectives.
2. *Consumer research*. Formative research is conducted to identify target consumer characteristics and needs. And/or intervention elements are pre-tested with the target group.
3. *Segmentation and targeting*. Different segmentation variables are considered when selecting the intervention target group. And/or intervention strategy is tailored for the selected segment/s.
4. *Marketing mix*. Intervention consists of promotion (communications) plus at least one other marketing 'P' (product, price or place). Other 'P's might include policy or people (eg, training is provided to intervention delivery agents).
5. *Exchange*. Intervention considers what will motivate people to engage voluntarily with the intervention and offers them something beneficial in return. The offered benefit may be intangible (eg, some personal satisfaction) or tangible (eg, rewards for participating in the programme and making behavioural changes).
6. *Competition*. Intervention considers the appeal of competing behaviours (including current behaviour). And/or intervention uses strategies that seek to minimise competition.

There was a three-part process for selecting references for inclusion in this review.

- 1) Reference titles and abstracts were included or excluded as appropriate, using the inclusion/exclusion criteria and assessment of relevance to the research questions (initial scanning was done by researchers individually, for their individual topics).
- 2) Two researchers reviewed abstracts of the selected references, and excluded further references using the inclusion/exclusion criteria, as well as considering whether, and to what extent, each paper addressed the research questions; i.e., does this paper address any of the research questions for this review, and if so, which one/s?
- 3) Full text articles were retrieved for the remaining studies, and considered in light of the inclusion/exclusion criteria and relevance to the research questions.

A time limit of 24 September 2006 was set for the receipt of papers, and papers that arrived after that date were not considered in the review.

## **Results of search**

In total, this review has analysed 83 papers. These were selected from an initial identification of 238 abstracts. There was variation in the number of references located for the various topics, with very few papers on social marketing in relation to high sugar drinks or television viewing.

### *Energy-dense, micronutrient-poor foods*

63 papers were initially included for review. Consultation between two researchers resulted in the exclusion of 32 papers that were not relevant to the research questions, leaving 31 references in total for this topic (this included heavy marketing of energy-dense foods as a risk factor). After reading the full text, an additional four papers were excluded as the interventions were not social marketing. This left a total of 27 papers for all components of this topic (including attitudes, risk/protective factors etc).

### *Sugar-sweetened beverages*

There were 24 references initially selected. Two researchers excluded 18 that were not relevant to the research questions, leaving six references in total for this topic. A further five papers were excluded after reading the full text, as they were not social marketing interventions. This left one paper for review.

### *Television viewing*

44 papers were initially selected for review. Two researchers excluded 38 that were not relevant to our research questions, leaving 6 references in total for this topic. A further five papers were excluded after reading the full text, as they were not on social marketing interventions. The remaining paper was assessed as relevant and included in the review.

### *Home environments*

Of the 72 abstracts initially identified, 24 papers were retrieved for consideration. Of these, 12 papers were selected, which covered nine social marketing interventions aimed at home environments supporting healthy food choices for children. An additional eight papers or reports were not classified as social marketing, but were reviewed for attitudes, risk/protective factors and background information.

### *School environments*

78 papers were initially included for review. Consultation between two researchers resulted in the exclusion of 38 papers that were not relevant to the research questions, leaving 40 references in total for this topic. After reading the full text, an additional 6 papers were excluded as the interventions were not social marketing. This left a total of 22 papers which were reviewed for all components of this topic and a further 12 papers that were not classified as social marketing, but were reviewed for attitudes and risk/protective factors.

All of the included papers were thoroughly reviewed and data were summarised into pre-set tables (Appendices 2-6). Some papers are included on a number of tables if they are relevant to more than one section. Emerging themes and features were synthesised into a draft paper, which was submitted to the HSC and the Reference Group for peer review. All of the papers included in the review (Appendices 2-6) are indicated in bold type within the report. Many other papers were used for background for the report and they appear as references that are not in bold type.

## **Limitations of this review**

As with any review, there are a number of limitations that need to be considered. Although the HSC values a full range of evidence to inform thinking about the effectiveness of interventions, this was a rapid evidence review for practical reasons. Data collected and used in this review have come from existing evidence bases that were searched comprehensively. The main ways in which the review was kept to a manageable size were through having tight definitions and inclusion criteria (for example, definition of social marketing interventions) that were agreed with the HSC, and by choosing not to do an exhaustive search of grey and unpublished literature. This has meant that some data that may have been informative to this work has not been included in the review. This might include, for example, doctoral theses on related topics, or high quality health promotion interventions that did not use a social marketing approach.

Furthermore, traditional processes used to identify, select and appraise interventions tend to favour a relatively narrow spectrum of potential evidence, such as from randomised controlled trials. Other types of methodological approaches, for example, qualitative work, tend to be under-represented in reviews of effectiveness. Also, systematic reviews, meta-analyses and other reviews of effectiveness tend to rely on published evidence and publication policies may exclude articles with inconclusive or negative findings.

The subjectivity of the critical appraisal process also needs highlighting. While the process is designed to be as transparent and objective as possible, the authors acknowledge that decisions do contain a subjective element. This should be taken into account when reading the findings, lessons and conclusion sections.



## 1.3 Factors associated with obesity

### Introduction

This review focuses on social marketing interventions that aim to improve nutrition and environments associated with healthy weight maintenance and obesity prevention. As the WHO has previously reviewed the main factors for which there is causative evidence (World Health Organization, 2003), this section briefly summarises these associations.

Factors one, two, four and five below were selected from the WHO's review. The other factors were either being covered by other work in New Zealand (e.g., breastfeeding), or were included within the topics (e.g., adverse socio-economic conditions). The third factor, a high level of TV viewing, was included because recent evidence has affirmed links between TV viewing and obesity (Scragg, Quigley, & Taylor, 2006).

The five factors covered in this review are presented in Table 1, with the classification of evidence level based on the WHO's assessment and more recent research.

**Table 1: Assessment of evidence for factors in this review**

| <b>Factors promoting obesity (increased risk)</b>           | <b>Factors protecting against obesity (decreased risk)</b>                  | <b>Level of evidence</b>  |
|---|---|---------------------------|
| High intake of energy-dense, micronutrient-poor foods       |   | Convincing                |
| High level of TV viewing                                    |   | Considerable <sup>3</sup> |
| Heavy marketing of energy-dense foods and fast food outlets | Home and school environments that support healthy food choices for children | Probable                  |
| High intake of sugar-sweetened soft drinks and fruit juices |   | Probable                  |

### Summary of evidence for factors in this review

The following summary is based on the WHO's technical report (World Health Organization, 2003) and a report by the Scientific Committee of the Agencies for Nutrition Action (ANA) in New Zealand, for the third section on TV viewing (Scragg, Quigley, & Taylor, 2006).

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<sup>3</sup> Based on report by the Scientific Committee of the Agencies for Nutrition Action (Scragg, Quigley and Taylor 2006)

## **1. Evidence for high intake of energy-dense, micronutrient-poor foods**

The WHO has assessed the evidence for high intake of energy-dense, micronutrient-poor foods as convincing in terms of increasing risk of obesity.

Energy-dense foods are defined as those high in fat, sugars and starch, while energy-dilute foods, such as fruit and vegetables, have high water content. Passive over-consumption of total energy can occur when the energy density of a diet is high, which is almost always the case in high fat diets. The report notes that energy-dense foods are not only highly processed, but also low in micronutrients, which further diminishes nutritional value.

The WHO also observed that low fat diets alone are not sufficient to prevent obesity. Diet needs to be accompanied by changes in physical activity patterns and attitudes toward food. Such changes require environments that are supportive of healthy food choices and an active life.

### **1a).Heavy marketing of energy-dense foods and fast food outlets**

(considered in this review as a risk factor within Topic 1)

The WHO found that there is a probable association between heavy marketing and an increased risk of obesity. Fast food restaurants and food and beverages classified as 'eat least' are the most heavily marketed products and outlets, especially on television.

Children are specifically targeted in the marketing of foods due to their influence on parents' purchasing of food. There is concern that young children are not yet able to distinguish between programme content and the persuasive intent of advertisers.

According to the WHO, substantial expenditure on marketing is a key factor in the increased consumption of food prepared outside the home, and of energy-dense foods in particular. While the evidence for heavy marketing as a causative factor for obesity is not indisputable, it was concluded that there is sufficient indirect evidence to justify its inclusion in the 'probable' category.

## **2. Evidence for high intake of sugar-sweetened beverages**

The WHO has classified high intake of sugar-sweetened beverages as having a probable causative effect in promoting obesity. There is high and increasing consumption of sugar-sweetened drinks by children in many countries. Diets that are low in fat will be higher in carbohydrates and are a protective factor against unhealthy weight gain, however a high intake of 'free sugars' (carbohydrates) in beverages promotes weight gain.

The WHO points out that the physiological effects of energy intake on satiation are quite different for fluids compared with solid foods. This is because the energy contained in fluids is not as well 'detected' by the body, and subsequent food intake is poorly adjusted to account for energy taken in through beverages.

The WHO reports an estimate that each additional can or glass of high-sugar drink that is consumed every day increases the risk of becoming obese by 60%. The current evidence relates predominantly to high-sugar drinks, but the WHO comments that it can be equally well applied to energy-dense fruit juices and cordials. The evidence for this area was judged to be moderately strong.

### **3. Evidence for high level of television viewing**

Although it did not include television viewing as a key factor related to obesity, the WHO report refers to the existence of consistent, strong relationships between television viewing and obesity in children (World Health Organization, 2003).

The ANA Scientific Committee found that New Zealand children are watching large amounts of TV, most of this viewing is occurring outside the hours designated as children's programming times, and TV watching exposes children to considerable amounts of food advertising (Scragg, Quigley, & Taylor, 2006).

The authors concluded that there is considerable evidence that watching TV contributes to increased body weight and obesity in children. Watching TV is not associated with a reduction in the resting metabolic rate. Although studies do not provide consistent support for the 'displacement hypothesis', that watching TV replaces more active pursuits, much of the evidence is cross-sectional and is not based on objective measures of activity.

Data have been more consistent in demonstrating an adverse effect of TV viewing on dietary intake in children. For instance, 19 out of 25 studies reported that increased TV viewing was associated with a less nutritious diet.

An adverse effect on dietary intake provides the strongest evidence to date explaining the relationship between TV watching and body weight in children. A number of international reports have identified marketing as a probable cause of childhood obesity.

### **4. Evidence for home environments that support healthy food choices for children**

The WHO has classified home environments that support healthy food choices for children as a probable way to decrease the risk of obesity. Although there is a clear and important role played by parents and home environments on children's eating patterns, there is currently very little hard evidence to support this.

There is evidence, however, that access to a range of fruits and vegetables in the home plays a key role in developing children's preferences for those foods. Parental attitudes towards those foods are important in role modelling positive attitudes to healthy foods. The WHO concluded that home environments have a probable causative influence on obesity, but called for further research in this area.

## **5. Evidence for school environments that support healthy food choices for children**

Compared with home environments, there is more research available on the impact of school environments. Evidence suggests that schools have an impact on children's nutrition knowledge, on eating patterns and physical activity while at school, and on sedentary behaviours while at home. Some studies, although not all, show a positive effect of school-based interventions on obesity prevention. The WHO concluded that school environments are a probable causative influence on obesity.

In summary, there is either probable or convincing evidence for causative associations between each of the five factors in this review and obesity.

## **1.4 Findings on effectiveness of social marketing**

### **Topic 1: High intake of energy-dense, micronutrient-poor foods**

#### **Introduction**

This section presents the review's findings on the effectiveness of social marketing interventions in relation to the intake of energy-dense, micronutrient-poor foods. It also suggests some critical features for successful social marketing in this area.

The WHO has defined 'energy-dense, micronutrient-poor foods' as processed foods high in fat (e.g., butter, oils, fried foods, packaged snacks) and/or sugars (World Health Organization, 2003). Specific examples of energy-dense foods include sweetened breakfast cereals, confectionary, muesli bars, fatty spreads, pies, French fries, potato chips, sweetened dairy products, meat products, and fast food (Lobstein & Dobb, 2005; Maher, Wilson, & Signal, 2005).

As the terminology 'energy-dense, micronutrient-poor foods' is new, this review used related search terms such as 'high-fat foods', 'high-sugar foods', and 'fat intake'.

#### **Summary of evidence for the effectiveness of social marketing on reducing intake of energy-dense, micronutrient-poor foods**

##### ***UK review of social marketing interventions***

A recent systematic review of social marketing included 18 studies that examined intervention effects on fat intake (McDermott, Stead, Gordon, Angus, & Hastings, 2006). The review concluded that 8 of the 18 interventions were effective overall in reducing fat intake, and three generated no change. Of the eight effective studies, two were of high quality and five were of medium quality. The reviewers concluded that there is currently 'reasonable' evidence of an impact of social marketing interventions on fat intake (McDermott, Stead, Gordon, Angus, & Hastings, 2006). However, it should be noted that there were some mixed findings, with several studies showing limited impact.

The following studies represent some examples of the evidence covered in the UK review of social marketing, and are divided into population groups.

##### **1. Positive effects on fat intake:**

###### **Children and families**

The *CATCH (Child and Adolescent Trial for Cardiovascular Health)* programme aimed to lower school students' fat intake, including lowering the fat content of school meals (Luepker et al., 1996). The programme was implemented in four US states, and a multi-site RCT (randomised controlled trial) was conducted with 56 intervention and 40 control elementary schools. Participants were 5105 third-grade students from ethnically diverse backgrounds.

The intervention included school food service modifications and food service personnel training to improve the nutritional content of school meals. It also involved physical education interventions and teacher training to increase the amount of moderate-to-vigorous physical activity, and classroom health curricula aimed at reducing smoking and improving eating habits and physical activity. Twenty-eight additional schools received these components as well as family education.

The study found that in intervention school lunches, the percentage of energy intake from fat reduced significantly (from 38.7% to 31.9%) compared with control school lunches (from 38.9% to 36.2%). In addition, fat intake considerably decreased from 32.7% to 30.3% of calories among students in intervention schools, compared with a much smaller reduction in control schools (**Luepker et al., 1996**). The researchers concluded that the *CATCH* programme was successful in modifying the fat content of school lunches, and in improving children's nutrition and physical activity behaviours during three school years.

### **People on low incomes**

A RCT of the Maryland *Food for Life* social marketing programme, aimed at low income women, found a positive effect of the programme on participants' intake of fat, fibre, and fruit and vegetables (**Havas et al., 2003**). This study is also discussed in relation to Topic 4 in this report. Participants were 1055 women at ten WIC (Women, Infants and Children) sites, with another 1011 women serving as controls. The programme consisted of monthly educational sessions, direct mail and telephone calls by trained peer educators. The various components included a 5-minute video of participants from the pilot study, a brochure, individualised feedback on their baseline questionnaire, a 'kick off' fair, four 45-minute workshops, newsletters, mail packets, personalised invitations, behaviour-reinforcing incentives, and phone calls.

The nutrition sessions differed from the original WIC nutrition programme in Maryland, as formative research had found some negative perceptions of the programme. The *Food for Life* programme used peer educators, more than half of whom were black, to assist with ensuring that all materials and intervention sessions were culturally sensitive to the low income participants. As well as teaching at the fairs and workshops, the peer educators made reminder phone calls to participants, and mailed educational information. They attended two days of training before each session, and were encouraged to adopt the recommended behaviours themselves.

The programme was based on 'stages of change' and social learning theories. The women were surveyed at baseline, two months post-intervention, and one year later.

Interestingly, this trial had better results than those in previous community trials that were conducted with higher SES populations. This study was assessed as high-quality evidence by the UK reviewers, who noted that there was consistency of outcomes across diverse populations and sites.

### **Ethnic minorities**

The *Body and Soul* intervention was developed from two previous successful interventions with African-American church members. It comprised a, taste-testing, distribution of self-help materials, motivational interviewing, and training for lay church members (Resnicow et al., 2004).

Church-wide activities were an essential element, with an implementation manual provided to suggest potential events such as a 'Body and Soul' Sunday when fruit and vegetables were served after church. Suggested policy changes included establishing guidelines for food served at church functions, and changing snacks provided at youth camps. Churches were encouraged to promote the programme through a volunteer, trained liaison officer. Self-help materials were also part of the intervention, such as a healthy cookbook written by church members, and a video to promote fruit and vegetable consumption that used both secular and spiritual messages. Another core element of the intervention was motivational interviewing by a lay health advisor, in order to explore barriers to behaviour change regarding food and to increase motivation to improve eating patterns.

The results for fat intake were positive, with the intervention group showing small, but significantly greater, positive changes compared with the control group.

## **2. Mixed results**

### **Children and families, indigenous population**

A RCT evaluating the effectiveness of a school-based, multi-component intervention for reducing percentage body fat in American-Indian schoolchildren produced mixed findings (Caballero et al., 2003). The *Pathways* intervention was a culturally tailored intervention comprising food service changes, classroom curricula and a family component (as well as a physical exercise component), and was based on formative research.

The intervention was preceded by a three-year feasibility phase, which aimed to develop a working partnership with the American-Indian communities and to undertake pilot testing of the intervention. Changes to the food service programme included provision of nutritional, low-fat cafeteria meals, and implementation of food preparation and selection guidelines.

The classroom curriculum was designed for third, fourth and fifth grade children, and addressed the high-risk behaviours identified in the formative research. The curriculum drew on American-Indian storytelling and used fictional characters on a journey through the six *Pathways* areas. It highlighted local customs and practices, and incorporated the use of 'hands-on' games and activities. *Pathways* staff trained teachers in the use of the curriculum, and provided instruction manuals and visual materials to assist with the uniform application of the curriculum across classes and schools.

Three strategies were used to engage family support with the intervention; 'family fun' nights including healthy taste tests, family take-home 'snack-packs' and action packs and school-based family advisory councils, which were an opportunity for family and community members to discuss the intervention and raise questions or concerns.

Although the intervention did not lead to a reduction in percentage body fat, it did contribute to a significant reduction in the percentage of energy derived from fat in the intervention schools, and to changes in food-related knowledge and behaviours. The authors concluded that it is feasible to implement a multi-component program for obesity prevention in elementary schools serving American-Indian communities, but that more intense or longer duration interventions may be needed to reduce percentage body fat (Caballero et al., 2003).

### **3. Limited or no effects on fat intake**

#### **Supermarket shoppers**

A Dutch supermarket intervention had no effect on fat intake after follow-up at two and six months (**Steenhuis, van Assema, van Breukelen, & Glanz, 2004**). Based on formative research and pre-testing, an educational programme and a labelling programme were specifically designed to be used in the supermarket environment. The six-month intervention comprised labelling of low-fat foods, increasing the range of healthy foods available and educational interventions.

The educational programme included posters with information about the programme, a brochure about healthy eating, recipe cards, and a self-help manual. Optional elements were badges for supermarket staff, a healthy nutrition competition, and order-separator bars at the cash register. The labelling programme identified low-fat products in nine food product categories, with a shelf label providing information on the programme logo, name of the item, and the indication that the product was a good low-fat choice.

The authors concluded that the highly competitive environment of the supermarket may have accounted for the lack of effect of nutrition education and labelling of low-fat foods (**Steenhuis, van Assema, van Breukelen, & Glanz, 2004**). The competitive environment makes it difficult to ensure exposure to, and awareness of, nutrition education messages. They also acknowledged the study was limited in that it only measured total fat intake. It was possible that people purchased more labelled low-fat items, but that this did not affect their fat intake due to the consumption of other high-fat products.

#### **People on low incomes**

A similar limited impact was found in an evaluation of a four-year, community-based cardiovascular disease (CVD) prevention programme among low income adults (O'Loughlin & Paradis, 1999). Drawing from a growing body of knowledge from first- and second-generation CVD prevention research and demonstration projects, the prevention programme included more than 40 interventions to promote heart health. The objectives were to promote heart-healthy behaviours, including a low-fat diet and increased physical activity. Example interventions included menu labelling in restaurants, a heart-health recipe contest, a point-of-choice nutrition education campaign in local grocery stores, direct-mail print education materials, development and distribution of heart-health videos, and a mailed intervention for healthy-weight regulation.

Although there were few overall programme effects, some component interventions showed promise in terms of acceptability and impact, such as point-of-choice information campaigns to encourage healthy food choices.

#### **Children and families**

A RCT of US middle-school students evaluated the effects of environmental, policy and social marketing interventions on fat intake and physical activity (Sallis, McKenzie, & Conway, 2003).<sup>4</sup> The two-year intervention programme aimed to change school policies and environments in order to increase the total energy expenditure from students' physical activity and to decrease the grams of total and saturated dietary fat purchased at, or brought to, school by students.

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<sup>4</sup> This study is also discussed in the school environments section.



The intervention was based on a structural, ecologic model of health behaviour, using four factors as intermediate structural and environmental influences on behaviour – availability of protective or harmful products or services, physical structures or characteristics of products and services, social structures and policies, and media and cultural messages.

The nutrition intervention was designed to provide and market low-fat foods at all school sources of food. Intervention strategies included plans to reduce fat content and introduce low-fat foods, recipe modification, ingredient substitution, salad bars, substitution of low-fat for high-fat items in lunches brought from home, and healthy lunch competitions.

The intervention also involved staff and students in policy change efforts. Health policy meetings were a key element in creating and supporting policy change, where key school personnel met with project staff to select and implement policy changes to create healthier school environments. There were three 90 minute meetings per school during the two year period, and each year two to four policies were selected to improve using action plans. An example policy was “serve 1% or skim milk only”. Other policy-level interventions were student health committees, parental education and financial incentives offered to schools to participate.

The intervention had no effect on reducing fat intake, but it did contribute to an increase in boys’ physical activity. The authors noted that the school food environment was influenced by wider marketing of unhealthy foods, and that there were strong financial barriers to schools limiting the availability of popular, high-fat foods. They highlighted the financial incentives for schools to serve products that students preferred, especially highly processed foods advertised in the mass media (Sallis, McKenzie, & Conway, 2003).

### ***Lessons from early US experience of social marketing***

A national social marketing campaign to reduce dietary fat intake, *Project LEAN*, was initiated in the US in 1987 (Samuels, 1993). Convenience, habits and taste were identified as the main barriers to change. The campaign comprised four elements:

- Media strategies to heighten public awareness about dietary fat.
- Demonstrations by chefs and food journalists on how to influence behaviours and popular tastes.
- Partnerships between government, the voluntary sector and industry to reinforce the message.
- Community programmes to create and institutionalise change (Samuels, 1993).

During the first three years of the campaign, eight partners sponsored collaborative events, making a significant financial contribution to promoting the campaign message. For instance, corporate sponsors supported a *Project LEAN* luncheon and reception at a conference, a low-fat luncheon and demonstration was held for the National Restaurant Association, and a *Project LEAN* promotion on grocery bags and in-store magazines was held throughout the national chain of Safeway stores. Guidelines for corporate collaboration were developed to ensure that the *Project LEAN* message would not be compromised and that the campaign would not endorse or promote any specific commercial product.

A national-level, public service advertising campaign produced two TV ads, two radio ads, and three print ads. In addition, extra publicity occurred outside of the public service advertising. Another strand of the campaign was a consumer hotline, with a brochure on choosing and preparing low-fat foods offered to those who rang the hotline number. Due to the combination of campaign ads and publicity, the hotline received nearly 300,000 consumer calls, which the Advertising Council said far exceeded responses to other campaigns. There were also interventions with the food industry and food professionals, including a working group of 35 prominent chefs and food journalists to work together to expand low-fat cuisine options.

The proportion of the public who were concerned about dietary fat intake rose significantly during the campaign years (42% in 1991, compared with only 9% in 1983). The programme's accomplishments included a strong national coalition of government and private industry, TV advertising that reached more than half of the potential viewing audience in the first year, extensive newspaper and print publicity, and a large response to an information 'hotline' (**Samuels, 1993**).

A key finding was that public service advertising, provided free of charge in the US, was less effective than well-placed, targeted publicity (**Samuels, 1993**). This was because targeted publicity provided immediately usable information, tailored the message to the needs of particular target audiences, and was less time-limited than public service advertising.

Another key learning was that advertising and public health professionals should be more aware of their differing approaches in the development of campaign messages. The authors acknowledged the difficulties in reaching consensus among diverse organisations and interests. They suggested that it may not be realistic to develop advertising concepts that are fully acceptable to all members of a partnership (**Samuels, 1993**).

### ***Findings from a review of intervention studies including social marketing***

A generic review of 80 dietary intervention studies for fat, fibre, and fruit and vegetable intake included several social marketing interventions (**Bowen & Beresford, 2002**). For instance, *Fat Watch*, an annual nationwide Dutch campaign to reduce fat, resulted in greater awareness of the campaign, and improved attitudes and intentions to buy low-fat products. The month-long campaign included mass media advertising, cues at food retailers and pharmacies, and print materials. The intervention was initially carried out as a pilot project to investigate the effectiveness of strategies and activities, with the intention of applying them subsequently in other cities.

In Norway, a national mass media campaign (*Heart for Life*) found that a quarter of adults were interested in changing dietary behaviours after viewing the television campaign. A Danish mass media campaign also increased attempts to eat less fat after one year of intervention (**Bowen & Beresford, 2002**).

The next two sections discuss evidence for some potential components of social marketing. The interventions covered (media-only marketing and pricing/promotion) do not constitute social marketing approaches in themselves, but could potentially be a component of a broader social marketing intervention.

### ***Effectiveness of a media-only approach***

One study found that a media-only marketing approach was successful in altering consumption from high-fat to low-fat milk (**Reger, Wootan, & Booth-Butterfield, 1999**). Although high-fat milk is not an energy-dense food, this study contains some relevant lessons for social marketing.

A six-week, multi-media campaign, the Wheeling *1% or Less* campaign, had the effect of increasing low-fat milk sales from 29% of all milk sales before the campaign to 46% in the month following the campaign, and this increase was maintained after 6 months. The mass media campaign included paid advertisements on TV, radio and newspapers, and public relations events such as press conferences and taste test events. The advertisements encouraged a switch from whole or 2% milk to 1% or fat-free milk as a simple way to reduce saturated fat intake and reduce heart disease risk. A campaign advisory board of 25 community leaders and local health professionals was formed in order to ensure the campaign's credibility, and to provide guidance on implementing the campaign **{Reger, 1999 #56}**.

In this study, a sole media approach appeared to be sufficient to encourage change in consumption behaviour. This would imply that there may be effective alternatives to full social marketing campaigns, which may also be cheaper to run. It should be noted, though, that the authors observed that a sole media approach may not be appropriate for all food behaviours (e.g., a campaign to increase consumption of whole grain foods would be more challenging, due to the difficulty in identifying a simple message).

### ***Pricing and promotion strategies***

The *CHIPS* study (*Changing Individuals' Purchase of Snacks*) examined the effects of various pricing and promotion strategies with regard to low-fat snacks from vending machines in 12 worksites and 12 schools (**French et al., 2001**). Sites were selected to be demographically and geographically diverse. Low-fat snacks were defined as snacks with 3 grams or less of fat per package. The interventions included four levels of pricing strategy and three levels of promotional strategies.

The pricing levels were a) equal price, b) 10% price reduction for low-fat snacks, c) 25% price reduction, and d) 50% price reduction. The three levels of promotion were 1) no signs, 2) signs labelling low-fat snacks, and 3) signs labelling low-fat snacks combined with signs placed on vending machines that encouraged a low-fat snack choice. Set-up of the vending machines for the study included placement of low-fat snacks in two designated rows of the vending machine, and placement of the appropriate low-fat labels or signs. Project staff visited the sites weekly to ensure there was fidelity of implementation.

Price reduction of low-fat snacks was significantly associated with the percentage of low-fat snack sales. 25% and 50% price reductions were associated with significant increases in the absolute number of low-fat snacks sold, when compared with the equal price and 10% reductions. Promotion of low-fat snacks was also significantly and independently associated with greater low-fat snack sales.

Both adolescents and adults were found to be price sensitive. The authors highlighted that the price reductions did not adversely affect profits from the vending machines (**French et al., 2001**).

## ***Lessons from a review of restaurant-based environmental interventions***

Although the focus was on fruits and vegetables rather than energy-dense foods, some relevant lessons can be drawn from a recent review of restaurant-based environmental, policy and pricing strategies (**Glanz & Hoelscher, 2004**). The review categorised studies into six types of restaurant interventions:

- increased availability
- increased access
- reduced prices and coupons
- catering policies
- point-of-purchase information, and
- promotion and communication.

There was also a category for ‘community-driven health promotion’ in restaurants, which was ‘increased availability’, combined with information and promotion. Examples of these interventions include the UK *Heartbeat Award* Scheme, the *Winner’s Circle* Healthy Dining Program in North Carolina, and the Australian programme *Healthy Food Choices in Licensed Premises*. Many of these programmes are multi-component, and attempt to address more than one health behaviour. For instance, the *Heartbeat Award* scheme requires premises to offer healthy choices for at least one-third of the menu, that at least one-third of seating is non-smoking, and that a third of food service staff be trained in food safety.

The term ‘restaurant’ was broadly defined, including fast food outlets, school cafeterias and vending machines. The review concluded that evaluation data show some significant impacts on healthy diets, especially with point-of-purchase information (**Glanz & Hoelscher, 2004**). Point-of-purchase information interventions in restaurants and cafeterias have shown positive results over several decades of research, and have been implemented in a range of settings, often combined with posters, labels and/or nutrition games. Some interventions have also used incentives and financial rebates. The reviewers stated that across studies, most targeted healthy items achieved increased sales. They noted that the main target outcomes of the studied interventions were reduced fat and calories, and several focused on fruit and vegetables.

### **Key findings on critical features for effectiveness**

#### ***Comprehensive approach with strong partnerships***

Early experience from the US national dietary fat campaign pointed to a range of effective features (**Samuels, 1993**). These included the use of comprehensive, integrated approaches that employed multiple intervention strategies and communication channels, and targeted a range of audiences.

The dietary fat campaign suggested that a coordinated approach across government, industry and voluntary sectors was crucial, with strong partnerships between organisations. However, guidelines on corporate collaboration were needed to ensure that the campaign was not influenced by commercial interests. The authors believed that collaboration with the private sector enabled expansion of the campaign (**Samuels, 1993**), which is consistent with other research findings (**Glanz & Hoelscher, 2004**).

### ***Targeted publicity***

A key lesson drawn from the US experience was that well-placed, targeted publicity was more effective than 'public service' advertising (provided free of charge in the US), which allows no control over the timing or placement of ads. Targeted publicity has the advantage of being able to be adapted in response to changes, and the message can be tailored to suit particular audiences (**Samuels, 1993**). Other research has also confirmed the advantages of targeted publicity over public service advertising (**Reger, Wootan, & Booth-Butterfield, 1999**).

### ***National and local programmes***

The US dietary fat campaign demonstrated a two-way, beneficial relationship between national- and local-level programmes that supported the campaign. National strategies benefited the community-based programmes, while the development of a network of local programmes had the effect of strengthening the overall campaign. It was also critical to include media monitoring and tracking as an integral part of the campaign, and to have highly credible spokespeople for the campaign. The use of chefs in promoting healthy recipes was cited as a successful element of the campaign (**Samuels, 1993**).

### ***Environmental change***

The dietary fat campaign also highlighted the importance of a tandem approach that concurrently raised public awareness and addressed environmental barriers to change (**Samuels, 1993**).

The authors of a review into policy, environmental and social marketing interventions commented that policy and environmental approaches may have the most impact when they influence the overall environment and reach many people (**Glanz & Hoelscher, 2004**).

### ***Duration of social marketing***

The *Pathways* programme for American-Indian schoolchildren found that duration of the intervention was important. The authors noted that in this case all three years were required to sustain change in the implementation of behavioural guidelines, and suggested that interventions may need to be at least two years' duration (**Story, Snyder et al., 2003**). The programme also found that staff development that was enjoyable, experiential and skill-based was essential to success.

### ***Simple message***

The effectiveness of a media-only approach in encouraging a switch to low-fat milk was partly attributed to the translation of a complex behaviour into a simple message (**Reger, Wootan, & Booth-Butterfield, 1999**).

## **Attitudes, behaviours and barriers related to energy-dense, micronutrient-poor foods**

A secondary data analysis of New Zealand's 2002 National Children's Nutrition Survey found that Maori and Pacific children may be consuming more fatty and sugary foods than New Zealand European children (Utter, Scragg, Schaaf, & Fitzgerald, 2006). The survey indicated that although it was common for all children to buy some or most of their food during school hours at the school 'tuckshop', Maori and Pacific students were significantly more likely to do so (Utter, Scragg, Schaaf, & Fitzgerald, 2006).

Compared with New Zealand European children, Maori children were 3.3 times more likely, and Pacific children 4.7 times more likely, to buy some of their school food from a dairy or takeaway. Foods prepared away from home tend to be higher in fat and saturated fat. The consumption of food from a dairy or takeaway at school has been correlated with body mass index (BMI) among New Zealand children (Scragg et al 2004, cited in (Utter, Scragg, Schaaf, & Fitzgerald, 2006). In addition, Maori children were twice as likely, and Pacific children more than three times as likely, to consume carbonated drinks five or more times a week (Utter, Scragg, Schaaf, & Fitzgerald, 2006).

A New Zealand study examined the frequency of eating by young Polynesian and European women (Amosa, Rush, & Plank, 2001). The research indicated that young women in New Zealand, both Polynesian and European, are not eating breakfast every day, and there was variation by ethnicity. Polynesian women in the study ate breakfast about three times per week on average, while New Zealand European women ate breakfast four times per week. Other research has shown that eating breakfast is associated with reduced intake of dietary fat and less snacking (Amosa, Rush, & Plank, 2001).

Another study investigated the impact of a health promotion workplace intervention on nutrition knowledge and behaviours in a 'hard to reach' population (Cook, Simmons, Swinburn, & Stewart, 2001). At baseline, fewer than 20% of the low-income workers in the study achieved the recommended fat score (30-34% of energy as fat). A higher fat intake was associated with younger age, lower nutrition knowledge and reduced belief in the importance of healthy eating. The intervention reduced fat intake and improved nutrition knowledge.

An earlier survey from 1991 had some findings relevant to energy-dense foods, based on interviews with more than 1000 New Zealand shoppers (Worsley, Worsley, & McConnon, 1991). In terms of attitudes, 27% of shoppers expressed concern about the presence of fat in foods, 18% were concerned about salt, and 14% were concerned about sugar. More than half of interviewees thought that reductions in fat intake would make their diets healthier. In addition, only one third of respondents could correctly identify the bottom row of the healthy food pyramid, and only one in five reported being aware of the New Zealand nutrition guidelines (Worsley, Worsley, & McConnon, 1991).

The authors of this study noted that the cost of food relative to household income is a major barrier to healthy food choices. The findings suggested that concerns and knowledge about nutrition were not related to socio-economic status, though, with early school leavers appearing more concerned about dietary guidelines than later school leavers (Worsley, Worsley, & McConnon, 1991).

Some major barriers to improving nutrition and preventing obesity include cost issues, convenience, habits and taste (Sallis, McKenzie, & Conway, 2003; Samuels, 1993). Many healthy foods such as fruit and vegetables are more expensive than energy-

dense, micronutrient-poor foods, including fast food and sugar-sweetened beverages (Wilson & Mansoor, 2005).

It should not be assumed that obese individuals are unaware of good nutritional practice, or that they lack motivation to address their obesity. New Zealand research indicates that many families on low incomes are aware the food they buy is not healthy, and would prefer to buy healthier food for their children (Downtown Community Ministry, 1999).

There are substantial ethnic variations in barriers to improving nutrition, especially the cost barrier. In the National Nutrition Survey, half of Pacific people and one-third of Maori, compared with only one-tenth of Europeans, reported that 'food runs out often or sometimes' due to inadequate income (Ministry of Health, 1999). Almost half of Maori and Pacific people found that the variety of foods they eat is limited by financial concerns, compared with a quarter of Europeans (Downtown Community Ministry, 1999; Ministry of Health, 1999).

## **Risk and protective factors for high intake of energy-dense, micronutrient-poor foods**

### ***Risk factors***

#### **1. Heavy marketing of energy-dense foods**

##### Association of marketing with food choices and obesity

There is now an established evidence base for the effects of marketing on children's food preferences and behaviour. In 2004, a systematic review of all published research into the effects of food advertising on children concluded that food promotion influences children's food preferences and purchasing behaviour (Hastings, Stead, & McDermott, 2004). The review found that food is promoted to children more frequently than any other product, and that TV advertising is the main form of promotion. Advertised diets contrasted sharply with nutritional guidelines, as they were consistently high in salt, sugar and fat. Most advertising was for pre-sugared breakfast cereals, soft drinks, confectionery, savoury snacks and fast food, which are generally energy-dense foods.

The reviewers emphasised that although there is not 'cast-iron' proof of an effect, there is sufficient evidence that commercial food promotion has a substantial influence on children (Hastings, Stead, & McDermott, 2004). This review was updated in 2006 and the findings confirmed that advertised diets contrast dramatically with recommended diets, that children engage with this unhealthy advertising, and that food promotion influences children's knowledge, preferences and consumption (Hastings, McDermott, Angus, Stead, & Thomson, 2006).

Another evidence review was undertaken by the Institute of Medicine in the US, which found strong evidence that advertising influenced the short-term diets of children aged 2 to 11 years, with insufficient evidence for older children (Institute of Medicine, 2006). In addition, there was moderate evidence to suggest long-term effects on children's diets for those aged 6 to 11 years.

There is also research to suggest that marketing contributes to obesity, although the potential contribution is yet to be explained fully. The WHO classified heavy marketing of energy-dense foods as a 'probable' factor in increasing risk of obesity (World Health Organization, 2003).

recent correlational study of ten countries found evidence of a significant association between the extent of obesogenic food advertising on children's TV and the proportion of overweight children (Lobstein & Dobb, 2005). In particular, there were strong associations for advertising that encouraged consumption of energy-dense foods.

Consistent with the review by Hastings and others, the authors observed that very few advertisements for healthy foods were shown (e.g., the highest percentage was 6% of all advertisements, which was in Finland). While the authors cautioned that advertising should not be seen as the sole cause of obesogenic behaviour, they concluded that their findings justify a need for precautionary restrictions on children's exposure to obesogenic marketing (Lobstein & Dobb, 2005).

The Institute of Medicine report also found a strong statistical association between higher exposure to TV advertising and obesity in children aged 2 to 11 years, and in young people aged 12 to 18 years (Institute of Medicine, 2006).

#### Evidence of heavy marketing of energy-dense foods in New Zealand

An observational study has shown that food advertising to children in New Zealand, as elsewhere, generally reflects unhealthy dietary patterns (Wilson, Quigley, & Mansoor, 1999). Of 269 food advertisements analysed in the study, 63% were for foods high in fat and/or sugar. This was a higher finding than the 46% result in a similar Australian study. Snack foods were shown in 76% of advertisements, while the only nutritional low-cost foods advertised were low-sugar breakfast cereals (9% of advertisements).

There is also recent New Zealand evidence for the intense marketing of food products in the vicinity of secondary schools (Maher, Wilson, & Signal, 2005). A pilot study found that 61.5% of all outdoor advertisements near schools were for food, and that of these food advertisements, the majority (70.2%) were for energy-dense foods such as soft drinks, frozen confectionery and savoury snacks. The results may underestimate the extent of marketing, as the study used a conservative definition of 'healthy' (Maher, Wilson, & Signal, 2005). The study showed that food outlets were located closer to secondary schools than other outlets.

#### Evidence of heavy marketing aimed at populations at risk

Overseas research suggests that there may be a higher density of fast food outlets and heavy marketing of unhealthy food in low income or ethnic minority communities. For instance, geographic analysis of fast food restaurants in the US showed that predominately black neighbourhoods had more fast food outlets per square mile than white neighbourhoods (Utter, Scragg, Schaaf, & Fitzgerald, 2006). Other research has found that a greater number of food advertisements are aired during African-American TV programmes compared with general programmes, and that these advertisements are more likely to be for high fat/high sugar foods (Utter, Scragg, Schaaf, & Fitzgerald, 2006).

The authors of the New Zealand study on TV advertising observed that there was no advertising for the healthy foods commonly eaten by Maori and Pacific peoples, such as fish, taro, bananas, coconut or kumara (Wilson, Quigley, & Mansoor, 1999). They also commented on the implications of their findings for people on low incomes, given the limited advertising of healthy cheap foods. The study into food marketing near secondary schools found that although high socio-economic status (SES) areas had a greater proportion of food advertisements, the advertisements in low SES areas were significantly closer to the secondary schools (Maher, Wilson, & Signal, 2005).



## **2. Availability and affordability of energy-dense, micronutrient-poor foods**

A second risk factor for a high intake of energy-dense, micronutrient-poor foods is the relatively greater availability and affordability of such foods, compared with healthier options. For instance, unhealthy foods are currently more available and less costly than healthy food in school food services in New Zealand (Carter and Swinburn 2004, cited in Utter, Scragg et al. 2006).

New Zealand pricing studies have found that, overall, foods with lower levels of saturated fats are considerably more expensive than processed foods with high levels of saturated fat (Wilson & Mansoor, 2005). In addition, overseas studies have confirmed that price influences people's choices of foods (French, Jeffery, Story, Hannan, & Snyder, 1997).

New Zealand research has also shown that food outlets are located closer to secondary schools than other outlets (Maher, Wilson, & Signal, 2005). As consuming food from a dairy or takeaway has been independently correlated with body mass index (BMI) in New Zealand children, the close proximity of unhealthy food outlets to schools is a likely risk factor for a high take of energy-dense foods and obesity (Scragg et al 2004, cited in Utter, Scragg, Schaaf & Fitzgerald 2006).

There is evidence to suggest that healthy options may be less accessible for people on low incomes. For instance, the pilot study of New Zealand secondary schools found that of those that sold school meals, the proportion with a salad option was significantly lower in low SES neighbourhoods (Maher, Wilson, & Signal, 2005). An Australian study found that low SES areas had greater availability of fast-food outlets (cited in Maher, Wilson, & Signal, 2005).

Another important issue that affects people on low incomes is food poverty. A study found that up to 4% of New Zealand households nationwide, and up to one-third of households in the lowest income areas, do not have access to the variety of foods required for health (Ministry of Health, 1999). Food banks in cities estimated that they supplied up to 10% of people in their local areas, including people in paid employment. These findings suggest that limited availability and affordability of healthy foods are relevant risk factors in New Zealand.

### ***Protective factors***

#### **1. Healthy school environments that make healthy choices easier**

A protective factor in terms of reducing intake of energy-dense foods is a school environment that makes it easier for children and young people to make healthy food choices. Several of the school-based social marketing interventions in this review had positive outcomes on fat intake and the fat content of school lunches (Caballero et al., 2003; Havas et al., 2003; Luepker et al., 1996). The issue of school environments is also considered separately in Topic 5.

#### **2. Eating breakfast**

Another protective factor is the consumption of breakfast each day. Eating breakfast has been associated with reduced intake of dietary fat and reduced snacking (Amosa, Rush, & Plank, 2001). As discussed above, a study has shown that both Polynesian

and New Zealand European women do not eat a daily breakfast (Amosa, Rush, & Plank, 2001).

Other New Zealand authors have suggested that children and young people who skip meals may be more likely to snack or buy takeaway food to compensate (Utter, Scragg, Schaaf, & Fitzgerald, 2006). These types of foods tend to be higher in fat and saturated fat, and contain less dietary fibre, calcium and iron compared with foods prepared at home (Utter, Scragg, Schaaf, & Fitzgerald, 2006).

Significant ethnic differences have been found in meal-skipping behaviour, with Maori and Pacific children much more likely than New Zealand European children to skip breakfast either sometimes or always (Utter, Scragg, Schaaf, & Fitzgerald, 2006).

### **3. Culturally tailored interventions**

Interventions that are culturally appropriate and culturally specific are protective in terms of lowering intake of energy-dense foods. For instance, one review found that programmes designed to be culturally sensitive were more likely to promote lower fat intake (Ammerman, Lindquist, Lohr, & Hersey, 2002).

There are examples in this review of effective social marketing interventions tailored to specific groups, for instance a church-based intervention with African-Americans (Resnicow et al., 2004).

The Maryland *Food for Life* social marketing programme specifically targeted low-income women through using trained peer educators from the same community who were also on low incomes themselves. The programme had a positive effect on participants' intake of fat, fibre, and fruit and vegetables (Havas et al., 2003).

### **Possible market segments, groups, and 'influencers' likely to benefit most from social marketing**

Drawing from this section of the review, several possible market segments can be highlighted that are likely to benefit most from social marketing interventions.

#### **1. Maori and Pacific populations**

New Zealand research indicates that these population groups tend to have relatively higher intake of energy-dense foods, especially Maori and Pacific children (Utter, Scragg, Schaaf, & Fitzgerald, 2006). Maori and Pacific people may eat less regular breakfasts and lunches, which is a risk factor for eating energy-dense foods (Amosa, Rush, & Plank, 2001; Utter, Scragg, Schaaf, & Fitzgerald, 2006). Furthermore, Maori and Pacific groups are disproportionately affected by cost barriers in terms of their ability to purchase healthy food (Downtown Community Ministry, 1999).

This review suggests that culturally tailored social marketing interventions may be effective in modifying intake of energy-dense foods. For instance, a community-based intervention with a remote Aboriginal community was effective in changing eating behaviour. The most critical success factor identified was the ongoing process of social change, including community control and participation (Lee, Bonson, Yarmirr, O'Dea, & Mathews, 1995). This is consistent with a New Zealand report that highlighted community participation and leadership as crucial factors for social marketing with Maori and Pacific populations (Sheehan, 2005).

## **2. Children**

This review has highlighted evidence for the influence of advertising on children, and for the existence of heavy marketing of energy-dense foods in New Zealand. Food promotion is now known to affect children's food preferences and purchasing behaviour (Hastings, Stead, & McDermott, 2004). TV advertising, in particular, is a key influencer with regard to children's eating patterns, and potential for change through social marketing.

This would imply a need for precautionary restrictions aimed at reducing children's exposure to advertising, and social marketing interventions that restrict children's exposure to marketing of unhealthy foods.

## **3. People on low incomes**

Another market segment that may benefit from social marketing comprises people on low incomes. This is because cost is known to be a key barrier to healthy food choices and there is concern about the existence of food poverty in New Zealand (Downtown Community Ministry, 1999). Overseas research suggests that social marketing can be effective in changing eating patterns in low income women (Havas et al., 2003). This intervention drew on trained peer educators from the low-income community as 'influencers', and this trial had better results than similar ones in high-income areas (Havas et al., 2003).

Other authors stated that models of community-based prevention designed for general populations may be inappropriate for populations on low incomes (O'Loughlin & Paradis, 1999), which confirms the need to develop tailored responses.

## **4. Specific settings**

Several settings emerged in the review as potential sites for effective social marketing interventions, including schools, churches, restaurants and other food outlets, and workplaces.

### Schools

This review indicates that schools would be an appropriate site, as school-based social marketing has been effective overseas (French et al., 2001; Luepker et al., 1996) and New Zealand researchers recommend school-based interventions including promotional and pricing strategies (Utter, Scragg, Schaaf, & Fitzgerald, 2006).

### Church congregations

It may be worth considering churches as a setting for social marketing. A church-based intervention in this review had an effect on lowering fat intake (Resnicow et al., 2004). In New Zealand the church has been suggested as a useful vehicle for engagement with Pacific peoples (Sheehan, 2005).

### Restaurant-based social marketing

A review of social marketing based in restaurants, fast food outlets, school cafeterias and vending machines found some significant impacts on healthy diets, especially with point-of-purchase information (Glanz & Hoelscher, 2004).

## Workplaces

Workplaces may also be a potential site for social marketing. A New Zealand health promotion intervention with a 'hard to reach' population had positive effects in reducing fat intake and improving nutrition knowledge (Cook, Simmons, Swinburn, & Stewart, 2001).

## **Information gaps where further research may be required to support a social marketing programme in the short and medium term**

Information gaps identified in this section of the review include:

- A need to better understand the extent to which environmental changes lead to individual changes toward healthier eating patterns. Emerging evidence suggests that more motivated subgroups may account for most of the change related to environmental impacts, and higher need groups may not be equally influenced by structural changes (**Glanz & Hoelscher, 2004**).
- Future research with low income populations to test social marketing strategies that promote community control of programme objectives, ensure a good fit with local concerns and values, and emphasise wide-scale community participation and long-term sustainability (O'Loughlin & Paradis, 1999).
- A need for research to document the barriers to making changes in school food environments, including financial barriers (Sallis, McKenzie, & Conway, 2003).
- Further research is needed into social marketing interventions using vending machines, where the food sold tends to be energy-dense (**Story, Snyder et al., 2003**).
- More research is needed into social marketing in 'grocery store' settings and 'point of purchase' interventions. The authors of one review observed that although point-of-purchase interventions in grocery stores may raise awareness about healthier eating, there is not yet any proven effects on actual behaviour (**Bowen & Beresford, 2002**).
- A need for studies in supermarket settings that combine labelling with price reduction strategies (**Steenhuis, van Assema, van Breukelen, & Glanz, 2004**).
- A need for more longer-term behavioural intervention studies (Ammerman, Lindquist, Lohr, & Hersey, 2002), including social marketing.

## **Conclusion**

This section has summarised evidence for the effectiveness of social marketing interventions on intake of fat or energy-dense, micronutrient-poor foods. A recent systematic review found that a 'reasonable' level of evidence exists for the effectiveness of social marketing interventions on fat intake (McDermott, Stead, Gordon, Angus, & Hastings, 2006). Social marketing interventions vary widely in practice, and there are some mixed findings. Overall, evidence for this topic is judged to be moderate.

Several lessons can be gained from experiences of implementing social marketing interventions, including the effectiveness of targeted publicity and tailored messages, and the importance of cross-sectoral partnerships and local community programmes that support a national-led campaign.

Key features of effective social marketing interventions in this area included the use of comprehensive, integrated approaches that employ multiple intervention strategies and communication channels, and target a range of audiences.

### **Strength of evidence in this area**

Appendix 2 provides more detail on the quality of studies. As social marketing interventions aimed at healthy nutrition are relatively new, the evidence base is still developing. However, there is a moderate level of emerging evidence to support the influence of social marketing interventions in modifying fat intake (as a proxy for reduction of intake of energy-dense foods).

To date, there has been one systematic review specifically on social marketing and nutrition (McDermott, Stead, Gordon, Angus, & Hastings, 2006). Of the eight studies in the review that found a positive effect on fat intake, seven were of high or medium quality. The reviewers' assessment was that a 'reasonable' evidence base exists for the effectiveness of social marketing interventions on fat intake (McDermott, Stead, Gordon, Angus, & Hastings, 2006). There were some mixed findings in the included studies.

Two of the three studies with positive effects, given as examples in this review, were assessed as high-quality evidence by the reviewers (**Havas et al., 2003; Luepker et al., 1996**). The other study was judged as medium quality (Resnicow et al., 2004). The one study with mixed results was assessed as high-quality evidence (Caballero et al., 2003).

Current evidence in this area also includes several lessons from national approaches to social marketing, such as the US campaign on fat intake (**Samuels, 1993**), and from related interventions such as restaurant-based interventions (**Glanz & Hoelscher, 2004**), and pricing and promotion strategies (**French et al., 2001**). Learning included the effectiveness of targeted publicity and tailored messages, and the importance of cross-sectional partnerships and local community programmes in supporting a national-led campaign.

An advantage of the current evidence base is that many studies have focused on populations of particular interest such as children and indigenous groups. For instance, the *Pathways* intervention study included a large number of schools serving American-Indian children, representing seven Indian tribes from diverse regions (**Story, Snyder et al., 2003**). The RCT evidence covered in this review also tended to involve large numbers and multiple sites.

A limitation of the evidence base is that some studies are short term and have only limited follow up (Ammerman, Lindquist, Lohr, & Hersey, 2002).

**Table 2: Summary table for energy-dense micronutrient-poor foods**

|  | <b>High intake of energy-dense micronutrient-poor foods</b>   |
|--|---|
| <b>Contribution of energy-dense, micronutrient-poor foods to obesity</b>           | Convincing  |
| <b>Contribution of heavy marketing of energy-dense foods and fast food outlets</b> | Probable  |
| <b>Evidence that social marketing works</b>  | Emerging moderate evidence (one systematic review found reasonable evidence of effectiveness, but with some mixed findings).  |
| <b>Evidence for critical success factors</b>                                       | Emerging evidence for a) coordinated approaches e.g., across government, industry and voluntary sectors<br>b) use of targeted publicity.  |
| <b>Evidence that social marketing works in low SES, Maori or Pacific</b>           | For low SES, emerging moderate evidence of effectiveness (several RCTs).<br><br>For Maori and Pacific, no evidence of effectiveness specific to this topic, but some lessons from other social marketing campaigns.   |
| <b>Behaviours in potential target group are of concern</b>                         | Higher intakes of energy-dense foods in Maori and Pacific children, also more likely to buy food from a dairy, takeaway or tuck-shop.<br><br>Maori and Pacific children and women eat less regular breakfasts (risk factor for eating energy-dense foods).  |
| <b>Knowledge, attitudes and barriers for target groups is known</b>                | No specific information was found on knowledge and attitudes of Maori or Pacific people regarding energy-dense foods, but these groups experience greater cost barriers to healthy eating.<br><br>People on low incomes have good knowledge about healthy foods, but also experience cost barriers. |
| <b>Environmental risk and protective factors known for New Zealand</b>             | NZ evidence indicates that unhealthy foods are heavily marketed, especially to children.<br><br>Evidence also suggests that limited availability and affordability of healthy foods is an issue in NZ.  |
| <b>Scientific message available on which to base social marketing campaign</b>     | WHO guidance for the prevention of obesity include restricting the intake of energy-dense, micronutrient-poor foods.<br><br>Call from International Obesity Taskforce for global ban on advertising unhealthy food to children.<br><br>ANA recommendations regarding sugary drinks.                 |

## **Topic 2: High intake of sugar-sweetened beverages**

### **Introduction**

This section presents the review's findings on the effectiveness of social marketing interventions in relation to the intake of sugar-sweetened beverages, and suggests some critical features for successful social marketing in this area. For the purpose of this review, 'sugar-sweetened beverages' include regular soft drinks, energy drinks, sports drinks, fruit drinks, and fruit juice.

As the definition of 'sugar-sweetened beverages' is broad, this review used related search terms such as 'soft drinks', 'juice', 'beverages' and 'drink'.

### **Summary of evidence for the effectiveness of social marketing on reducing intake of sugar-sweetened beverages**

One social marketing intervention that targeted sugar-sweetened beverages was identified from the 24 abstracts initially identified, and six papers retrieved for consideration (**McGarvey et al., 2004**).

The intervention was a non-randomised controlled, one-year prospective study of two WIC<sup>5</sup> sites in the US, consisting of 186 WIC parents with 2-4 year-old children. The intervention aimed to test the effects of a programme that targeted six parental behaviours to prevent obesity.

The three-pronged intervention (education, staff reinforcement, community reinforcement) was grounded in social cognitive theory and self-efficacy theory. The intervention was an educational group every two months and an individual session with a WIC nutritionist every six months. The educational content was modified in the intervention group to promote six messages, one of which was 'drink water instead of sweetened beverages'. WIC centre staff members were trained to model appropriate behaviours, and the intervention materials were made available within other community activity/service centres.

Using parental self-report on their child's behaviour in the last seven days, participants in both groups reported increased frequency of offering the child water, and the increase was significantly greater for participants at the intervention site. Spanish-speaking participants reported a greater increase in frequency of offering water instead of sweetened beverages, compared with English speaking participants.

### **Key findings on critical features for effectiveness**

#### ***Strong partnerships***

The authors of the WIC study noted that influencing parental behaviour to promote healthy eating in children is possible. Community coalition members and WIC nutritionists formed strong active partnerships over the course of the programme, and prioritising staff time for community outreach was considered crucial. The authors described significant difficulties and costs with the intervention. The least costly components were the materials and their development, and the scheduled sessions.

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<sup>5</sup> WIC is the US Special Supplemental Nutrition Program for Women, Infants and Children

The most costly components were the staff time contacting community partners, educating WIC staff about use of the materials and monitoring staff as they participated in staff modelling activities (McGarvey et al., 2004).

### **Culturally tailored interventions**

In this study, the effectiveness achieved with Spanish-speaking people appears promising. The investigators made considerable efforts to provide materials in Spanish, to use messages that were appropriate to the Spanish community, and to provide Latino staff (McGarvey et al., 2004).

### **Attitudes, behaviours and barriers related to sugar-sweetened drinks**

The 2002 National Children’s Nutrition Survey (Ministry of Health, 2003) found that half of New Zealand children reported consuming soft drinks at least once per week, with similar numbers reporting regular (at least once per week) consumption of fruit juices and fruit drinks. The proportion of children consuming cola drinks at least once a week increased substantially across age groups from 30% in 5–6 year-olds to over 50% in 11–14 year-olds. The table below shows that the proportion of Maori and Pacific children that consume sugar-sweetened beverages at least once per week is higher across all categories. Similar gradients exist across New Zealand Deprivation Index quintiles, with the proportion of children consuming *at least once per week* being highest in the most deprived quintiles.

**Table 3: Total of all age groups, percent consuming sugary drinks at least once per week**

|                                 | <b>NZEO males</b> | <b>NZEO females</b> | <b>Maori males</b> | <b>Maori females</b> | <b>Pacific males</b> | <b>Pacific females</b> |
|---------------------------------|-------------------|---------------------|--------------------|----------------------|----------------------|------------------------|
| <b>Powdered fruit drink</b>     | 50                | 50                  | 65                 | 61                   | 67                   | 64                     |
| <b>Fruit drink from cordial</b> | 29                | 28                  | 35                 | 36                   | 44                   | 43                     |
| <b>Cola drinks</b>              | 39                | 33                  | 55                 | 58                   | 62                   | 59                     |
| <b>Mountain dew</b>             | 5                 | 2                   | 15                 | 17                   | 37                   | 34                     |
| <b>Other soft drinks</b>        | 37                | 40                  | 52                 | 61                   | 62                   | 64                     |

NZEO = New Zealand European

In total, beverages (including tea, coffee and substitutes, soft drinks, juices, cordials, powdered fruit drinks, sports drinks and energy drinks) contributed 6% of energy in the diets of New Zealand children (Ministry of Health, 2003).

A secondary data analysis of New Zealand’s 2002 National Children’s Nutrition Survey found that Maori children were twice as likely (30%), and Pacific children more than three times as likely (44%), to consume carbonated drinks five or more times a week than New Zealand European children (14%) (Utter, Scragg, Schaaf, & Fitzgerald, 2006).

As part of a review on obesity and sugary drinks, Agencies for Nutrition Action (ANA) has developed a set of recommendations for children on the frequency and amount of sugary drinks appropriate for consumption (Agencies for Nutrition Action, 2005). These recommendations have not yet been tested with parents or children, but few other resources exist in New Zealand that provide clear messages.



A similar set of guidance has been produced by the Southern Nutrition and Physical Activity Network (SNAPA), based on the ANA recommendations. In addition, Waitemata DHB has produced guidance for school settings.

## **Risk and protective factors for high intake of sugar-sweetened beverages**

### ***Risk factors***

Key risk factors include the heavy marketing of sugar-sweetened beverages and the easy availability and affordability of such drinks. As these risk factors are discussed in the section on energy-dense, micronutrient-poor foods (Topic 1), this detail is not repeated here.

### ***Protective factors***

#### **Healthy environments**

A protective factor in terms of reducing intake of sugar-sweetened beverages may be a healthy environment where food messages are reinforced by staff members who promote and model those actions. Healthy school and home environments are also known to be protective and are separate topics in this review.

## **Possible market segments, groups, and ‘influencers’ likely to benefit most from social marketing**

### ***1. Maori and Pacific populations***

New Zealand research indicates that Maori and Pacific children have higher frequencies of five or more servings per week of sugar-sweetened beverages (Utter, Scragg, Schaaf, & Fitzgerald, 2006).

The single study identified in this review also suggested that a culturally-tailored social marketing intervention in a Latino population was effective in modifying intake of sugar-sweetened beverages. This is consistent with a New Zealand report that highlighted community participation and leadership as crucial factors in social marketing with Maori and Pacific populations (Sheehan, 2005).

### ***2. Children***

This review has highlighted evidence for the influence of advertising on children, and for the existence of heavy marketing of sugar-sweetened beverages in New Zealand. Food promotion is now known to affect children’s food preferences and purchasing behaviour (Hastings, Stead, & McDermott, 2004). TV advertising, in particular, is a key influencer with regard to children’s eating patterns and offers a potential avenue for change using social marketing.

### ***3. Specific settings***

The only setting identified in this review as a potential site for an effective social marketing intervention for sugar-sweetened beverages was a health and welfare service setting, which then provided materials and support to other community activity and service centres.

## **Information gaps where further research may be required to support a social marketing programme in the short and medium term**

Behaviour information is available on a population basis for sugar-sweetened beverages. However, there is no information on knowledge or attitudes, which would be particularly useful to inform a social marketing campaign. There is very little research evidence on the reasons why people choose to consume sugar-sweetened beverages. The marketers of sugar-sweetened beverages are able to draw on commercially sensitive social and cognitive information for encouraging purchases, yet that same information is not publicly available for social marketing purposes.

## **Conclusion**

High intakes of sugar-sweetened beverages increase the risk of obesity. However, there is only weak evidence from a single study that promotion of drinking water over sweetened drinks has the potential to be an effective social marketing approach in ethnically diverse 2-4-year-old children. No evidence of effectiveness for Maori or Pacific people was identified.

Maori and Pacific children, and children in deprived households, are more likely to consume sugar-sweetened beverages than New Zealand European and other children, and would therefore be an obvious target group. However, no research about attitudes and knowledge surrounding the consumption of sugar-sweetened beverages in New Zealand was identified for this review. Limited amounts of information are available that indicate some protective and risk factors for sugar-sweetened beverages in the New Zealand environment.

## **Strength of evidence in this area**

Appendix 3 provides more details on the quality of studies. The evidence regarding the effectiveness of social marketing in this area is weak, as it is based on a single RCT. The study consisted of multiple educational messages, one of which promoted the drinking of water over sweetened drinks. The data collection was reliant on parental self-report (which was appropriate for the age group of 2-4-year-olds) and used non-validated measures.

On the following page, Table 4 provides a summary for this section.

**Table 4: Summary table for sugar-sweetened beverages**

|  | <b>Sugar-sweetened beverages</b>   |
|--|--|
| <b>Contributes to obesity</b>  | Probable   |
| <b>Evidence that social marketing works</b>                                    | Weak   |
| <b>Evidence that social marketing works in low SES, Maori or Pacific</b>       | Weak in low SES, Latino population   |
| <b>Behaviours in potential target group are of concern</b>                     | Higher intakes in low SES, Maori and Pacific children  |
| <b>Environmental risk and protective factors known for New Zealand</b>         | Limited information  |
| <b>Knowledge and attitudes for target groups is known</b>                      | No information identified  |
| <b>Scientific message available on which to base social marketing campaign</b> | ANA recommendations; <i>SNAPA</i> beverage guidelines (based on ANA); Waitemata DHB beverage guidelines for schools. |

## Topic 3: Television viewing

### Introduction

This section presents the review's findings on the effectiveness of social marketing interventions in relation to television viewing, and suggests some critical features for successful social marketing in this area.

For the purpose of this review, 'television viewing' includes DVD and video viewing as well as viewing usual TV programming. At present, the causal relationship of other types of screen viewing such as computer games is less understood, as there are only a small number of studies investigating this link. Also, as non-TV screen viewing is a small component of total screen time activity, any population effect is likely to be far smaller than that for television viewing. Consequently, non-TV screen viewing has not been included in the definition.

### Summary of evidence for the effectiveness of social marketing on reducing television viewing

One social marketing intervention that targeted television viewing was identified from the 44 abstracts initially identified and 18 papers retrieved for consideration (**Robinson et al., 2003**).

The intervention was a pilot study consisting of a twelve-week, two-arm RCT carried out in low-income neighbourhoods in California. The participants were sixty-two 8-10-year-old African-American girls and their parents. The intervention tested the benefits of a programme that targeted two main behaviours to prevent weight gain – reducing television viewing, and increasing activity through organised dance classes (**Robinson et al., 2003**).

The intervention was grounded in Bandura's social cognitive model, which considers the interplay of personal, behavioural and environmental factors. The television intervention was delivered in the home in five lessons over a 12-week period. An African-American intervention specialist scheduled lesson times with each family, and focussed on non-selective reductions in total hours and/or access to television; selective reductions by day/ time/ context or content; and replacing viewing time with other activities. African and African-American history and cultural themes were integrated into the lessons. The cultural themes included culturally-matched staff, models, language, values and social and historical influences. The specialist used behavioural goals such as self-monitoring; a two-week TV-turnoff; budgeting viewing hours, and 'intelligent viewing'. Electronic, TV-time managers were also provided to each family to help with budgeting TV time. Five newsletters were mailed to parents/guardians to reinforce the lessons (**Robinson et al., 2003**).

Media use behaviour was collected with previously validated instruments. Television viewing time was self-reported by the girls, and parents self-reported overall household television viewing. Qualitative feedback on the process of the interventions showed that the television intervention was well received by both parents and children, and that the process needed little change.

As it was a pilot, the trial was not designed to have sufficient statistical power to detect changes in BMI and other outcomes. Nonetheless, this information was analysed, and the intervention was statistically successful at reducing media use by 23%, reducing total household television viewing, and reducing dinners eaten with the television turned on, in the intervention group relative to the control group.

## **Key findings on critical features for effectiveness**

### ***Community involvement in design***

The authors described that 'integrating the project into the community and designing assessment and intervention methods to meet the needs of participants led to highly successful recruitment and retention of a sample of low-income, high-risk girls and their families'. This is likely to be due to the trial being informed by extensive formative research and pilot testing in the study communities, using focus groups and feasibility trials.

### ***Value of the intervention to parents and community leaders***

The after-school period of 2.5 hours in which the dance intervention occurred also included a homework session. The authors believe that the combination of the homework session with the reduction in television viewing hours, and the use of college-student role models who delivered the interventions were critical for producing a statistically significant improvement in recent school grades. Parents valued this very highly and any health intervention that can also improve learning outcomes would receive additional parental and community support. Similarly, this intervention strongly supported African-American culture, another outcome valued by parents and community leaders above weight loss outcomes.

## **Attitudes, behaviours and barriers related to television viewing**

The amount of television viewed by children in New Zealand is, on average, greater than two hours every day (Hancox, Milne, & Poulton, 2004; New Zealand TV Broadcasters' Council, 2005). Few children watch less than one hour per day (5.7% of boys and 7.9% of girls), and there are considerable increases in viewing hours as both boys and girls grow older (Hancox, Milne, & Poulton, 2004). TV watching is highest at the weekend – 40% watch more than four hours per weekend and 7% watch eight hours or more (Ministry of Health, 2003). Nearly half of Year 5-10 students said they had their own TV (University of Auckland, 2005).

The table on the next page shows that a higher proportion of Maori and Pacific children watched television or videos during weekdays for more than 2 hours than New Zealand European and children of "other" ethnicity. Significant gradients exist across New Zealand Deprivation Index quintiles, with the proportion of male children who watched television or videos for more than eight hours per weekend being higher in the most deprived quintile (10.9%) versus the least deprived quintile (2.8 %) (Ministry of Health, 2003).

**Table 5: Total of all age groups, percent watching television or videos**

|   | <b>NZEO males</b> | <b>Pacific males</b> | <b>Maori males</b> | <b>NZEO females</b> | <b>Pacific females</b> | <b>Maori females</b> |
|---|-------------------|----------------------|--------------------|---------------------|------------------------|----------------------|
| <b>Watched TV or videos &gt; 4 hours per weekend</b>  | 40                | 42.9                 | 46                 | 36.8                | 38.2                   | 43.2                 |
| <b>Watched TV or videos &gt; 10 hours during week</b> | 22.8              | 33.9                 | 35.4               | 23.9                | 27.2                   | 37.5                 |

For the total population (children and adults), average viewing time is 2 hours 40 minutes per weekday, and 3 hours and 8 minutes per weekend day (New Zealand TV Broadcasters' Council, 2005).

International qualitative research that has investigated parents' perceptions and insights of preschoolers' screen-viewing behaviours has shown that many parents were not concerned with the amount of screen viewing their children engaged in, although the content of what was on the screen was of particular interest to them. Very few parents seemed aware of the links between preschoolers' screen-viewing habits, food purchase attempts, food choices or their potential risk for obesity (He, Irwin, Sangster Bouck, Tucker, & Pollett, 2005; Hindin, Contento, & Gussow, 2004). Parents are most likely to co-view television with children only when the child is watching adult programming, and even then, little discussion about advertisements occurs (Lull, 1982).

ANA has developed a set of recommendations for children about the appropriate amount of television viewing, and strategies to reduce TV viewing, as part of a review regarding obesity and television viewing (Agencies for Nutrition Action, 2006). Although these recommendations and strategies have not yet been tested with parents, children or industry, there are few other sources of guidance currently available in New Zealand. International recommendations also exist, as set out by the American Academy of Paediatrics (American Academy of Pediatrics, 2003).

## **Risk and protective factors for high level of television viewing**

### ***Risk factors***

#### **1. Child having their own television in their bedroom**

Children with TVs in their bedroom watch significantly more TV overall than children who do not have a TV in their bedroom (Anastassea-Vlachou, Fryssira-Kanioura, & Papathanasiou-Klontza, 1996; Dennison, Erb, & Jenkins, 2002; Saelens et al., 2002). Based on the reported research, children with a TV in their bedroom watch up to 40 additional minutes of TV per day, compared with those without a TV in their bedroom (Dennison, Erb, & Jenkins, 2002).

## **2. Social status**

A number of factors influence how much TV is watched. US-based research shows that social status is a key factor. Less educated parents tend to watch more TV themselves, and the more TV a parent watches, the more TV their children will watch (Kennedy, 2000). TV watching levels are higher in children from one-parent families than among children from two-parent families, and/or where the mother is unemployed (Kennedy, 2000). In the US, pre-school children from households where the mother was either obese or had depressive symptoms watched significantly more TV than children from other households (Burdette, Whitaker, & Kahn, 2003). In New Zealand, increased child and adolescent TV viewing (age 5–15 years) is associated with lower childhood socio-economic status, smoking by parents and higher parental body mass (Hancox, Milne, & Poulton, 2004).

## **3. Ethnic groups**

There are also known associations with ethnicity. In New Zealand, Maori watch more television than Pacific children, and Pacific children watch more television than New Zealand European and children of "other" ethnicities (Ministry of Health, 2003). Similarly, in US studies, TV watching is highest among African-Americans, the next highest among Hispanics and lowest among White people (Andersen, Crespo, & Bartlett, 1998).

## **4. Advertising**

The content of the advertisements broadcast during children's programming hours in New Zealand shows that the proportion of food advertisements was 42%. In 2005; a high proportion of food advertisements were counter to improved nutrition. A theoretical diet based on food advertising would be too high in fat, saturated fat, protein, free sugars and sodium (70.4% in 2005) (Wilson, Signal, Nicholls, & Thomson, 2006) and would contain sub-optimal intakes of fibre and numerous micro-nutrients (Wilson, Quigley, & Mansoor, 1999).

A recent study of ten countries found evidence of a significant association between the extent of obesogenic food advertising on children's TV and the proportion of overweight children (Lobstein & Dobb, 2005).<sup>6</sup> In particular, there were strong associations for advertising that encouraged consumption of energy-dense foods. Consistent with the review cited above, the authors observed that very few advertisements for healthy foods were shown (e.g., the highest percentage was in Finland, at 6% of all advertisements).

There is now a strong evidence base for the effects of marketing on food preferences and behaviour. In 2004 a systematic review of all published research into the effects of food advertising on children concluded that food promotion influences children's food preferences and purchasing behaviour (Hastings, Stead, & McDermott, 2004).<sup>6</sup> Similar results have been described for adults and TV advertising.

## **5. Dietary intake and sedentary lifestyle**

Dietary intake and sedentary lifestyle are known risk factors for obesity in children, and multiple studies have shown associations between television viewing and these factors. The general research conclusion is that dietary intake and sedentary lifestyle are affected by TV watching, as demonstrated by longitudinal studies.

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<sup>6</sup> This study is also discussed in the section on energy-dense, micronutrient-poor foods.

## ***Protective factors***

### **1. Co-viewing, parental knowledge and family comment**

Several studies have shown that children can benefit from the comments of family members or significant others while they watch television commercials, such as making positive comments while co-viewing the commercial. This was most effective at reducing high-sugar snacks, compared with negative comments and no-comment conditions.

As parents discuss, interpret and evaluate television commercials with their children, their children also learn how to view television critically. Understanding media techniques, reading food labels, being able to evaluate media claims, and talking to children about commercials were all features of effective nutrition education interventions (Hindin, Contento, & Gussow, 2004).

### **2. Stimulating environments**

A protective factor in terms of reducing television viewing may be a stimulating environment for children, which counteracts boredom and loneliness. This is because television was the preferred solitary activity only when social activities, friends or play were not readily at hand. Children were most likely to watch television when there was a lack of supervision and they had 'time to kill' (Kline & Botterill, 2001).

### **3. Supportive environments**

Given that TV viewing is often a family matter (where the TV is not in a child's bedroom at least), family patterns and home environments also need to be supportive of controlled viewing (Kline, 2005).

## **Possible market segments, groups, and 'influencers' likely to benefit most from social marketing**

### ***1. Maori and Pacific populations***

New Zealand research indicates that Maori and Pacific children watch more television and videos than New Zealand European and other children (Ministry of Health, 2003).

### ***2. Children***

Kline, in his media intervention, chose to target children aged 6-10 years because "they are still forming their sedentary lifestyle practices and because parental concern and involvement in media use or its alternatives is at its highest" (Kline, 2005).

## **Information gaps where further research may be required to support a social marketing programme in the short and medium term**

Behaviour information is easily accessible on a population basis for television viewing, particularly for New Zealand children, but far less so for New Zealand adults. However, there is no New Zealand information on knowledge or attitudes, which would be useful information for social marketing campaigns. There is little research understanding of



why people choose to watch television except for a small amount of Canadian research.

## Conclusion

Excessive watching of television increases the risk of obesity. However, there is weak evidence from a single pilot study for the use of social marketing to reduce television viewing. No studies showing evidence of effectiveness for Maori or Pacific people have been identified.

Maori and Pacific children, and children in deprived households, are more likely to watch television more than two hours a day than New Zealand European and children of "other" ethnicity, and so would be an obvious target group. No research into attitudes and knowledge surrounding television viewing in New Zealand has been identified. A reasonable amount of information is known about environmental risk factors in New Zealand, but little is known on environmental protective factors.

A basis for a potential message exists through the ANA review of television viewing, which provides strategies and recommendations. A single message/guideline has also been produced by the Academy of Pediatrics.

## Strength of evidence in this area

Appendix 4 provides details on the quality of the study in this section. The evidence regarding the effectiveness of social marketing in this area is weak, as it is based on a single pilot study.

**Table 6: Summary table for television viewing**

|  | <b>Television viewing</b>   |
|--|---|
| <b>Contributes to obesity</b>  | Probable  |
| <b>Evidence that social marketing works</b>                                    | Weak evidence   |
| <b>Evidence that social marketing works in low SES, Maori or Pacific</b>       | No studies identified   |
| <b>Behaviours in potential target group are of concern</b>                     | Higher viewing in low SES, Maori and Pacific children                       |
| <b>Knowledge and attitudes for target groups is known</b>                      | No information identified   |
| <b>Environmental risk and protective factors known for New Zealand</b>         | Moderate information on risk factors, little known about protective factors |
| <b>Scientific message available on which to base social marketing campaign</b> | ANA recommendations; Academy of Pediatrics guideline.                       |

## **Topic 4: Home environments that support healthy food choices for children**

### **Introduction**

This section presents the review's findings on the effectiveness of social marketing interventions in relation to home environments that support healthy food choices for children.

The WHO notes that, despite the obvious importance, there is very little hard evidence available to support the view that parents and home environments play an important role in children's eating and physical activity behaviours. What is known is that exposure and access to a range of fruit and vegetables is important in developing preferences for these foods. As well, parental knowledge, attitudes and behaviours in relation to healthy diet and physical activity are important in role modelling (World Health Organization, 2003).

The Institute of Medicine notes that children and adolescents' eating behaviours are strongly influenced by the home and family environment. Household socio-economic status, food availability, family meals, parental intakes and child feeding practices all have an influence on children's home food choices (Institute of Medicine, 2006).

For the purposes of this review, home environment has been taken to mean the physical environment (e.g., provision of healthy food including fruit and vegetables) and parental/main carer influences (parental knowledge, habits and behaviours relating to food in the home).

Obesity tends to be a family issue, and family-based interventions are typically used as ways in which family members can work toward improving nutrition and exercise behaviours. Parents and caregivers are highly influential on their children's eating patterns (Berry et al., 2004).

General strategies in the home environment for obesity prevention in infants and young children include instructing parents or caregivers to accept their child's ability to regulate energy intake rather than feeding until the plate is empty<sup>7</sup>. Parents need to understand the costs of coercive feeding practices such as rewarding children for eating 'healthy foods' with treat foods, leading to increased preference for those foods. Also, coercing and pressuring children to eat particular foods promotes dislike of those foods. Parents need to be given alternatives to restricting food and pressuring children to eat (Birch & Davison, 2001). For children and adolescents, obesity prevention strategies in the home include promoting the intake of fruit and vegetables (World Health Organization, 2003).

Studies of social marketing which aim to impact on adult/parental knowledge and behaviour (without specifically relating to shopping and home environment implications for children) have not been included. These could impact on modelling and habits in the home, but have not been included due to the potentially large number of such studies. Outcomes from social marketing campaigns addressing adult/parental knowledge and behaviour could influence the home environment, which in turn could support healthy food choices for children.

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<sup>7</sup> There was no age range specified in this review for 'infants and young children'.

The primary focus of these interventions would not have been behaviour change leading to improving outcomes for children, so these types of studies have not been researched at this stage. Given the impact of parental behaviour and habits in the home on children's food choices, this larger area of research may warrant further investigation. A number of papers excluded on the basis of the criteria of this review could offer valuable information on which to build a social marketing approach to improve home environments to facilitate healthy food choices for children and young people. This additional review would need to be carefully planned given the potential for a very wide scope.

For this section, nine social marketing interventions aimed at home environments supporting healthy food choices for children were identified from the 72 abstracts initially identified and the 24 papers retrieved for consideration.

## **Summary of evidence for effectiveness of social marketing on healthy home environments**

### ***Low-income women with children***

In the US, the federally funded Special Supplemental Nutrition Program for Women, Infants and Children (WIC) programme involves approximately 7.1 million low-income participants and operates in all 50 states. Low-income women represent a group of people likely to consume fewer fruit and vegetables than the general population. Women are likely to carry the primary responsibility for food purchase and preparation, and therefore influence food choices for adults and children in their household (**Birmingham, Shultz, & Edlefsen, 2004**). There have been a small number of studies looking at the effectiveness of various aspects of the programme and some of these are nutrition-related social marketing studies.

The *5 A Day for Better Health* programme, a national nutrition education programme aimed at reducing risk of cancer and other chronic diseases through increased fruit and vegetable consumption, was launched in the US in 1991. National baseline data showed that only 23% of Americans had five-plus servings of fruit and vegetables a day, and the mean consumption was 3.4 servings a day (Subar et al 1995, cited in **Birmingham, Shultz, & Edlefsen, 2004**). Due to the increased risk of the WIC population and the convenient sampling frame provided in a WIC clinic, this was an appropriate venue for *Five A Day* nutrition education. The following WIC studies were all part of this programme.

In Washington State, an evaluation of the WIC *Market Basket Booklet* (MBB) Project was undertaken. Three sites tested the booklet (based on preliminary focus group data) with participants including 225 at pretest and 167 at post-test. The aims of the study were to identify WIC mothers' perceived barriers and behaviours related to fruit and vegetables, and to estimate the impact of the MBB on those perceived barriers and behaviours. WIC personnel were trained in the intervention protocol used with the booklet. The MBB had information on produce selection, storage and preparation; Kid's Corner recipes; seasonal availability of fruit and vegetables. Information was verbally personalised by the WIC personnel to participants and household members' food preferences.

Overall, the use of the MBB enhanced mothers' confidence in handling fresh produce and led to them serving fruit and vegetables more frequently. It did not reduce overall barriers or increase consumption among mothers. The authors note that the impact of the MBB could be successfully coupled with the Farmers' Market Nutrition Programme (including vouchers to use at the market) to enhance consumption of fruit and vegetables among young children and mothers. They also noted improvements in the programme such as Kid's Corner recipes being highlighted as snacks, and family meals for parents as well as children. Also, canned or frozen versions of produce could be used if fresh vegetables or fruit are unavailable or unfamiliar to families. Portion sizes could be highlighted (adult compared with child) to assist in making recipes more economical (**Birmingham, Shultz, & Edlefsen, 2004**).

A randomised crossover design trial of the Maryland 5 A Day (WIC) programme, a social marketing programme for low-income women, found a positive effect on fruit and vegetable consumption overall (**Havas et al., 1998**). This multi-site, two-year study included 1443 intervention participants and 1679 controls, all of whom were low-income women enrolled in the programme or women who had children enrolled. The intervention hoped to increase participants' fruit and vegetable consumption.

Following formative research on the target audiences' knowledge, attitudes and practices, a pilot test was undertaken to refine the intervention. These included (1) nutrition intervention sessions conducted by peer educators, (2) printed materials (cue cards for education sessions, recipe book, children's activity book, video of children singing about fruit and vegetables, a refrigerator magnet, calendar reminder sheets and visual reminders), (3) direct mail (letters with tip sheet and cue card).

The authors noted that, despite the presence of a national programme promoting increased consumption of fruit and vegetables, the results demonstrated greater increases in the study's intervention participants, compared with control participants. Outcomes of the trial were statistically significant changes in fruit and vegetable intake and knowledge which persisted one year beyond the end of the trial. This was up by 0.27 daily servings for both groups from 0.11 servings for intervention participants and 0.7 servings for control participants at two months post-intervention. This was directly related to the peer-led education sessions along with the other aspects of the intervention such as the number of nutrition sessions attended. Furthermore, a positive effect on participants' 'stage of change' was significant only for White and high-school educated participants, despite the peer educators being predominantly black.

At ten Maryland WIC sites the *Food for Life* programme study was conducted with diverse populations of low-income women with children. Participants in the intervention group numbered 1055, and 1011 women acted as controls (**Havas et al., 2003**). The programme of six-month interventions included monthly educational sessions, direct mail and telephone calls by trained peer educators.

The study found a positive effect on all objectives – to reduce fat intake, increase fruit and vegetable intake, and fibre consumption. Outcomes for fruit and vegetable consumption were a 0.4 net serving increase, suggesting that a community-based intervention can change dietary behaviours sufficiently to reduce future risk of developing cancer, among other diseases. The authors note that an estimated 0.5 serving size in fruit and vegetable consumption would equate to an eight percent lower incidence of cancer (World Cancer Research Fund 1997, cited in **Havas et al., 2003**).

Another study at a Michigan WIC programme, the Michigan Farmers' Market Nutrition Programme called *Project FRESH*, along with subjects from a Community Action Agency, undertook to evaluate the effectiveness of the programme on fruit and vegetable consumption (**Anderson et al., 2001**). The study of low-income women included 564 Project FRESH participants at the pre-test and 455 post-test. It examined the effectiveness of the intervention, which included fruit and vegetable coupons for the farmers' market and education. Four groups were compared: coupons and education, education only, coupons only, and no intervention.

The study found that the two groups that received education (about the use, storage and nutritional value of fruit and vegetables) were more likely to have heard the phrase '5 A Day for Better Health'. The two groups who received coupons (\$20 redeemable for fresh produce at the farmers' market) were more likely to report visiting the farmers' market. Coupons had a direct effect on increasing fruit and vegetable consumption behaviour, but no effect on attitudes. Post intervention results showed that education had a significant positive effect on attitudes to fruit and vegetables and seemed to exert an effect on consumption behaviour through attitudes. Participants had reduced perceived barriers to change in attitudes and consumption behaviour for fruit and vegetables (cost, availability, personal and family preference and convenience). Although no impact was found for education or coupons alone on the measure of intake of specific types of fruit and vegetables, there was significant interaction between the components (**Anderson et al., 2001**).

### ***African-American girls***

The Girls' Health Enrichment Multi-site Study (*GEMS*) is an American obesity-prevention research programme targeting young African-American girls aged eight to ten years. It is a two-phase, seven-year programme that was initiated in 1999. Phase one (two to three years) was conducted collaboratively among four field centres, a co-ordinating centre and a project office. The studies all included formative assessment research and pilot tests over 12 week periods. Phase 2 (4-5 years) is currently underway and tests the interventions that appear most promising in preventing excessive weight gain in young African-American girls (Obarzanek & Pratt, 2003; Rochon et al., 2003). Three of the studies looked particularly at altering the home environment as well as educating the girls involved.

The Baylor GEMS study (*The Fun, Food and Fitness Project*) used a day camp for eight year old African-American girls, followed up by an internet home-based programme which supported the behaviour change goals (increase in fruit and vegetable consumption, reduction in high fat foods, increase in water consumption and reduction in sweetened drinks, along with increased physical activity). It found that the day camp results after four weeks showed no significant differences in BMI between the treatment and control groups. At the end of the 12 weeks, there were substantial, although not significant, differences between the groups in the hypothesized directions: total lower calories and percent calories from fat, greater consumption of water and fruit, juices and vegetables, and less consumption of sweetened beverages. On average, less than half the treatment participants, and an even lower rate for control participants, logged on to the website, which limited the intervention dose. The authors noted that more research was needed to identify procedures that maximise log-on rates for the internet component of the intervention. They used a \$100 weekly lottery as an incentive for parents to log on and learn from their environment (**Baranowski, 2003**).

In the Memphis GEMS study (Child- and Parent-Targeted Interventions), the focus was on the feasibility, acceptability and outcomes of two versions of a culturally relevant, family-based intervention to prevent weight gain in African-American girls. The sample was 60 eight to ten-year-old girls and their parents or caregivers. The study was comprised of two family-based active interventions – girls only (*GEMS Jamboree*) and a family-targeted, child intervention with parents only (*Eating and Activity Skills for Youth – EASY* – based on a ‘train the trainer’ approach) both focusing on nutrition and physical activity. The comparison group focused on self-esteem and general health.

The intervention for the girls included education sessions, incentives, taste testing, and take-home recipes, and for the parents, education sessions and take-home materials to reinforce key points. Local community centre staff members were trained to assist with the education.

The results were positive, although not statistically significant for the BMI outcomes. Compared with the girls in the comparison group, the intervention girls demonstrated an 11.7% increase in minutes of physical activity, a 34.1% decrease in servings of sweet beverages and 1.5% increase in water servings. Outcomes of the study indicated that treatment of parents and children together is a preferred option for participants in this target group of African-American girls. Outcomes were better in the session with mother and child together, although the authors cite some research with White girls that had the opposite outcome (Brownell et al 1984 cited in **Beech 2003**). They recommended looking at the effectiveness of combining the two interventions with some allowance for separate sessions as a better approach than separate interventions (**Beech et al., 2003**).

The third relevant GEMS study (*After-School Obesity Prevention Programme*) looked at an after school community based programme – *Girlfriends for KEEPS*’ (*Keys to Eating, Exercising, Playing and Sharing*) involving 54 African-American girls aged eight to ten years and their parents / caregivers. Behaviour change goals were to increase physical activity, decrease consumption of high-fat foods, increase consumption of fruit and vegetables, decrease consumption of sweet beverages and adopt healthy eating practices. Family component goals were to help familiarise families with the intervention, and create an environment that reinforced and supported regular and enjoyable physical activity and healthy eating – increasing availability of healthy foods in the home and decreasing physical inactivity. Education sessions, family packets (healthy eating and physical activity suggestions, fridge magnets, tip sheets, and food ingredients for low fat snacks) were sent home to parents, and GEMS staff also organised neighbourhood walks.

There were no statistically significant differences in BMI between the groups, as was expected given the short time (12 weeks) of the study. For a majority of the variables, differences between the intervention and control groups were in the hypothesized directions. This included that the intervention group increased their physical activity level, improved their behavioural intentions for healthy eating, nutrition knowledge, and physical activity preferences. As well, parents of girls in the intervention group reported making positive changes in lower fat food practices and preparation, and reported consuming a lower percent of calories from fat. The outcomes suggested that a community after-school intervention programme targeted toward African-American girls at high risk for obesity was well received. The authors noted it offers a promising model for health behaviour interventions (**Story, Sherwood et al., 2003**).

## ***Parents of toddlers***

One study (**Coleman, Horodynski, Contreras, & Hoerr, 2005**) looked at the Nutrition Education Aimed at Toddlers (NEAT) curriculum, which aimed to help rural, low-income parents gain knowledge and skills to help their toddlers adopt healthy eating habits. The NEAT intervention was developed using audience research in the form of focus groups with low-income parents of toddlers between the ages of one and three years. The programme included education sessions, including toddlers being involved in the food preparation and tasting activity (four ninety-minute sessions), 18 reinforcing activities including tasting sessions, and giveaways such as a child development wheel or child-sized utensils. The intervention emphasised the parental role of what food is served and when it is served, and the children's role in deciding how much to eat or whether to eat. This ties in with the WHO obesity strategy for prevention in infants and young children which includes instructing mothers to accept their child's ability to regulate energy intake rather than feeding until the plate is empty (World Health Organization, 2003). Parents in the intervention group significantly increased their knowledge of the skills needed to help their toddlers gain healthy eating habits (offering new foods and encouraging tasting of them as well as role modelling). Parents also allowed their toddlers more independence when eating and had the television on less frequently (making mealtimes a social experience), compared with the control group (39% versus 48%).

## ***Low- income families, women and 'usual household shoppers'***

**Foley and Pollard (1998)** note in their paper that research indicates that nutritional status in low socio-economic groups is considered poorer than higher socio-economic groups in relation to intakes of fat, sugar and fibre. As well, they note that low-income earners are a 'hard to reach' group for health promotion. The *Food Cent\$* project in Western Australia was piloted to facilitate behaviour change and to create an infrastructure for project delivery.

The aim of the project included increasing consumption of fruit and vegetables, bread and cereals (and lowering consumption of high fat, sugar and salt), and changing amounts of money spent on different food groups in line with a healthy diet pyramid. The pilot recruited low-income family participants, including women and usual household shoppers, as families were the target audience for the intervention. Results indicated significant positive changes in fat and sugar consumption among budget session attendees, and positive trends in fruit and vegetables, bread and cereal consumption consistent with the objectives of the project.

The intervention components incorporated education sessions including budget and cooking sessions. A mix of publications (weekly family menus, recipes shopping lists and other project publications) was also used. Volunteer adviser training was incorporated based on the premise that a person can be both an agent of change and a respondent to change. A media campaign (television, radio and press ads, leaflets and posters) was used to raise awareness and recruit advisers. In total, 1992 people were involved in the overall activities of the project. 612 people attended Food Cent\$ sessions of which 150 were trained as advisers and 1310 people attended public relations activities including a launch, shopping centre promotions and public talks.

Following the pilot, the programme was extended out and a process evaluation (pre and post-test), impact evaluation (follow up diet check with advisers) and outcome evaluation with advisers (at four years follow up) were conducted. The authors note the Food Cent\$ advisers successfully delivered a health promotion program with a

nutrition outcome to community members. The use of advisers from the community, along with the promotional activities and media campaign, attracted mostly women, as well as low-income and "usual" shoppers. Advisers were encouraged to participate in community interventions which led to expanding social networks, which is particularly important in low socio-economic status areas.

The skills training element in the community education sessions was used to highlight the theory of empowerment. Trained advisers were able to encourage adults in healthy food selection and preparation, which led to behaviour change, and also made changes in their own eating habits. The *Food Cent\$* promotion project, which supports those on a limited income in a positive and empowering way to improve eating habits, has as its central concept the comparison of foods on a price per kilogram basis. The authors note that this concept could be incorporated into a point-of-sale display to assist people to compare prices between and across groups. They state that this would enable selection of foods that are 'value for money', and could be a simple and important public health initiative (Foley & Pollard, 1998).

Another study looked at the Victorian '*2 Fruit n 5 Veg Every Day*' campaign, which aimed to increase awareness of the need to eat more fruit and vegetables, and to increase consumption in the state of Victoria. The primary groups targeted across the four years of the campaign were consumers (women with children, men and young men), followed by health and education professionals, and then food retailers and service providers (Coleman et al., 2005).

The campaign used television advertising and other mass media promotion, point-of-sale materials, including a cookbook, and education of providers (health and education professionals). The television commercials used humorous situations where consumption of fruit and vegetables was equated with stamina, strength and coordination. They concluded with the slogan question 'Have you eaten your two fruit and five veg today?'

The evaluation sample size included a total of 2044 representing approximately 500 Victorians aged 20+ across four annual post-campaign telephone surveys. The results suggested that those with less education and low occupational status were more likely to be aware of almost all aspects of the campaign, and fruit and vegetable campaign advertisements may have reached those of lower occupational status more efficiently than healthy diet advertisements in general. Males and females were reached equally by the television commercials, but females may have been better reached by other community level activities such as point-of-sale promotions. Awareness of the '*2 n 5*' slogan was associated with reporting that more vegetables should be eaten and were consumed. This was slightly less for beliefs about fruit consumption. The overall level of public awareness, reported consumption and beliefs about appropriate levels of consumption paralleled the level of mass media investment.

The authors conclude that significant achievements could be made with relatively small budgets for mass media health promotion, as part of a more comprehensive programme. This may need to continue for several years if change is to be achieved (Coleman et al., 2005).



## **Key findings on critical features for effectiveness**

### ***Peer-led education sessions and interventions***

Peer-led nutrition education sessions, along with other aspects of the intervention in the Maryland WIC '5 A Day', were identified as being causally related to the increases in consumption of fruit and vegetables (**Havas et al., 1998**). This was supported by a similar finding in the *Food Cent\$* project, in which the authors note that those delivering projects need to be perceived as identifying with the issues and concerns of low income earners (Travers 1995, cited in **Foley & Pollard, 1998**).

The *Food Cent\$* report states that it has been noted that a person can be both an agent of change and a respondent to change, therefore enhanced outcomes can be gained through active participation of community members in delivering interventions within their own community (Hendrickson et al 1990, cited in **Foley & Pollard, 1998**).

### ***Contact already established with low-income parents***

Settings where there is frequent contact with low income populations may merit interventions such as the WIC social marketing intervention programme which included additional nutrition education and written supportive materials (**Havas et al., 2003**).

### ***Combination of approaches***

Maximum impact on the combined fruit and vegetable attitudinal and consumption behaviour outcomes can be achieved through the combined use of both education and coupons in sites where fresh fruit and vegetables are easily accessible, such as at a farmers' market (**Anderson et al., 2001**).

The use of an educative book with recipes, food handling information and seasonal availability information, coupled with a coupon to redeem for fresh fruit and vegetables, is an effective combination to enhance consumption of these foods (**Birmingham, Shultz, & Edlefsen, 2004**).

### ***Coupons***

Coupons which can be redeemed for fresh produce at a farmers' market can have a significant positive effect on the belief that vegetables are more costly than other foods. Coupons, combined with education, can have positive effects on perceived availability of fruit and vegetables and on self-reported consumption behaviour in low income women with children (**Anderson et al., 2001**).

## **Attitudes, behaviours and barriers related to home environments**

### ***Attitudes and behaviours***

Strategies to reduce perceived barriers (e.g., cost, availability, personal and family preference, and convenience) can help low-income women increase fruit and vegetable intake (Quan et al 2001; Cohen et al., 1998, cited in **Anderson et al., 2001**). As well, life experiences, including eating fresh fruit and vegetables, also increases the intake behaviour of low- to moderate-income people (Devine et al., 1999, cited in **Anderson et al., 2001**).

In the Michigan WIC *5 A Day* intervention, both farmers' market coupons and education about fruit and vegetable use were significantly related to change in attitudes about fruit and vegetables, and consumption behaviour related to these foods (**Anderson et al., 2001**).

Education can lead directly to attitude change, which can lead to change in consumption behaviour over time (**Anderson et al., 2001**). This is supported by a similar study by Dixon and others, which showed that people are unlikely to try to increase their consumption of vegetables if they do not believe that they should eat more (**Dixon, Borland, Segan, Stafford, & Sindall, 1998**).

### ***Barriers and facilitators***

Prior to the Washington State evaluation of the WIC '*Market Basket Booklet*' (MBB) project (described previously), 65% of participants reported that they did not avoid serving fresh fruit and vegetables because they take too long to prepare, but many (54%) stated that canned and frozen vegetables are faster to prepare for a meal than fresh.

Regarding cost, 65% of participants thought it cost more to buy fresh rather than canned or frozen fruit and vegetables, while 54% thought it was expensive to eat fruit and vegetables on a daily basis. Family preference, including both adult and child views, was not seen to be a barrier. While these barriers did not change significantly following the intervention, possibly stemming from the short exposure to the booklet, there was greater confidence in purchase and storage of quality produce as described in the booklet. The study did, however, increase mothers' servings of fruit and vegetables in the home after receiving the booklet (**Birmingham, Shultz, & Edlefsen, 2004**).

A systematic review on barriers to, and facilitators of, healthy eating in young people (aged eleven to sixteen years) found mixed effectiveness for the interventions evaluated. The key barriers to healthy eating included poor school meal provision and preference for fast food, which was supported by easy access and relative cheapness of these foods. These unhealthy foods were associated with life outside the home and with friendship, pleasure and relaxation (Shepherd et al., 2006).

The systematic review highlighted an intervention with students preparing healthy foods at home and school, and then sharing information with friends and families. This was identified as a facilitator of change. In another two interventions, parents were sent newsletters and brochures as well as recipes and coupons, and took part in food surveys and seminars to help with the home environment's reinforcement of school interventions (Shepherd et al., 2006).

One study found two main barriers to *fresh* fruit and vegetable consumption (**Birmingham, Shultz, & Edlefsen, 2004**). Barriers included the idea that canned and frozen vegetables were faster to prepare than fresh. Perceived cost was a barrier to buying fresh fruit and vegetables compared to canned or frozen, and eating fruit and vegetables on a daily basis was perceived to be expensive. In contrast to cost and convenience being barriers to fresh consumption, family preference to fresh fruit and vegetables was not identified as a barrier to consumption (**Birmingham, Shultz, & Edlefsen, 2004**).

## **Risk and protective factors for home environments that support healthy food choices for children**

### ***Risk factors***

#### **Parents' attitudes, behaviours and knowledge**

A review of family environmental factors that influence food intake in children found that relatively little research has assessed the extent to which parents (particularly those who are overweight) choose environments that promote overweight in their children. (Birch & Davison, 2001).

### ***Protective factors***

#### **Parents' attitudes, behaviours and knowledge**

In a review of the effectiveness of community interventions to increase fruit and vegetable consumption (not specifically looking at social marketing), some positive general observations were made which support some of the findings here. The authors noted that the use of peer educators and paraprofessionals with low-income mothers was effective. The most effective interventions gave clear messages about increasing fruit and vegetable consumption, incorporated multiple strategies that reinforced the messages, involved the family, were more intensive and provided over a long period of time rather than one or two contacts, and were based on a theoretical framework (Centre for Reviews and Dissemination, 2004).

In the systematic review of barriers and facilitators, young people associated the home environment with healthy food as well as with adulthood. They cited family members as a common source of information on nutrition. This support from family was the most helpful factor cited as promoting diet change in young people (Shepherd et al., 2006).

Family eating environments include parents' eating behaviours and child-feeding practices. The authors noted that a primary public health goal should be the development of family-based prevention programmes for childhood overweight. They suggested that these should focus on parents fostering patterns of preference and food selection by children and promote children's ability to self-regulate intake. Development of patterns of food intake should be a focus of information given to parents, as well as portion size and timing and frequency of meals and snacks (Birch & Davison, 2001).

## **Access to fruit and vegetables in the home**

The strongest correlates of fruit and vegetable intake among adolescents are taste preferences and home availability. When available, intake of fruit and vegetables has been shown to increase even when taste preferences are low (Neumark-Sztainer et al., 2003, cited in Institute of Medicine, 2006; Cullen et al., 2003, cited in Institute of Medicine, 2006).

If parents or caregivers provide access to fruit and vegetables in the home as a matter of course, these findings indicate that children and adolescents are more likely to make healthy food choices in relation to fruit and vegetables regardless of initial preference.

A key theme of the research on barriers and facilitators was the value that young people place on choice and autonomy in relation to food. Providing a range of healthy snacks and meals in schools and social spaces enables them to exercise their choice of healthier options. The same principles could be applied to the home environment (Shepherd et al., 2006).

Another literature review, on parent-modifiable influences on childhood weight gain, suggested specific ways in which parents can influence children's risk for overweight and obesity (Ritchie, Welk, Styne, Gerstein, & Crawford, 2005). The authors suggested seven guidelines for creating a less obesogenic family environment:

1. Provide children with ample access to nutrient-dense foods and beverages, and high-fibre foods, both at meals and snack time.
2. Reduce children's access to high-calorie, nutrient-poor beverages and foods, both at home and when eating away from home.
3. When nutrient-poor foods are available, avoid excessive restriction and use of food as a reward.
4. Encourage children to eat breakfast.
5. Work to find ways to increase fun and achievable physical activity in children.
6. Reduce children's television and video game time.
7. Model healthy eating and physical activity practices for children.

## **Possible market segments, groups, and 'influencers' likely to benefit most from social marketing**

Women (pregnant, lactating and caring for children) are those who are most likely to be able to influence the home environment in terms of food consumption and therefore create environments that support healthy food choices for children. The studies reviewed have shown that women respond well to support in helping create healthy environments for their families.

Usual household shoppers are those able to dictate what is provided in the home by their purchase of the families' food. They can also be influenced by programmes that enable them to purchase healthy options, such as fruit and vegetables, which they may not normally have considered due to cost, such as the farmers market coupons in Michigan study. This was found to be effective when combined with education (Anderson et al., 2001).

Low-income families are most likely to have lower nutritional status and are therefore most likely to benefit from social marketing. A range of approaches has been shown to be effective with low-income families in the studies reviewed.

## **Information gaps where further research may be required to support a social marketing programme in the short and medium term**

Social influences on food intake and the modelling of eating behaviours of peers, older youth, media or celebrity role models could be explored further. If these effects were positive, they would impact on the design of interventions, including those that are home based, to improve healthy food choice behaviour in children and adolescents (Institute of Medicine, 2006).

## **Conclusion**

In this review, home environment has been defined as the physical environment (e.g., provision of healthy food including fruit and vegetables) and parental/main carer influences (e.g., parental knowledge, habits and behaviours relating to food in the home).

There is a correlation between parental knowledge, attitudes and behaviours and the food environment in the home, but there is limited evidence at this stage to support this. The studies here mostly show that parents' behaviour can be influenced, and that this in turn changes the home environment in which children and adolescents are making healthy food choices.

The clear market segments, groups and 'influencers' likely to benefit most from social marketing were women who care for children and are likely to be the usual household shoppers. Low-income families, including women for the above reasons, also responded well to interventions.

A majority of the interventions had components of 'out of home' education of parents and/or children which impacted positively on the home environments and behaviour.

Active participation of people from communities to help to educate and inform peers was seen as important in several studies (**Havas et al., 1998**). This is an important point, as people can be both agents of change and respondents of change, and can thereby enhance outcomes.

Where there are existing settings that frequently engage low-income populations, these settings can be successfully used to present a social marketing intervention, rather than trying to encourage people to attend new venues (**Havas et al., 1998**).

A strong slogan '2 Fruit n 5 Veg Every Day' was successful in raising awareness and changing behaviour in the Victorian programme. As well, the overall level of public awareness, reported consumption and beliefs about appropriate levels of consumption paralleled the level of mass media investment. It seems that significant achievements could be made with relatively small budgets for mass media health promotion, as part of a more comprehensive programme (**Dixon, Borland, Segan, Stafford, & Sindall, 1998**).

Reducing perceived barriers such as cost, availability, personal and family preference, and convenience can help low-income women increase fruit and vegetable intake (**Anderson et al., 2001**). The *Food Cent\$* promotion project had as its central concept the comparison of foods on a price per kilogram basis. As the authors noted, point-of-sale displays to assist people to compare prices between and across groups, would enable selection of foods that are 'value for money', and could be a simple and important public health initiative (**Foley & Pollard, 1998**).

Mixed approaches using coupons for reduced-price fruit and vegetables, alongside educational components, seems to be effective in changing attitudes about fruit and vegetables and consumption behaviour related to these foods (**Anderson et al., 2001**).

### **Strength of evidence in this area**

Appendix 5 provides more details on the quality of studies. The amount of evidence of social marketing interventions aimed at healthy nutrition and at improving home environments to support healthy choices for children is fairly limited. The one systematic review looking at social marketing and nutrition found that five of the eight studies that primarily looked at fruit and vegetable consumption were effective overall. This included two high-quality studies. Five of the other six studies were also effective in terms of fruit and vegetable consumption (McDermott, Stead, Gordon, Angus, & Hastings, 2006). The studies here mostly suggest that parents' behaviour can be influenced to change, and that this in turn changes the home environment in which children and adolescents are making healthy food choices.

**Table 7: Summary table for home environments**

|  | <b>Home environments that support healthy food choices for children</b>  |
|--|--|
| <b>Contributes to obesity</b>  | Probable that unhealthy home environments contribute to obesity in children.   |
| <b>Evidence that social marketing works</b>                              | Limited evidence available.  |
| <b>Evidence that social marketing works in low SES, Maori or Pacific</b> | Mixed approaches including coupons (subsidised fruit and vegetables) and education worked in some settings with low SES.<br><br>Mass media campaigns work for low SES and low occupational status relative to campaign budget.<br><br>No research specific to Maori and Pacific was located. |
| <b>Behaviours in potential target group are of concern</b>               | Lower intakes of fresh fruit and vegetables in lower SES, as perceived to be more expensive than canned.   |

|  |  |
|--|--|
|  | <b>Home environments that support healthy food choices for children</b>  |
| <b>Knowledge and attitudes for target groups is known</b>                      | <p>Lower SES perceived fresh fruit and vegetables to be more expensive.</p> <p>Canned and frozen fruit and vegetables perceived as faster to prepare for a meal than fresh.</p> <p>Parents of toddlers in one study improved knowledge as a result of the intervention, e.g., recognising the need for toddlers to regulate their own energy intake.</p> <p>Women likely to be responsible for food purchase and preparation and therefore influence food choice in their household</p> <p>There is a correlation between parental knowledge, attitudes and behaviours and the food environment in the home, but there is little evidence at this stage to support this. The studies here mostly show that parents' behaviour can be influenced to change and that this in turn changes the home environment in which children and adolescents are making healthy food choices.</p>  |
| <b>Environmental risk and protective factors known for New Zealand</b>         | No specific evidence available.  |
| <b>Scientific message available on which to base social marketing campaign</b> | <p>No particular scientific message, but the evidence suggests that home environments that support healthy food choices are important.</p> <p>The parental role involves what food is served and when it is served, and the children's role is deciding how much to eat or whether to eat. The WHO obesity strategy for prevention in infants and young children includes instructing mothers to accept their child's ability to regulate energy intake rather than feeding until the plate is empty.</p> <p>Other key messages include:</p> <ul style="list-style-type: none"> <li>▪ Provide children with ample access to micronutrient-dense foods and beverages, and high-fibre foods, both at meals and snack time.</li> <li>▪ Reduce children's access to high-calorie, micronutrient-poor beverages and foods, both at home and when eating away from home.</li> <li>▪ When micronutrient-poor foods are available, avoid excessive restriction and use of food as a reward.</li> </ul> |

|  |   |
|--|---|
|  | <b>Home environments that support healthy food choices for children</b>   |
|  | <ul style="list-style-type: none"><li>▪ Encourage children to eat breakfast.</li><li>▪ Work to find ways to increase fun and achievable physical activity in children.</li><li>▪ Reduce children's television and video game time.</li><li>▪ Model healthy eating and physical activity practices for children.</li></ul> |



## **Topic 5: School environments that support healthy food choices for children**

### **Introduction**

School environments that promote healthy food choices for children have been identified by the WHO as protective against obesity in children (World Health Organization, 2003). This section examines the literature to identify interventions that have attempted to foster school environments that promote healthy food choices. Some have used methods to directly impact on the food available in schools, while others have used marketing techniques to promote healthier options in the school environment. There are also a number of studies that have included a curriculum component to promote healthy eating, both at school and in the daily lives of children. Another intervention component used in some studies is the engagement of parents in order to provide a supportive home environment. A small number of studies included a wider community component, often by using social marketing techniques in the wider community to support healthy food choices.

The majority of studies have used outcome measures that identify changes to dietary behaviour at school. A smaller number include measures of daily intake, and hence have potential to also influence dietary intake outside the school environment. Bell and Swinburn (2005) argue that while energy contribution from foods consumed at school is relatively small, the symbolism is significant. The types of foods and beverages that predominate school canteens not only undermine the health and nutrition curriculum, but also create the impression that foods and drinks high in fat, sugar and salt belong in the 'everyday foods' rather than 'occasional foods' category (Bell & Swinburn, 2005).

In a survey to measure the obesogenic elements of the school food environment, Carter and Swinburn found that the food environment was not conducive to healthy food choices for children, and that this was reflected in the high sales of relatively unhealthy foods for school food services (Carter & Swinburn, 2004).

This section identifies the various components of creating healthier school food environments through social marketing and examines their relative effectiveness.

### **Summary of evidence for the effectiveness of social marketing on healthy school environments**

#### ***Multiple food behaviours***

The *Pathways* Study was a school-based RCT for the prevention of obesity in American-Indian school children. The primary outcome of interest was percent body fat. Forty-one (41) schools took part in the RCT (21 intervention, 20 control) involving 1704 third to fifth grade American-Indian children (Caballero et al., 2003). The intervention included a classroom curriculum implemented in two 45-minute sessions per week over 12 weeks. The curriculum content was based on priority behaviours from formative research. There was also a foodservice component to create a supportive school food environment and a family component to support healthy eating at home (Davis et al., 2003).

No significant differences in anthropometric results, percent body fat or BMI between control and intervention were identified at the end of the trial. 24-hour recall data showed a significant decrease in total energy and percentage energy from fat. Menu analysis and lunch direct observation confirmed lower fat intake, but showed no difference in energy (**Caballero, Clay et al. 2003**). Knowledge was higher in intervention schools, self-efficacy to choose healthy foods was not changed but healthy food intentions improved in the intervention schools (**Stevens et al., 2003**).

The USDA<sup>8</sup> Team Nutrition pilot was established to investigate the feasibility of changing eating behaviours (reducing fat consumption, increasing fruit, vegetables and grains) through interactive classroom lessons reinforced by activities and messages in a variety of settings. Seven US school districts selected 19 elementary (kindergarten through to 4<sup>th</sup> grade) schools which were randomly assigned to intervention or control in matched pairs.

The two-component intervention was based on Social Learning Theory. It involved training and technical assistance for foodservice staff such as chef activities, and school-wide cafeteria events and nutrition education through modules that included food tasting and lunchroom activities. There was also wider community involvement through district-wide media and events (**Levine et al., 2002**). Small improvements were seen in intervention group knowledge, motivation to eat healthier foods and increased consumption of grains (**USDA, 1999**).

Two small pilot studies focusing on children from ethnic minorities, both based on Social Learning Theory using interventions in school classroom, school cafeteria and parental involvement, showed some positive changes in dietary behaviour post intervention, however anthropometric measurements did not improve significantly (Saksvig et al., 2005; Trevino et al., 1998). It is possible that the short intervention time (one year or less), coupled with the lack of control group, may have precluded positive results.

In a two-year study of Californian middle schools to evaluate the effects of environmental, policy and social marketing interventions on physical activity and fat intake, the authors found the intervention was not effective in lowering total fat or saturated fat intake. The intervention attempted to increase the availability and marketing of low fat foods at all school food sources, and also included changes in school food policy, parental education and school incentives. The authors noted several barriers to lowering the fat content of foods offered at school including financial imperatives for school food services and lack of control over food made off site (**Sallis, McKenzie, & Conway, 2003**).

In a RCT of 16 schools in Minneapolis, **Birnbaum, Lytle, Story, Perry, & Murray, (2002)** tested three interventions as part of the TEENS study. The three nutrition-based interventions consisted of:

1. environment only
2. environment + classroom education
3. environment + classroom education + peer leaders.

The only group that showed significant changes was the third group. In this group, fruit and vegetable consumption increased by half a serving, and there was also increased tendency to choose lower fat foods. The results of this study support the need to use multiple intervention strategies to achieve behaviour change (**Birnbaum, Lytle, Story, Perry, & Murray, 2002**).

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<sup>8</sup> United States Department of Agriculture

### ***Low-fat milk consumption***

Wechsler and others conducted a small RCT of 6 inner city elementary schools to examine the effects of a school-based intervention to promote consumption of low-fat milk at school lunchtimes. The authors had clear behaviour change goals – to increase the consumption of low-fat milk. ‘Lowfat Lucy’, a Disney-like cow, was the campaign mascot. The schools were predominantly Hispanic (70% or more of the student population), so all messages were delivered by Latino people. Intervention activities were not classroom based and included promotion with competitions, merchandise and flyers as well as placement of messages in cafeterias. Immediately after the intervention, the number of low-fat milk cartons doubled in the intervention schools (from 25% to 57%). The proportion remained the same in the control schools at 28%. The increase was higher among first and second grade students (27% to 69%) compared with third and fourth grade students (24% to 47%). This study highlights the need to target interventions to the age of the children. The intervention’s effects were sustained 3 to 4 months after the intervention (**Wechsler, Basch, Zybert, & Shea, 1998**).

### ***Fruit and vegetable consumption***

Two recent reviews (French, 2003; Perez-Rodrigo & Aranceta, 2001) suggest that the most successful schemes to increase fruit and vegetable intake in children have used multi-strategy approaches.

The results of several large multi-component school-based programs to increase fruit and vegetables have shown positive results (**Baranowski et al., 2000; O’Neil & Nicklas, 2002; Perry et al., 1998; Reynolds et al., 2000**). All four studies were RCTs with an intervention period of one to two years. All of the studies took place in the US, three in elementary (primary) schools and one in a high school. All four studies were based on sound theoretical models of behaviour change, with three using Social Cognitive Theory and the other using the ‘PRECEDE-PROCEED’ model.

In the elementary school *Gimme 5* trial, sixteen schools were randomly assigned to intervention or control. The intervention, based on Social Learning Theory, took place over three years and included curriculum (12 x 45 minute sessions per year) targeting behaviour change, take-home materials, video, point-of-purchase demonstrations in stores, and changing the school lunch menu. There was no difference in school lunch servings of fruit and vegetables offered between control and intervention groups. While there was no increase in fruit and vegetables for the intervention group, there was a decline in intake in the control group resulting in a significantly higher intake of 0.2 servings in the intervention group at the end of the study (**Baranowski et al., 2000**).

The high school *Gimme 5* trial used a similar RCT methodology to the elementary school *Gimme 5* trial. The high school intervention took place over four years using the PRECEDE model to focus on awareness development, skills training, reinforcement, application and maintenance of increasing fruit and vegetable consumption. The intervention included a school media-marketing campaign with monthly themes, cafeteria displays, giveaways of fruit or vegetables, point-of-service signs and posters, a curriculum component with five 55-minute workshops, changing the availability, variety and desirability of fruit and vegetables in the school food service and parental involvement to increase availability of fruit and vegetables at home (**Nicklas & O’Neil, 2000**).

There was a linear increase in consumption of fruit and vegetables over the first two years in the intervention group of 14%. At follow up, there was no difference between the intake of the control and intervention groups. Knowledge scores were significantly higher for intervention schools at follow up. Self-efficacy increased in both the control and intervention groups. There was an increase in awareness of the *Gimme 5* program in both the control and intervention groups, but it was significantly higher in the intervention group (O'Neil & Nicklas, 2002).

In the Alabama *High 5* project, 28 elementary schools were randomly assigned to intervention or control conditions. The two-year intervention, to ascertain whether the *High 5* project would result in higher intake of fruit and vegetables and lower percentage of calories from fat in the intervention children and parents, included 1698 families of fourth grade students. There were three components to the intervention:

- Classroom component included modelling, self-monitoring, problem solving, reinforcement, taste tests in a 14 lesson curriculum
- Parent component included completing homework activities with child
- Food service component included training on purchasing, preparing and promoting fruit and vegetables, judged by a star rating for cafeterias (Reynolds et al., 2000).

The intervention group had higher intakes of fruit and vegetables at one-year and two-year follow up (1.68 and 1.00 serving). Total calories consumed and percentage protein did not differ between the two conditions, but there was a decrease in percentage of calories from fat and an increase in percentage of calories from carbohydrate in the intervention group. Fruit and vegetable servings increased at one-year follow up for intervention parents, but was not significant after two years (Reynolds et al., 2000).

In the *5-a-day Minnesota Power Plus Program*, 20 elementary schools were randomly assigned to control or intervention groups. The intervention had four components; school curriculum (skill building, food preparation and tasting and problem solving), food service changes (encouraging fruit and vegetable consumption at point of purchase, increasing attractiveness and availability), parental involvement/education and industry involvement/support. The intervention increased lunchtime consumption of fruit and vegetables for both girls and boys. Daily fruit consumption increased in the intervention group, as did the proportion of total daily energy attributable to fruit and vegetables (Perry et al., 1998).

A small non-randomised study to examine the effects of a peer-modelling and rewards-based intervention showed substantial increases in consumption and liking for 16 different fruits and vegetables. The study of 402 British primary school children aged 4-11 years used six 6-minute peer modelling videos featuring the heroic 'Food Dudes' battle the evil 'Junk Punks' who plan to deprive the world of fruit and vegetables. Rewards of 'Food Dudes' merchandise (pens, pencils, stickers etc) were given for tightly specified changes in behaviour. Snack time consumption of fruit and vegetables increased significantly from 48% to 71% (mean percentage of serving offered) as did lunch time consumption (27% to 71%). Preferences for all of the 16 fruit and vegetables offered in the study increased significantly from baseline (Lowe, Horne, Tapper, Bowdery, & Egerton, 2004).

## **Key findings on critical features for effectiveness**

The *Pathways* Study process evaluation suggests that implementation of the intervention was high, and success was based on having culturally sensitive, grade-appropriate curricula taught by regular teachers, a multi-component food service intervention and a family component (**Steckler et al., 2003**). Other key aspects of success were developing and maintaining a long-term relationship with the American-Indian communities, planning for extended time for approval of study methods, materials by American-Indian communities, and use of formative research through participatory relationships (Gittelsohn et al., 2003).

### ***Culturally-centred***

*Pathways* curriculum content was culturally appropriate, based on tribal knowledge, maps of the *Pathways* Nations and traditional American-Indian stories promoting healthful eating. The focus of the lessons was not obesity prevention, but the importance of healthy lifestyles (**Davis et al., 2003**). In the third and fourth grades curricula, two American-Indian children began a journey accompanied by their grandparents who shared their experiences that reinforced cultural pride and healthy traditions. Other activities promoted skills, personal goal setting, hands-on activities in snack preparation, taste tests of new foods and making healthier choices. In the fifth grade, the stories featured young American-Indian runners from the Seven Nations carrying messages about healthy eating. Skills to develop healthy eating patterns, which differentiated 'everyday foods' from 'sometimes foods', were developed. Teaching others, being a role model, and developing self-discipline and motivation were emphasised (**Davis et al., 2003**).

### ***Informed by formative research***

In the *Pathways* study, curricula activities were based on formative research that produced a framework of social, cultural and environmental factors that influence learning and behaviour. The food service component was also based on risk factors for children eating high fat diets identified in the formative assessment. Food service interventions to address risk factors were developed by nutritionists and food service personnel. These included nutrient guidelines, behavioural guidelines, hands-on material and activities for food service personnel, training for food service personnel, and kitchen visits by nutritionists (**Snyder et al., 1999**).

### ***Theory-based***

Social Learning Theory was used to underpin the *Pathways* intervention. It had a focus on developing personal factors such as knowledge, values and sense of personal control, and changing behavioural factors by providing opportunities and experience in goal setting, as well as skills development in food selection and preparation, and self-monitoring. A supportive environment was created by changing the school food service, providing role models and encouraging families to choose and prepare healthier foods (**Davis et al., 2003**).

## ***Parental involvement***

In the Team Nutrition pilot study process evaluation, several factors were identified that related to the success of the intervention. While classroom lessons were generally incorporated well, the resources and school lunchroom activities were only used about two-thirds of the time. The classroom 'dose' was generally lower (14-16 hours per phase) than that estimated to change behaviour. The schools made efforts to include parents through school and community events, take-home materials and the media. In both phases, over 90% of fourth grade parents were aware of the Team Nutrition activities. Parents indicated that they found the take-home materials fun and interesting, with 77% in phase 1, and 83% in phase 2, using the materials. Getting parents to attend school and community events was less successful – 18-31% attended in phase 1 and 22-48% in phase 2 (Levine et al., 2002). Involving parents in school-based behaviour change interventions has a positive impact for younger children, but possibly makes no difference for older children (Contento, Manning, & McKinlay, 1992).

## ***Support for teachers and food service staff***

One of the key findings of the Team Nutrition study was the need to adequately coordinate efforts and provide assistance to teachers and foodservice staff. Teachers need training and resources to provide them with background information on nutrition, particularly if they have not taught nutrition before. Teachers indicated that this was a barrier to teaching nutrition. Coordinating supplies and resources for classroom and cafeteria activities is also critical (Levine et al., 2002). Allowing sufficient time for planning and implementation for incorporation of activities into the school environment is also essential. Support from nutrition policy and staff release time for training, both for teachers and food service staff, is critical to success (Levine et al., 2002).

The building of community relationships with chefs, local public health staff, food suppliers and NGOs was part of Team Nutrition, and added to the sustainability and community ownership of the intervention. Working with the local media, although new to most schools, was very successful. This was often facilitated by strong links with community partners.

Each of the pilot communities employed their own coordinators, and these people were central to all activities. With a greater number of components undertaken by coordinators, there was higher satisfaction from teachers and food service staff. Adequate resources and coordination, through a central management structure with regional coordinators to assist implementation, was noted as the most important learning from this intervention. In addition, it was important to allow team work to be fostered by reducing the burden on front line team members, such as teachers, foodservice managers and community partners (Levine et al., 2002).

## ***Focus on foods not nutrients***

In a study to encourage low-fat milk consumption in US elementary schools, the researchers found that social marketing techniques were successful at increasing consumption. The authors believe that a focus on foods rather than nutrients is critical for behaviour change interventions aimed at children.

The messages given were primarily positive, and the low-fat milk was positioned as tasting good and a 'cool' choice through activities in a fun light-hearted environment (Wechsler, Basch, Zybert, & Shea, 1998). A charismatic celebrity, 'Lowfat Lucy', was used for promotion and also made personal appearances in costume at the schools. Taste-testing of the low-fat milk was given during Lucy's visit. Elementary schools in the US are mandated by law to provide a choice of whole and low-fat milk, so this is a good example of the level of behaviour change that can be achieved through marketing. The authors commented that a limitation of the social marketing was not being able to alter the packaging of the milk. There was no curriculum component to this campaign (Wechsler, Basch, Zybert, & Shea, 1998).

### **Rewards**

In the *Food Dudes* intervention, peer-modelling and rewards led to a significant increase in both consumption and preferences for fruit and vegetables. The study intervention combination of peer modelling and rewards was identified as an important component of success. Other fruit and vegetable interventions (Baranowski et al., 2000; Perry et al., 1998) have used modelling and rewards, but the authors argue that it was not to maximum effect. In the *Gimme 5* intervention (Baranowski et al., 2000), parents were used as role models, however research shows that peers are more effective models for children than adults. Rewards in the *Gimme 5* intervention were based on completion of activities rather than actual behaviour change as in the *Food Dudes* intervention (Lowe, Horne, Tapper, Bowdery, & Egerton, 2004).

In the *5-a-Day Power Plus Program*, models were comic book characters, with rewards related to team rather than individual consumption (Perry et al., 1998). However, there was a long delay between the team event and the rewards, so children may not have directly associated the two (Lowe, Horne, Tapper, Bowdery, & Egerton, 2004).

In the *Food Dudes* intervention, the fruit and vegetables were offered several times so that children came to like their taste and find them rewarding in their own right. The authors suggest that this acquired taste may lead in time to these foods providing their own intrinsic rewards and replace the extrinsic intervention rewards. Some authors argue that rewards can have a negative influence, particularly if the context of obtaining them is coercive or negative. In this intervention, the reward was offered in a positive context and the modelling reinforced consumption as fun and intrinsically rewarding. Taste exposure is particularly important for increasing consumption of foods in children, and offering rewards increases the likelihood of repeated taste exposure.

### **Adequate 'dose' of implementation**

The *Gimme 5* elementary school trial achieved a small effect size (increase of 0.2 servings of fruit and vegetables), which was comparable to other trials (Baranowski et al., 2000). The Alabama *High 5* project was an exception, resulting in a reported increase of 1.68 servings, but there was no impact on observations at school lunch (Reynolds et al., 2000). Possible reasons for the success of the Alabama *High 5* project include the use of specially trained teachers hired to specifically deliver the *High 5* curriculum which improved the intervention dose, and a more effective theoretical framework that was better able to affect change in mediating variables of a dietary assessment error.

In *High 5* there was full or partial completion of 95% of the classroom activities, and newsletters and brochures were read by over 80% of parents. The *High 5* intervention was effective for both boys and girls, African-Americans and European Americans, low, middle and high-income families and for parents of low, medium and high educational attainment (Reynolds et al., 2000).

The *Gimme 5* intervention revealed a low level of curriculum implementation by classroom teachers. The teachers were not comfortable delivering the behaviour change oriented sessions. This discomfort, in conjunction with the modest levels of use of take home materials and in-store demonstrations, will also have contributed to the small effect size (**Baranowski et al., 2000**). These findings regarding intervention dose and teacher training are similar to those found in the Team Nutrition pilot (**Levine et al., 2002**).

In the high school *Gimme 5* trial, there was no difference in intake of fruit and vegetables at the end of the trial. There was a 14% increase observed after the first two years. The authors note that after the first two years the intervention was no longer fully implemented. There were also changes to the district-wide menus mandated by USDA in the final year of the trial (Nicklas, Johnson, Myers, Farris, & Cunningham, 1998; O'Neil & Nicklas, 2002). Both these factors will have impacted on the trial.

In the Minnesota *5 a Day Power Plus Program*, the increase in lunchtime fruit consumption (but not vegetable consumption) was potentially influenced by availability, ease, attractiveness and preference for the fruit. It is easier to provide fruit options at lunchtime, as they are easy and quick to eat, and children tend to prefer the flavours to those of vegetables. Even though the programme included a parental component with recipes, information and snack packs, it was not possible to have control over changes to the home environment (as it is with the school environment). This is one of the reasons the authors believe that the daily consumption of fruit and vegetables did not change, whereas the lunchtime consumption increased (Perry, Zauner, Oakes, Taylor, & Bishop, 2002).

The ability of schools to directly influence the availability of healthy foods and reduce competition from other products appears to have a strong impact on food eaten in school environments; however, this may not be translated into an increased daily consumption of healthy foods or a sustained change into the future.

Wells (2005) describes the results of the pilot National School Fruit Scheme (NSFS) in the UK. The NSFS has one primary component – the provision of fruit. While it is clearly effective in the short term at increasing fruit intake, it does not appear to have longer-term effects following intervention. The fruit intake of children receiving fruit (4-6 years) in infant school, and those that had received fruit (7-8 years) now in junior school was measured in grams from a validated Food Frequency Questionnaire and a tick list for fruit and vegetables. Median intake of fruit in intervention infant schools was significantly higher (117g vs. 67g); however, there was no difference in intake of fruit at junior school between those that had been part of the NSFS and those that had not. The authors conclude that it would be appropriate within the context of the NSFS to consider how other aspects of nutrition promotion and integration of nutrition into the primary school curriculum might need to be undertaken in a more systematic way to promote a more sustainable outcome (Wells & Nelson, 2004).



A 5 year randomised intervention (*Hip Hop to Health Jr*) in the Chicago area, among pre-school African-American and Latino children (3-5 years), is underway in order to ascertain whether an intensive intervention in preschool minority children and their parents can prevent childhood obesity. The focus is on reducing fat, increasing fibre and increasing fruit and vegetable intake. The intervention was based on extensive formative research and consists of a 45-minute class three times a week for 14 weeks, including 20-minute interactive hands-on activity and food pyramid food groups represented by puppets for the children.

The parental component includes homework using a newsletter following class themes with a reward for completion. In the pilot study to inform the development of the intervention, Fitzgibbon and others noted the following factors as necessary for the success of the intervention:

- Easy and safe access to the programme.
- Fostering identification between interventionists and participants.
- Addressing cognitive (knowledge and attitudes) and environmental (social support, cultural attitudes, unsafe neighbourhoods, conflicting responsibilities) barriers to the adoption of a low-fat, high-fibre diet that includes more fruit and vegetables.
- Emphasis on behavioural demonstrations to facilitate lifestyle changes.
- Consideration of all literacy levels.
- The inclusion of behaviour change interventions for both the children and the parents (**Fitzgibbon, Stolley, Dyer, VanHorn, & KauferChristoffel, 2002**).

### **Attitudes, behaviours and barriers related to the school environment**

Two of the main components to a healthy school food environment are the food available at the school and the school curriculum. In a survey to measure the obesogenic elements of the New Zealand school food environment, Carter and Swinburn found that the food environment was not conducive to healthy food choices for children and that this was reflected in the high sales of relatively unhealthy foods for the school food services (Carter & Swinburn, 2004).

Recently there has been considerable concern from teachers and nutritionists about the low priority placed on the food and nutrition curriculum in schools. Nutrition has been included in the Health and Physical Education curriculum and many teachers and nutritionists believe that it has become a low priority in schools. There is also a lack of teachers specifically trained in food and nutrition, therefore nutrition is often taught by technology or physical education teachers.

While we were unable to locate any New Zealand data specifically focused on the attitudes and behaviours that act as barriers to a healthy school environment, it is likely that many of the factors identified internationally will be relevant in New Zealand. These include lack of teacher training in nutrition, and lack of resources for teaching nutrition (**Levine et al., 2002**).

The majority of resources for nutrition in schools are sponsored by the food industry. In education, there is the paradoxical situation of the increasing presence of the food industry in schools amid increasing scrutiny and critique of marketing to children, and rising concerns about childhood obesity (Stuart, 2004). Many teachers accept and welcome food industry-sponsored educational material in schools, particularly those with a good curriculum fit. Stuart suggests that rather than banning sponsored educational material in the classroom, it could be used as the start point for a critical analysis of the corporation itself.

While the notion of school activism around corporate behaviours may seem a long way from day-to-day teaching, schools are publicly positioned in these debates. As more and more resources and programmes are offered to schools, they are implicated in a range of sometimes-global struggles for public consent. If schools collectively fail to grasp this, they are re-creating particular social realities and conditions for their children (Stuart, 2005).

In a New Zealand study, Richards and others found that the majority (83%) of schools participate in sponsorship, incentive and fundraising initiatives. Some partnerships delivered positive health messages to students, but others were linked with products or activities potentially deleterious to health (Richards, Darling, & Reeder, 2005).

## **Risk and protective factors for school environments that support healthy food choices for children**

There are a number of risk and protective factors identified in the literature for school environments that promote healthy eating.

### ***Risk factors***

#### **1. Food offered in the school environment**

The provision of energy-dense foods (including availability, promotion and accessibility) has a negative impact on what children eat at school and possibly also outside of school. In the *Pathways* Study, the following factors were identified as obesity risk factors through comprehensive formative research (in-depth interviews, focus groups and semi-structured interviews of teachers, food service staff and parents, and direct observation of food purchasing and consumption behaviour of children):

- Children eating many high-fat foods and fried foods at school.
- Children not eating enough fruit and vegetables at school.
- Children eating many high fat snacks and drinking many sugar drinks at school (**Gittelsohn et al., 1999**).

While it is not possible to control food brought from home, it would seem important that food offered by the school encourages healthier options, such as fruit and vegetables, and minimises less healthy options, such as sugary drinks, fried and high fat foods, and high fat snacks.

In the *Pathways* formative research, the authors noted that children drink much more whole milk at school and that the positioning of low-fat milk makes it less accessible (**Gittelsohn et al. 1999**). By promoting low-fat milk and repositioning it as a 'cool' option, one study achieved a doubling of consumption of low-fat milk in intervention schools (**Wechsler, Basch, Zybert, & Shea, 1998**). Gittelsohn and others also note that offering high-fat, high-sugar foods at special events is a risk factor for an unhealthy school food environment (**Gittelsohn et al., 1999**).

Interestingly, the *Pathways* Study formative research also identified food-service staff and teachers encouraging children to finish all their food, and food service staff not following recipes, as risk factors for an unhealthy school food environment (**Gittelsohn et al., 1999**). While this may not be directly transferable to New Zealand schools, it is probably important to note for food prepared and sold on site. It may also be relevant to the messages that teachers give in encouraging and role modelling food behaviours for young children.

## **2. Barriers to changing the school food environment**

A study aimed at lowering the amount of fat in foods served at school (Sallis, McKenzie, & Conway, 2003) found that the single largest policy barrier was the requirement of the school food service to be financially self-supporting. School policies often created financial incentives to serve products that students already preferred, particularly processed food marketed heavily in the mass media. This study also found that lack of control of preparation and ingredients in food made off site was a barrier to lowering the fat content of school food (Sallis, McKenzie, & Conway, 2003).

### ***Protective factors***

#### **1. Supportive environment**

There have been a number of recent studies looking at the effect of food availability on what children eat. The evidence is clear that the school environment has an impact on children's eating. For example, one cross-sectional study (Kubik, Lytle, & Hannan, 2003) found that 'a la carte' food availability (where each item is priced individually and students buy the items they choose, either in the school canteen or through a tuck-shop or vending machines) is associated with higher fat intake and lower intake of fruits and vegetables, compared to school lunch programmes where menus are set.

Another study (Cullen & Zakeri, 2004) looked at the changes in children's eating patterns when they moved from elementary school, where school lunch was served and there was no shop, to middle school with a 'snack bar' where children could purchase their choice of food. The study found that the children consumed fewer fruits and vegetables and less milk, and consumed more sweetened drinks and fries when they moved to a new school environment with access to a snack bar. A third study (Templeton, Marlette, & Panemangalore, 2005) found that when competitive food (CF) items, (salty and sweet snacks and non-carbonated drinks) were offered in addition to the school lunch, one third of students purchased CF items. Those purchasing CF had significantly higher energy (20% higher) and fat intakes, and lower protein, calcium and Vitamin A intakes.

Intervention studies have also shown that school policies and environments can affect what children eat. Increased availability and promotion (Carter & Swinburn, 1999; Dwyer, Cosentino, & Li, 2002; French, Story, & Fulkerson, 2004) and reduced prices (Hannan, French, & Story, 2002) of lower-fat foods in school canteens and vending machines, resulted in increased consumption of lower-fat foods. These empirical studies are supported by qualitative research (Bauer, 2004), in which students identified the quality of the food served in school lunches and the easy availability of non-nutritious snacks as key barriers to eating nutritious food at school.

Pricing reduction interventions demonstrate that lowering prices is a very effective method of promoting desired food choices. In a study by French (2001), the price reduction and promotion interventions had no significant effect on the profits in dollars (from the control) due to a significant increase in sales. Signage and placing low fat snacks in a designated low fat row improved sales marginally, but was not nearly as effective as price reduction.

## **2. Whole of school approach - curriculum must be supported by school environment**

In the *TEENS* study, the authors found that the only group that showed significant changes in dietary intake was the intervention group (included environment + classroom education + peer leaders). In this group, fruit and vegetable consumption increased by half a serving and there was also an increased tendency to choose lower fat foods. There was no change in the 'environment + classroom education' group, and interestingly, there was a decline in consumption of fruit and vegetables in the 'environment only' group (**Birnbaum, Lytle, Story, Perry, & Murray, 2002**). The results of this study support the need to use multiple intervention strategies to achieve behaviour change and the importance of peer modelling for adolescents.

## **3. Involvement of parents/supportive home environment**

In the Minnesota *5 a Day Power Plus Program*, a three-component intervention, including curriculum, food service changes and parental involvement/education, was used to change student behaviour in elementary schools. Changes were achieved for lunchtime fruit and vegetable consumption, but not for daily fruit and vegetable consumption. The findings underscore the difficulty in making changes in home environments and the importance of creating new and more effective strategies for parental involvement (**Perry et al., 1998**).

## **4. Modelling and rewards**

Peer modelling appears to be more persuasive than parental role modelling for changing eating behaviours of children (**Lowe, Horne, Tapper, Bowdery, & Egerton, 2004**). However, inadequate role modelling by school teachers was identified as an important risk factor for obesity in extensive formative research in the *Pathways* Study (**Gittelsohn et al., 1999**). In the *Food Dudes* intervention, the authors note that rewards related to actual changes in behaviour, and delivered immediately after the behaviour is performed, are more compelling than non-specific activity related rewards (**Lowe, Horne, Tapper, Bowdery, & Egerton, 2004**).

In the *Pathways* Study formative research, the authors found that foods high in fat and sugar were used as rewards at school and that this was a risk factor for obesity (**Gittelsohn et al. 1999**).

## **Possible market segments, groups, and 'influencers' likely to benefit most from social marketing**

School environments that promote healthy food choices for children are clearly essential for obesity prevention in children. As Bell and Swinburn argue, even though food consumed in the school environment does not represent the majority of daily food intake, it sets the norm (Bell & Swinburn, 2005). School environments that do not support healthy food choices also negate the messages in the school nutrition curriculum.

One of the key barriers to creating school environments that support healthy choices is competition from conflicting environments and messages. While it is clearly possible to change the immediate school environment, there has been far less research on the impact of the wider environment on the school environment.

## **Information gaps where further research may be required to support a social marketing programme in the short and medium term**

Baranowski and others (2000) suggest that in school-based interventions, more research is needed to:

- Understand why students eat the foods they do.
- More effectively impact the mediating variables and processes through the intervention activities.
- Explore other channels for helping students and their families make these important eating related changes.
- Develop methods of training that result in higher fidelity to the provided curriculum (**Baranowski et al., 2000**).

Future research on dietary interventions in children needs to report in more detail on the following:

- generalisability of the sample
- response and retention rates
- method of randomisation
- process measures describing the integrity or fidelity of programme delivery (including the number of participants actually receiving the intervention, and the 'dose' they receive)
- training provided to, and the role of, those delivering the intervention (eg, teacher, nutritionist, researcher)
- theoretical basis of, and its application through, the intervention
- improve tracking to ensure greater retention at follow-up
- control seasonality (in terms of availability and consumption of fruits and vegetables)
- increase sample sizes in multi-site studies
- perform sample size calculations to ensure that a study has sufficient power to detect between group differences
- use valid and reliable outcome measures
- ensure that the outcome assessor is blind to group allocation to intervention or control
- ensure that there is a more coordinated approach to conducting evaluations across sites
- ensure that analysis is at the same level as unit of allocation to intervention and control groups (eg, school, classroom, region)
- include cluster analysis and intention to treat analysis
- perform longer follow-up (beyond one year)
- evaluate the separate and relative impact of individual components within multi-component interventions
- seek consensus from experts about what constitutes clinically important differences in outcomes in terms of risk for chronic disease, morbidity and mortality
- replicate successful interventions (as determined by an RCT)
- have sufficient resources to evaluate community-based nutrition programmes
- investigate the cost-benefit of large-scale nutritional interventions (Broadstock, 2006).

## **Conclusion**

There is good evidence that it is possible to create school environments that support healthy eating within those environments, and to a lesser degree in the daily lives of

children. The majority of studies in this review achieved positive changes in diet using interventions that included curriculum and food service components (**Baranowski et al., 2000; Birnbaum, Lytle, Story, Perry, & Murray, 2002; Caballero et al., 2003; O'Neil & Nicklas, 2002; Perry et al., 1998; Reynolds et al., 2000; Saksvig et al., 2005; Trevino et al., 1998; USDA, 1999**).

Some of these interventions also included a home/parental component (**Baranowski et al., 2000; Caballero et al., 2003; O'Neil & Nicklas, 2002; Perry et al., 1998; Reynolds et al., 2000; Saksvig et al., 2005; Trevino et al., 1998**) and/or a community component (**USDA, 1999**). For younger children, increasing the availability and attractiveness of particular foods through promotion, rewards and placement as a single strategy can lead to substantial increases in consumption (**Lowe, Horne, Tapper, Bowdery, & Egerton, 2004; Wechsler, Basch, Zybert, & Shea, 1998**). The only intervention that did not achieve any positive changes in diet was a food service-only intervention that encountered several barriers to changing the school food service environment (**Sallis, McKenzie, & Conway, 2003**).

When combined in one intervention, positive changes to the whole school food environment (food for sale, food used in fundraising and events, modelling by teachers), emphasis on healthy eating in the curriculum and changes to the wider environment impacting on children's food choice, including home and community settings, have the greatest potential to influence children's dietary intake.

### **Strength of evidence in this area**

Appendix 6 provides more details of the quality of studies. Much of the evidence in this section is from high- or moderate-quality studies that used a randomised controlled design. In some studies it is difficult to ascertain the fidelity of the intervention implementation, which would impact on the outcome results.

Various dietary assessment methods are used, including food diaries, 24-hour recall, observation, food frequency questionnaires and plate waste. Some of the dietary assessment methods are stronger than others.

The length of the intervention and the length of the follow up period also vary considerably between studies. The studies that have longer intervention and follow-up periods are more likely to be representative of outcomes that are generalisable and relevant to 'real life'.

While there is a need for further research in this area, there is already a body of evidence of reasonable quality that could be used to design social marketing interventions for piloting and evaluation.

On the following page, Table 8 provides a summary for this section.

**Table 8: Summary table for impact of schools on healthy food choices of children**

|  | <b>Impact of schools on healthy food choices for children</b>   |
|--|---|
| <b>Contribution of school based healthy eating plans on obesity</b>      | Probable  |
| <b>Evidence that social marketing works</b>                              | Strong evidence that healthy school environments will support healthy eating in the school environment and (with less available evidence to date) in the daily lives of children  |
| <b>Evidence for critical success factors</b>                             | Strong international evidence of multi-component strategies having positive results (food service and curriculum, and either community or family components).<br>Peer modelling and rewards led to a significant increase in consumption of healthy food options.   |
| <b>Evidence that social marketing works in low SES, Maori or Pacific</b> | Evidence that school promotion of healthy food is successful in encouraging those in low SES to make healthy choices.<br><br>No specific evidence in relation to Maori or Pacific, but some studies have been successful with ethnic minorities.  |
| <b>Behaviours in potential target group are of concern</b>               | Children are influenced by their peers – effective international intervention programmes have focused on peer influence to encourage the promotion and selection of healthy food choices in a school environment.<br><br>Children also were found to require role models (excluding parents) and such role models could either be peers or even teachers. Knowledge of teachers with regards to healthy eating provided an important modelling component. |
| <b>Knowledge, attitudes and barriers for target groups is known</b>      | No specific information was found on knowledge and attitudes of Maori or Pacific people regarding promotion of healthy food in schools.<br>Barriers to the promotion of healthy food in schools include the lack of priority given to such healthy food promotion by the government. Other barriers include the financial self-sufficiency of school food service providers – a lack of control is experienced by the schools.                            |
| <b>Environmental risk and protective factors known for New Zealand</b>   | NZ research has shown that the school food environment is not conducive to healthy food choices for children. A large proportion of food offered for sale is relatively unhealthy and the majority of fundraising initiatives involve the sale of unhealthy food products.  |

|  |  |
|--|--|
|  | <b>Impact of schools on healthy food choices for children</b>  |
| <b>Scientific message available on which to base social marketing campaign</b> | <p>According to WHO, the promotion of healthy food in schools can have an impact on the selection of healthy food choices in the wider lives of children</p> <p>Schools that do not promote healthy food choices effectively negate the emphasis on nutrition in the curriculum</p> <p>Government policy to increase healthy food promotion in schools ('Mission On' package).</p> |



## Findings for specific groups

### Children and families

This review did not locate any New Zealand research on the effectiveness of social marketing interventions for children and families. However, much of the international evidence on social marketing is based on studies with children or young people. As most of the topics in this review had a specific focus on children, this section provides a brief summary only.

There is good evidence that it is possible to create school environments to support healthy eating at school, and to a lesser degree in the wider lives of children. The majority of studies in this review achieved positive changes in diet using interventions that included curriculum and food service components (**Baranowski et al., 2000; Birnbaum, Lytle, Story, Perry, & Murray, 2002; Caballero et al., 2003; O'Neil & Nicklas, 2002; Perry et al., 1998; Reynolds et al., 2000; Saksvig et al., 2005; Trevino et al., 1998; USDA, 1999**). The *Pathways* intervention in schools did not result in a reduction in percentage body fat, but it did contribute to a significant reduction in the percentage of energy derived from fat, and to changes in food-related knowledge and behaviours (**Caballero et al., 2003**).

Some of these interventions also included a home or parental component (**Baranowski et al., 2000; Caballero et al., 2003; O'Neil & Nicklas, 2002; Perry et al., 1998; Reynolds et al., 2000; Saksvig et al., 2005; Trevino et al., 1998**), and/or a community component (USDA, 1999). For younger children, increasing the availability and attractiveness of particular healthy foods through promotion, rewards and placement as a single strategy can lead to substantial increases in consumption (**Lowe, Horne, Tapper, Bowdery, & Egerton, 2004; Wechsler, Basch, Zybert, & Shea, 1998**). The only intervention that did not achieve any positive changes in diet was a food service-only intervention that encountered several barriers to changing the school food service environment (**Sallis, McKenzie, & Conway, 2003**).

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When combined in one intervention, positive changes to the whole school food environment (food for sale, food used in fundraising and events, modelling by teachers), emphasis on healthy eating in the curriculum and changes to the wider environment impacting on children's food choice, including home and community settings, have the greatest potential to influence children's dietary intake.

### Maori (and other indigenous peoples)

Although the review did not locate any specific social marketing research on Maori in relation to the five topics, a New Zealand social marketing report contains some

relevant findings specific to Maori (Sheehan, 2005). There are also lessons from research with other indigenous groups such as Australian Aboriginal and American-Indian populations.

A report on social marketing approaches in relation to Maori and Pacific communities in the Counties-Manukau region outlines a range of useful lessons (Sheehan, 2005). The following points indicate some of the key lessons regarding Maori groups from recent experiences of social marketing in New Zealand.

- Visible Maori clinical and community leadership in social marketing campaigns is important.
- Maori should be well integrated and actively engaged in all levels of the campaign.
- The importance of 'site-specific' opportunities to engage Maori communities (the more connected the site is to Maori communities, the more effective the engagement will be).
- Understanding of the historical and political realities of Maori as whanau, hapu and iwi should be gained before the campaign, in order to inform how Maori communities function (Sheehan, 2005).

An international review of behavioural interventions, and individual studies identified in this review, found that programmes designed to be culturally sensitive appear more likely to influence positive dietary change such as a reduction in fat intake, and several interventions were successful with ethnically diverse participants (Ammerman, Lindquist, Lohr, & Hersey, 2002; **McGarvey et al., 2004**).

An Australian study evaluated the long-term effectiveness of a community-based nutrition programme in a remote Aboriginal community (**Lee, Bonson, Yarmirr, O'Dea, & Mathews, 1995**). The programme promoted an increased intake of fruit, vegetables and wholegrain bread, and discouraged the eating of takeaway foods and sugar. The evaluation compared the nutritional outcomes in the three years before the programme, with the following three years. The programme resulted in a significant decrease in dietary intake of refined sugar and saturated fat, and an increase in the consumption of foods with higher levels of micronutrients. The percentage of energy derived from fat and saturated fat continued to decrease after the intervention.

The most critical success factor identified in this and other culturally based interventions was the ongoing process of social change ((Lee, Bonson, Yarmirr, O'Dea, & Mathews, 1995). Community control and participation was crucial. Other success factors included the existence of strong traditional beliefs and values in the community, effective strategies targeted to community needs, and the initiation of structural change to make healthier food choices easier (**Lee, Bonson, Yarmirr, O'Dea, & Mathews, 1995; McGarvey et al., 2004**).

The *Pathways* study concluded that it was viable to implement a social marketing programme for obesity prevention in elementary schools serving American-Indian communities, but that more intense or longer duration interventions may be needed to have an effect on percentage body fat (Caballero et al., 2003).

## Pacific peoples

No research was located on the effectiveness of social marketing approaches with Pacific peoples. There have been some lessons drawn from New Zealand's generic experience with social marketing, however. Lessons related to Pacific peoples from the Counties-Manukau report included the following points (Sheehan, 2005):

- Use of existing Pacific networks is important.
- The importance of credible leadership and a high profile of Pacific clinical staff.
- The church is a strong vehicle for engagement with Pacific peoples, but it is essential to use an appropriate process to engage people.
- Ethnic-specific targeting (of specific island groups) is effective when there is clear understanding and involvement of the community.
- Use of Pacific media is important.
- Understanding of Pacific cultural protocols and sensitivities is crucial.

## People on low incomes

Much of the evidence located for the home environments topic involved low-income populations. Compared with the general population, there was some relatively stronger evidence for effects of interventions targeted to low-income populations in both home and school environments. Social marketing was effective with low-income population groups, for instance, the WIC social marketing intervention programme, which included additional nutrition education and written supportive materials (Havas, Anliker et al. 2003). Mixed approaches including coupons (subsidised fruit and vegetables) and education worked in several settings with people of low SES. Mass media campaigns also worked and were cost-effective for low SES groups and those with low occupational status.

One Australian intervention appeared to have a relatively greater impact for people with lower occupational status. The results suggested that people with lower educational and occupational status were more likely to be aware of almost all aspects of the mass media campaign, and fruit and vegetable advertisements may have reached those with low occupational status more efficiently than healthy diet advertisements in general (Dixon, Borland, Segan, Stafford, & Sindall, 1998).

For Topic 1 (energy-dense, micronutrient-poor foods), two overseas studies were located on social marketing approaches with people on low incomes. The Maryland *Food for Life* programme was with low-income women and had a positive impact on their intake of fat (Havas et al., 2003). This intervention drew on trained peer educators from the low-income community, and achieved better results than comparable programmes in high-income communities (Havas et al., 2003).

A four-year comprehensive programme with low-income adults had a limited impact on fat intake (O'Loughlin & Paradis, 1999). The authors noted, though, that some component interventions showed promise in terms of acceptability and impact, especially point-of-choice information campaigns to encourage healthy food choices. The authors concluded that models of community-based prevention designed for general populations may not be suited to populations on low incomes (O'Loughlin & Paradis, 1999), which suggests a need to develop tailored responses.

## **Summary of findings**

### **Conclusion**

This review presents evidence on the effectiveness of social marketing campaigns in five topic areas, which are known to be causally related to obesity (see summary results in Table 9). Overall, the evidence for effectiveness of social marketing appears moderate for energy-dense, micronutrient-poor foods and strong for school environments. Evidence is limited or weak for sugar-sweetened beverages, home environments, and television viewing. There was some relatively strong evidence for effects of interventions targeted to low-income populations in both home and school environments.

These findings reflect the reality that social marketing is a relatively new discipline, particularly applied to food and nutrition. Not only is there an acknowledged dearth of evidence on population-level interventions to prevent obesity and overweight, but this is heightened for social marketing, given its complex nature and a limited awareness about what it is and how it might work.

This review also highlights the difficulties in defining social marketing. A number of the papers included in this review would fit equally well into a review of health promotion, rather than social marketing. Self-defined interventions that met all six of Andreasen's criteria for social marketing were rare, and the majority of interventions included in this review only met a smaller number of those criteria (as described in the methods section). Furthermore, the quality of the studies included was often hampered by either small sample size, non-validated measures, self-reporting of behaviours or limited follow-up (in terms of both time and retention).

Where papers did not meet all of the criteria for social marketing interventions, but lessons could be learned from them, they were included in the review. These papers indicate that single approaches where messages are clear and simple to enact can also be effective. For example, a media-only approach to influence the type of milk purchased, and price/promotion-only interventions around low fat snacks in vending machines.

The papers reviewed show that effective social marketing can occur with nearly any target group (whole population, ethnic groups, children, low income) and in nearly any setting (schools, home, workplaces, churches, mass media, etc). One paper noted that where there were existing settings that frequently engaged low-income populations, such settings were successfully used to present a social marketing intervention, and this was considered more useful than trying to encourage people to attend new settings and services (**Havas et al., 1998**).

The review also highlighted that appropriate messages are a key feature of effective social marketing. Not only do they have to be culturally tailored to a target group, but they must also be well accepted by service providers and other stakeholders so that messages are delivered consistently in a collaborative manner by multiple stakeholders.

The following table summarises the review's main findings across the five topics.

**Table 8: Summary table for review of effectiveness of social marketing**

|  | Home environments  | School environments  | Energy-dense, micronutrient-poor foods  | Sugar-sweetened beverages                             | Television viewing                                    |
|--|--|--|---|---|---|
| <b>Contributes to obesity</b>  | Probable   | Probable   | Convincing (and probable for marketing)   | Probable  | Considerable  |
| <b>Evidence that social marketing works</b>                              | Limited evidence is available  | Strong evidence for results in the school environment, and less evidence for effects on children's lives outside school  | Emerging evidence (one systematic review found reasonable evidence of effectiveness, but with some mixed findings).   | Limited evidence identified                           | Limited evidence identified                           |
| <b>Evidence that social marketing works in low SES, Maori or Pacific</b> | Stronger evidence for low SES<br>No research specific to Maori and Pacific was located   | For low SES, good evidence<br>No specific evidence in relation to Maori or Pacific, but some interventions have been successful with ethnic minorities   | For low SES, emerging moderate evidence of effectiveness (several RCTs).<br>For Maori and Pacific, no evidence of effectiveness specific to this topic, but some lessons from other social marketing campaigns.   | Limited evidence for low SES, Latino population       | No studies identified                                 |
| <b>Behaviours in potential target group are of concern</b>               | Lower intakes of fresh fruit and vegetables in lower SES groups, as fresh foods tend to be more expensive than canned.   | Children are influenced by peers – effective interventions focused on peer influence<br>Children require role models outside of parents, knowledge of teachers is important for modelling  | Higher intakes of energy-dense foods in Maori and Pacific children, also more likely to buy food from a dairy, takeaway or tuck shop.<br>Maori and Pacific children and women eat less regular breakfasts (risk factor for eating energy-dense, foods). | Higher intakes in low SES, Maori and Pacific children | Higher viewing in low SES, Maori and Pacific children |
| <b>Knowledge, attitudes and barriers for target groups is known</b>      | Lower SES perceived fresh fruit and vegetables to be more expensive. Parents of toddlers in one study improved knowledge as a result of the intervention, eg, recognising the need for toddlers to regulate their own energy intake. | No specific information on knowledge and attitudes of Maori and Pacific peoples regarding healthy food promotion in schools.<br>Barriers to healthy food promotion in schools include lack of priority and financial implications. | No specific information was found on knowledge and attitudes of Maori or Pacific people regarding energy-dense foods, but these groups experience greater cost barriers to healthy eating.<br>People on low incomes have                                | No information identified.                            | No information identified.                            |

|  | <b>Home environments</b>   | <b>School environments</b>   | <b>Energy-dense, micronutrient-poor foods</b>   | <b>Sugar-sweetened beverages</b>  | <b>Television viewing</b>  |
|--|--|--|---|---|--|
|  | <p>Women likely to be responsible for food purchase and preparation and therefore influence food choice in their household.</p>  |  | <p>good knowledge about healthy foods, but also experience cost barriers.</p>   |   |  |
| <p><b>Environmental risk and protective factors known for New Zealand</b></p>      | <p>No specific evidence identified.</p>  | <p>New Zealand research has shown that the New Zealand school food environment is not conducive to healthy food choices for children. A large proportion of food offered for sale is relatively unhealthy and the majority of fundraising initiatives involve the sale of unhealthy food products.</p> | <p>New Zealand evidence indicates that unhealthy foods are heavily marketed, especially to children. Evidence also suggests that limited availability and affordability of healthy foods is an issue in New Zealand.</p>  | <p>Heavy marketing of soft-drinks; Availability and affordability of soft-drinks (New Zealand evidence of risks).<br/>Healthy school and home environments (New Zealand evidence of protective-ness).</p> | <p>Heavy marketing of energy-dense micronutrient poor foods; TV in bedroom; number of TVs in a household; social status of parents; ethnic group; dietary intake; sedentary lifestyles (NZ evidence of risks).</p> |
| <p><b>Scientific message available which to base social marketing campaign</b></p> | <p>No particular scientific message, but the evidence suggests that home environments that support healthy food choices are important.<br/><br/>There is a correlation between parental knowledge, attitudes and behaviours and the food environment in the home but there is little evidence at this stage to support this.</p> | <p>WHO report states that healthy food promotion in schools can impact on food choices in the wider lives of children.</p>   | <p>WHO prevention guidance to restrict the intake of energy-dense, micronutrient-poor foods.<br/><br/>Call from International Obesity Taskforce for global ban on advertising unhealthy food to children.<br/><br/>ANA recommendations regarding sugary drinks.</p> | <p>ANA recommendations; SNAPA beverage guidelines (based on ANA); Waitemata DHB beverage guidelines for schools.</p>  | <p>ANA recommendations; Academy of Pediatrics guideline.</p>   |

## Section 2: Theories and models and other social marketing interventions

### *2.1 Theories and Models of behaviour change*

The obesity epidemic is the result of a population imbalance of energy intake and energy expenditure. There is evidence that this imbalance is being driven by changes in environmental factors and is mediated by eating and physical activity behaviours (Crawford & Ball, 2002). Therefore, eating behaviours form the interface between biology and environment, and are an obvious target for a social marketing campaign.

In order to understand population eating behaviours and where to intervene to improve them, it is essential that our efforts are based on sound knowledge and theory. While there is an extensive literature on the psychology of eating behaviour (including risk factors and psychosocial correlates of poor dietary habits), which might help to inform a nutrition-related social marketing campaign, a review of such literature is outside the scope of the current evidence review. Rather, this section focuses on the theories and models that attempt to explain how behaviour may be changed in relation to healthy nutrition practices and environments that affect the maintenance of healthy weight and prevention of obesity. It also outlines a number of models of health that go broader than the medical model, thus underpinning public health action. This section draws heavily on the background work undertaken for the HSC for the social marketing strategy on gambling (Perese, Bellringer, & Abbott, 2005).

A review of interventions focused on physical activity and dietary behaviours, published between 1993 and 2003, found that although factors known to influence behaviour change were discussed in some reports, explicit theoretical models were used in only 35% of studies (Blue & Black, 2005).

Theory guides interventions by suggesting how behaviour can be best influenced. There is evidence from behavioural nutrition that the most effective interventions are those based on a theoretical framework (Crawford & Ball, 2002). Many behavioural nutrition theories have been borrowed from other health behaviours and are based on individual rather than population behaviour change. Some of the more recent ecological and social cognitive models have recognised that the determinants of obesity are far more complex than individual behaviour and also include environmental factors (Swinburn & Egger, 2002). While changes to environmental factors will be necessary to reverse the obesity epidemic, it is also critical that efforts are focused on exposures that influence obesity risk behaviours. Thus, environmental interventions need to be well integrated with educational and behavioural change programmes to enable people to take advantage of supportive environments. These interventions require theory that addresses the relationship between modifiable aspects of the environment and behaviours (Jeffery, 2004).

One such attempt at this is the 'mediating variable' model, proposed as a framework both for designing interventions and for understanding how interventions work to promote change in diet (Baranowski et al., 2003). Mediating variables are risk or protective factors that operate between an intervention and an outcome. They influence behaviours of interest and can be identified from other theoretical or conceptual models of behaviour. Interventions using the mediated variable model attempt to change the mediating variables identified, which may include environmental, psychosocial, behavioural or biological variables.

Furthermore, some variables are moderators of the effect of a programme, for example some programmes promote change for girls but not boys, or in the New Zealand context, Pakeha but not Maori. These moderating factors are the result of complex interactions of attitudes, behaviours and beliefs.

Models of health behaviour at the individual and interpersonal levels are usually described as cognitive-behavioural theories. These theories see behaviour as being mediated through cognitions (what we know and think affects how we act). Some of the well-known theories that have been applied to eating behaviour are summarised in the following section. It is important to note that the theories and models discussed here are not necessarily competing, but tend to focus on different aspects of behaviour and behaviour change. While some are more applicable to a nutrition social marketing campaign than others, any social marketing framework is likely to be informed by more than one theory or model.

## Individual Models and Theory

A number of models and theories of individual behaviour change were considered for this review including the Knowledge, Attitude, Behaviour (KAB) model, the Health Belief Model (HBM), the Theory of Reasoned Action (TRA) or Theory of Planned Behaviour (TPB) Model and the Stages of Change (SOC) or Transtheoretical Model. These models are outlined and discussed in relation to healthy eating in Appendix 7.

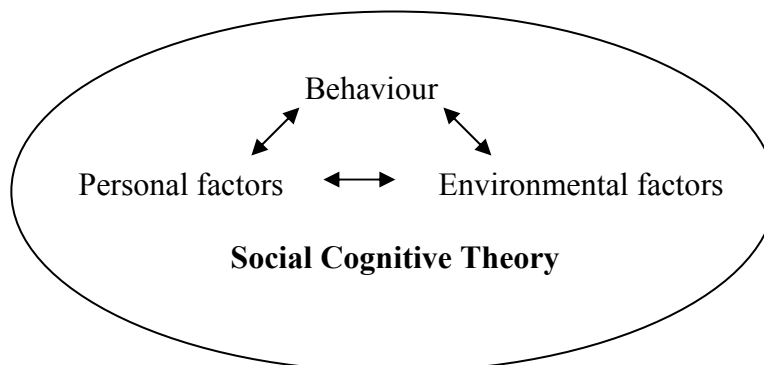
Individual factors such as knowledge, values, attitudes and beliefs are only part of the picture when it comes to eating behaviour. What and when people eat is also influenced by many social and environmental factors such as social rituals, trends, economic factors and social desirability. Because the individual models do not incorporate these social influences on behaviour, these models each have limitations when applied to healthy eating, and therefore it is not recommended that they are used to frame a healthy eating social marketing intervention.

## Interpersonal Theories and Models

### Social Cognitive Theory (SCT)

SCT has been the most commonly used model in the design of nutrition-related health promotion initiatives. Developed from Social Learning Theory, SCT offers a comprehensive framework for understanding health-related behaviours and how to change them.

The basic premise of SCT is that people learn not only from their own experiences but also by observing the actions of others and the results of those actions. In SCT, there is continual interaction of personal factors, environmental influences and behaviour.





Reciprocal determinism, which is central to SCT, proposes that behaviour is a function of aspects of the environment and of the person, all of which are constantly interacting.

The primary personal factors of SCT for understanding behaviour are skills, self-efficacy and outcome expectancies. Key environmental factors include modelling and availability. The primary motivational variable in SCT is outcome expectancies – the desire to achieve positive outcomes and avoid negative ones (Perese, Bellringer, & Abbott, 2005).

Various studies have evaluated outcome expectancies and self-efficacy related to diet. Men tend to have greater perceived outcome expectancies from eating a variety of foods than women. Self-efficacy is important in predicting changes in dietary behaviour. Goal setting is a common intervention procedure in dietary behavioural change interventions. It is one of the few interventions consistently associated with changes in diet for adults, but little evidence exists for children. Further research is needed to determine which eating components children exert the most control over, and therefore which components could be expected to be predictive. It may be that younger children do not exercise much control over their diets, and environmental factors offer more promise as an intervention point (Baranowski et al., 2003).

## Community Level Models and Theories

The following models are not 'behaviour change' models as such, but are different models for understanding health and the components/determinants that underpin community wellbeing. These have been included because they describe understandings of health that underpin public health action (including social marketing) and provide a much broader remit for action than that offered by the dominant biomedical model of health. Note that this section presents selected models only, and there are other community level models for example the various community development and partnership models.

It is widely accepted that in order to be successful, public health initiatives for Maori must be grounded within a framework that makes sense for Maori and incorporates Maori values. The same is true of initiatives for Pacific communities, and other cultural groups. Therefore, since Maori and Pacific communities are likely to be key partners and key audiences in the HSC's social marketing programme, it is essential that culturally-specific understandings of health and wellbeing are used to inform the planning of the programme.

### Maori Models

There are a variety of Maori models of health. Three of the better-known models are *Te Whare Tapa Wha*, *Te Wheke* and *Te Pae Mahutonga*. The descriptions of these models below are drawn from a New Zealand research report (McKerchar, 2003).

The most widely used Maori definition of health is *Te Whare Tapa Wha* or the four-sided house model, first proposed by Durie in 1982 (Durie, 1994). The *Whare Tapa Wha* model describes health as being made up of four dimensions; *taha tinana* – physical dimension, *taha hinengaro* – mental dimension, *taha wairua* – spiritual dimension and *taha whanau* - family dimension. Each dimension represents a side of the house and together they make a whole.

Durie argues that *taha wairua* is generally felt by Maori to be the most essential requirement for health. Durie states that belief in God is one reflection of *wairua*, but it is also evident in relationships to the environment especially to mountains, lakes, rivers and the sea. Durie notes that Maori elders would regard a lack of access to tribal land as a sign of poor health.

It is important to note that in tikanga Maori, food and eating has significance not only for nourishing the physical body (*taha tinana*), but also has spiritual significance (*taha wairua*) and is an important aspect of maintaining social relationships (*taha whanau*). *Te Whare Tapa Wha* suggests that a nutrition social marketing campaign for Maori must take into account the complex meanings and uses of food within contemporary Maori culture.

Another model that defines Maori health is *Te Wheke*, or the octopus (Pere, 1984). This is used by Pere as a symbol for family health. Pere states that the head and body represents the whanau. The eyes reflect the sustenance gained by each tentacle and so *waiora* or total wellbeing is reflected. Each of the tentacles represents the following dimensions; *wairuatanga* – spiritual development; *mana ake* – uniqueness; *mauri*- life force or vitality, *ha a kui ma a koro mā* – cultural heritage, *taha tinana* – the physical, *whanaungatanga* – the family; *whatumanawa* – the emotions; *hinengaro* – the mental state. Pere contends that if each of these dimensions is sustained then there will be total wellbeing.

While these models highlight the relationship between the individual, other people and the natural environment, *Te Whare Tapa Wha* and *Te Wheke* do not specifically conceptualise the relationship between people and other environmental factors that play a major role in nutrition and physical activity, such as advertising, product availability, transport and school policies. *Te Pae Mahutonga*, another model developed by Durie (1999), does provide this wider context and may be the most appropriate model to consider in relation to a healthy eating social marketing programme, since consideration of the economic, built and social environment is crucial.

*Te Pae Mahutonga* is a symbolic representation for the Southern Cross, with the four stars representing the four key tasks of health promotion, navigating the way to Maori wellbeing. The first is *Mauriora* – *Access to te Ao Maori*. This relates to the need for secure identity and confidence as Maori, including access to health-promoting aspects of the Maori world such as language and knowledge, culture and cultural institutions, and to Maori economic and social resources such as land, fisheries, Maori services and networks. The second principle is *Waiora* – *Environmental Protection*, which is about the relationship Maori have with the wider environment, both in terms of spiritual connections, but also interactions with the natural, social and built environments that can either enable or inhibit Maori health. The third star relates to *Toiora* – *Healthy lifestyles*. This is based on the premise that there are modifiable lifestyle risks that present major threats to Maori health, and impact on the ability of Maori to fulfil their potential. *Toiora* is about harm minimisation, targeted interventions, and addressing ‘upstream’ causes within a framework that is culturally relevant, builds on strengths and focuses on positive development. The final star is *Te Oranga* – *Participation in Society*. Given the inextricable link between socio-economic position and health outcomes, *Te Oranga* is a principle that reflects on the extent to which Maori are able to benefit from their participation in the economy, education, employment, decision making, and other aspects of society. It relates to the type, nature and delivery of services for Maori, inequalities of access to and outcomes from wider societal benefits, and includes issues such as Maori autonomy and control over their own circumstances.

*Te Pae Mahutonga* also includes the ‘Two Pointers’ that are part of the Southern Cross constellation, which are described in the framework as *Nga Manukura* – leadership, and *Te Mana Whakahaere* – Autonomy. These principles refer not only to the importance of Maori leadership and autonomy to pursue community aspirations, but the need to nurture, support and build Maori leadership and autonomy through appropriate processes, the sharing of skills and knowledge, effective partnerships and alliances, workforce development, community ownership and self-governance for example.

*Te Pae Mahutonga* encourages an approach that addresses the environmental factors that encourage or inhibit Maori health. In the same way that aspects of the HSC’s Auahi Kore programme have reflected on Maori identity and linked this to smokefree lifestyles utilising Maori values around whanau, whakapapa, manaaki to enhance motivation around health promoting behaviours, healthy eating may be able to draw on these values.

## Pacific Models

Pacific communities also tend to have a holistic view of health and wellbeing, but each of the 22 Pacific nations represented in New Zealand has its own unique culture, history and worldview. This diversity has led to the development of a wide variety of Pacific models of health and research methodologies, for example the Cook Islands *Tivaevae* model, the Samoan *Fonofale* and *Fa'afaletui* models, and the Tongan *Kakala* model to name a few that have been documented. It should be noted that many Pacific models, eg, the *Vaka* model (Tokolauan), *Niu* model (Niuean), and *Tauhi e Va Ke Lelei* (Tongan), while well known within the relevant community, are not extensively documented in the academic or medical literature.

It is beyond the scope of this review to explore each Pacific culture's view of wellbeing, but two prominent and potentially useful Pacific models of wellbeing are presented here. These are drawn from a fono in 2006 that discussed these models in relation to harms from gambling (National Pacific Gambling Stakeholders Fono, 2006) and the Mental Health Foundation's 'Mind Your Health' guide to health promotion (Mental Health Foundation, 2004).

One well-known Samoan model of health is the *Fonofale* model, developed by Karl Pulotu Endemann, using the traditional Samoan meeting house as a metaphor. The *fale*'s roof represents how the philosophies and methodologies of traditional and adapted cultural values and beliefs can be a shelter for people. The *fale*'s foundation is the immediate and extended family – the fundamental basis of Samoan social organisation and support. The four posts represent spiritual beliefs; physical and biological wellbeing; mental and emotional strength and wellbeing; and other influences such as gender, sexuality, education, employment, income and age. These four dimensions are interwoven, each being reliant on the others. Surrounding the *fale* are: time (including impact, difference and difficulties of living in New Zealand); environment (including tension between the Samoan and New Zealand ways of life); and context (such as differences experienced by New Zealand-raised and Samoan-raised peoples). This model provides a comprehensive and culturally appropriate summary of the key influences on the health of New Zealand Samoans, and thereby gives a guide to the personal, interpersonal, and environmental elements that need to be considered in the development of programmes and interventions for and with Samoan communities.

A Tongan research framework, *Fakalotofale'ia*, developed by Seluvaia Tu'itahi-Tahaafe, might also usefully inform the development of a healthy eating social marketing programme. This model was originally developed in relation to her research with Tongan people with disabilities and their families. It describes 'the way (*faka*) inside the heart (*loto*) of the household (*fale'ia*)' and is based on a number of Tongan values and principles such as *'ofa* (love or compassion), *fetokoni'aki* (interdependence), *makefetl'aki* (reciprocity), *uouangataha* (collective), *faka'apa'apa* (respect), and *fe'ofa'ofani* (harmony, and looking out for each other). Such a model may be useful in the planning of interventions and programmes for the Tongan community, since it highlights the Tongan worldview and the unique motivators and barriers that Tongan individuals and families are likely to experience in relation to healthy eating.

As well as the range of Pacific cultures and worldviews of the different nations, diversity also results from the length of time people have lived in New Zealand. This ranges from those newly arrived in this country right through to families who have been here for several generations, each facing different issues, barriers and motivations in relation to healthy eating. What works for one group may not necessarily work for another. It is therefore essential that this heterogeneity is taken into account when working alongside and developing programmes targeting Pacific peoples.

## **Ecological and Social Models**

Due to the limited success of psychosocial models, ecological and social models have generated substantial interest for obesity prevention and healthy eating in recent years.

We all live in environments or ecologies with physical and human or social aspects. The ways that environment affects health are complex as the environment is multilevel (neighbourhood, region, city, country), multi-structural (physical, socio-economic, social capital), multi-factorial (diet, physical activity, stress) and multi-institutional (family, society, government) (Baranowski, Cullen, Nicklas, Thompson, & Baranowski, 2003).

Our environment influences individual choices and behaviour. This is often mediated through availability, for example, large supermarkets with fresh low-cost foods are often located in middle-class neighbourhoods. Having healthier choices available is related to healthier food consumption patterns. Swinburn and Egger (2002) argue that obesogenic environments are the main driving forces behind the obesity epidemic. They suggest the use of the traditional Epidemiological Triad Model (host, vectors, environments) as a framework for obesity prevention strategies (Swinburn & Egger, 2002).

Ecological and social models have generally not included cognitive variables, and therefore have no motivational variables. Possible motivational cues to action could include enhancing the availability and accessibility of healthy options, reducing the availability and accessibility of unhealthy options, and increasing the attractiveness of healthy options by increasing the number of healthy options available. Examples of environmental change include legislation, policy changes, healthy neighbourhood planning and environmental cues to action such as informational signs in supermarkets.

## **Tools for Behaviour Change**

### **Social Marketing**

Rather than a model for understanding behaviour change, social marketing is a set of procedures emanating from marketing's conceptual framework, including exchange theory, audience segmentation, competition, the marketing mix (price, place, product, promotion), consumer orientation and continuous monitoring. Social marketing is the use of marketing principles to design and implement programmes to promote socially beneficial behaviour change. Although social marketing usually targets consumers, it can be used to influence policy makers who can address the broader social and environmental determinants of health. Social marketing operates using several of the concepts from other theories including outcome expectancy, pros and cons, or benefits and barriers. Its primary motivation is perceived self-interest.

The marketing mix is extremely important and relies not only on promotional activities but also on the non-promotional price, product and placement, for example modifying and enhancing healthy products, lowering their price and creating accessible outlets.

Social marketing usually focuses on changing individual behaviour and has been criticised as 'blaming the victim' or working downstream. It is possible, however, to use social marketing to change the behaviour of decision makers and to change environments, and hence to work further upstream on the fundamental determinants of unhealthy behaviours.

Social marketing requires extensive formative research in order to be successful. It may in some cases be possible to gain some of the relevant information from other interventions. Grier and Bryant (2005) suggest that as no one theory or discipline can provide the guidance needed to direct social change, that social marketing should explore public health's other theoretical frameworks for directing change (Grier & Bryant, 2005). Behaviour theories, advocacy, theories of social capital, political risk compensation theories, community development and organisational theories could be blended with aspects of social marketing to more fully understand and direct behaviour and environmental change.

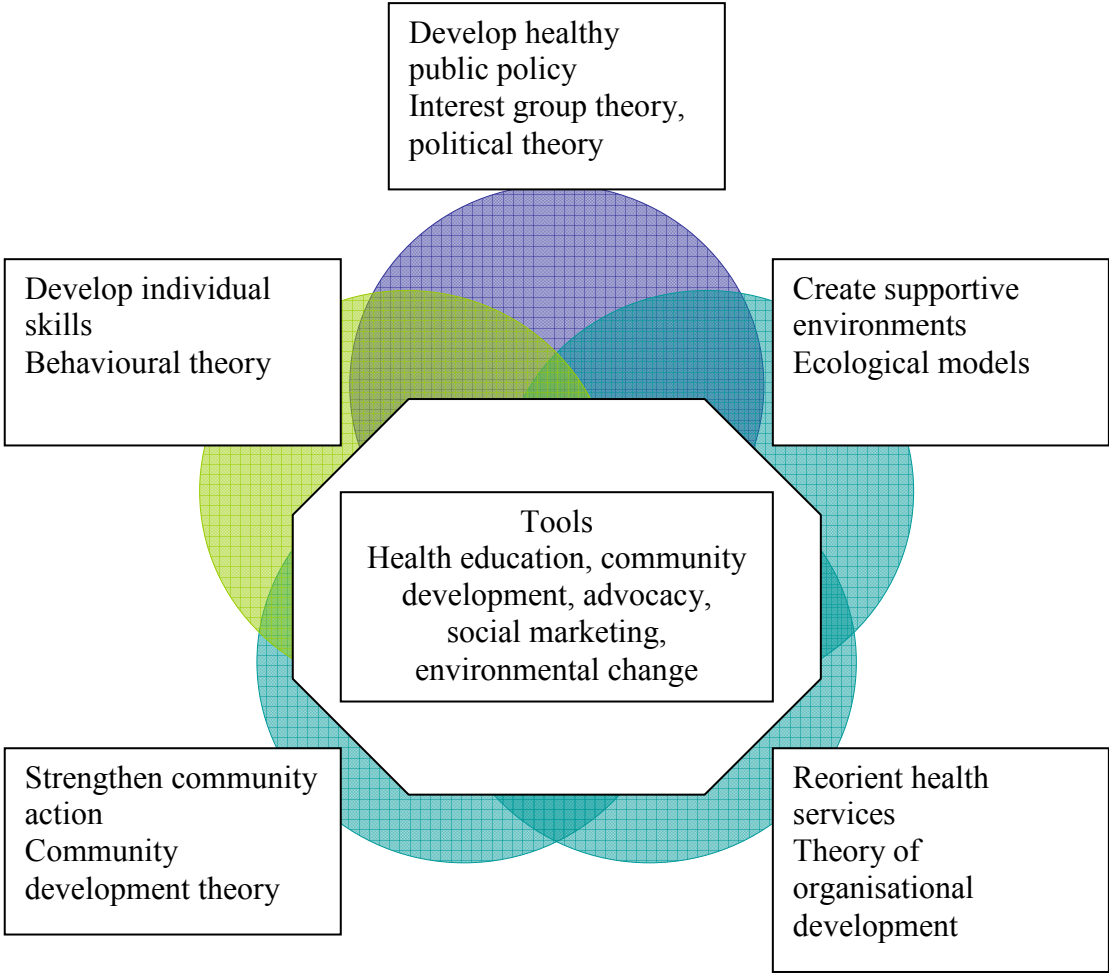
## **Health Promotion**

Health promotion is a discipline within public health that could be seen as a very useful overarching framework offering a number of tools for behaviour change, at an individual, community, environmental, health system and societal level. Health promotion is the process of enabling people to increase control over and improve their health (World Health Organization, 1986). Health promotion is underpinned by the acknowledgement that the determinants of health are not always directly within the control of an individual, and therefore it takes efforts at a community, organisational and societal level to enable people to improve their health.

It is tempting to focus our efforts to promote health on individual behaviour change; however, this often overlooks the determinants of these individual behaviours. Just as social marketing is more than advertising, health promotion is more than health education. The five strategies commonly used in health promotion are shown diagrammatically in Figure 1. Each of the strategies is underpinned by theory and can be achieved using a variety of tools.

Health promotion is concerned with reducing inequalities in health. Inequalities in health exist because of the unequal distribution of the determinants of good health (Howden-Chapman & Tobias, 2000). Inequalities result from policies and programmes, and because they have been created, they can also be reduced (Woodward & Kawachi, 2000). A conscious focus on those who are most disadvantaged is fundamental to health promotion. Many of the tools used in health promotion can have a negative impact by reinforcing inequalities in health, by improving the health of the least rather than the most disadvantaged. Health promotion is committed to social equity and the empowerment of individuals.

**Figure 1: Tools and Theories of the Ottawa Charter**



**Conclusion**

To conclude this section, understanding the risk and protective factors for behaviours that promote or reduce obesity will enable us to design interventions that adequately address the determinants of these behaviours. This will need to include a much better understanding of how attitudes, beliefs and knowledge are related to behaviour, and how environments influence behaviour. All of this needs to be understood for particular subgroups of the population, and particularly for those groups that are most disadvantaged. This section has outlined some of the broad models and theories that might help to frame these understandings. For each specific behaviour, a complex model will need to be formulated that allows us to understand the environmental, community, family/whanau and the individual mediators of behaviour.

Furthermore, sustainability is a key issue for obesity prevention initiatives. Programmes that are highly specific and tailored tend to be more successful, but also tend to involve more outside intervention and resources. There are examples of community directed programmes that have been successful in achieving nutrition-related behaviour change (Rowley et al., 2000). These programmes appear to have high community support and sustainability. Any environmental or behavioural interventions need to be supported by well integrated and community owned initiatives that support sustainability.

There are a wide range of theories, models and tools that might helpfully inform the development of a social marketing strategy around healthy eating. The discussion in this section highlights the limitations of behaviour change models that focus on the individual, and suggests that interpersonal models for behaviour change and holistic/ecological models are likely to be more relevant. This section also highlights the cultural specificity of the determinants of wellbeing and determinants of eating behaviour, and the need for culturally appropriate theories and models, particularly when considering Maori and Pacific partners and audiences.

## **2.2 Learning from other social marketing interventions**

A recent report for Counties Manukau District Health Board (DHB) drew out some key lessons for Maori and Pacific communities from New Zealand's experiences of social marketing (Sheehan, 2005). It is also useful for highlighting generic lessons for the practice of social marketing as a whole. This section will consider some learning for social marketing overall, and will discuss the implications for Maori and Pacific populations in particular.

A common feature of the studies in this report is that they often attempted to change more than one nutrition-related behaviour at a time. Effective studies were most likely to be comprehensive, integrated approaches that employed multiple intervention strategies and communication channels. For example, a comprehensive campaign might both raise public awareness and address environmental barriers to change. This makes evaluation, monitoring and tracking more difficult, as there are multiple outcomes of interest, and it is difficult to tease out the components of the intervention mix that have been most effective and reasons for their effect. Most of the studies commented that evaluation, monitoring and tracking was essential. This is backed up by the learning from other social marketing campaigns, where for example, the experience of *Like Minds Like Mine* and *One Heart Many Lives* suggest that ongoing research and evaluation are essential, and can be used to further modify campaigns and target groups.

Other features of effective social marketing interventions included targeting a range of audiences. This ties in well with general public health approaches, where targeted 'high risk' approaches can be used with particularly vulnerable groups to ensure that inequalities in health are not maintained or widened. Yet a high risk approach by its nature often does little to improve overall population health, as the number of people targeted is generally low (as a proportion of the total population). Therefore, a whole population approach is required to ensure that the general populations' health is improved, as well as a targeted approach for high-risk populations.

Timeframes for social marketing appear important, with research and experience from social marketing within New Zealand suggesting that 'years' are required for success. Larger campaigns often move through phases, going from raising public awareness in initial phases to attempting specific behaviour change in later phases. This will be particularly true if changes in weight outcomes are expected rather than process, knowledge, attitudes or behaviour change outcomes.

To achieve a broad reach, effective social marketing campaigns used a coordinated approach across government, industry and voluntary sectors. This allowed a national overview to be presented that was supported by coordinated local action. Strong partnerships between agencies were considered essential for success within many of the included studies, and it was considered resource intensive to develop these. Again, this is backed up by the learning from other social marketing campaigns, where *Like Minds Like Mine* demonstrates a strong partnership between the advertising agency and research companies, and both *QuitLine* and *Like Minds Like Mine* demonstrate the importance of a national overview that supports local community-based service delivery. Effective features of *One Heart Many Lives* include partnerships with community figures and community organisations. *QuitLine* also benefited from the personal nature of the helpline by using trained counsellors, and the counsellors' work was further reinforced by environmental shifts such as law and price changes.

Many of the effective social marketing campaigns were notable for their development of appropriate messages for specific target groups. Culturally tailored social marketing interventions that include community control, community participation and leadership are critical features of effectiveness. This is backed up by learning from other social marketing campaigns, where *Like Minds Like Mine* demonstrates strong partnerships with mental health service users and providers, including specific attention being paid to Maori and Pacific peoples. The culturally specific campaigns acknowledged that many of the behaviours, risks and protective factors practiced or experienced by Maori and Pacific peoples were less favourable than the proportionally dominant groups in society. This supports a need for a high-risk approach as a component of an overarching population approach. One study noted that linking the campaign with another outcome, improved academic performance, provided significant value for parents and community leaders beyond possible health benefits (Robinson et al., 2003).

## Generic lessons from social marketing in New Zealand

The *SunSmart* Campaign to increase sun protective behaviours among children and caregivers has contributed to an increasing awareness and application of 'SunSmart' behaviours.<sup>9</sup> Key lessons learned from this campaign include the need for a national overview and focus, and to ensure future sustainability of the campaign. This is seen as especially important where the available budget is very small and unable to sustain multiple target audiences. The experience of the *SunSmart* campaign also highlights the need for collaboration at the delivery end so that messages are consistent and not competing. It was important to engage organisations outside the health sector that play a significant role in the issue of sun safety.

The following summary of other New Zealand campaigns is adapted from the report for Counties Manukau DHB (Sheehan, 2005). The report analysed four social marketing campaigns; *Quitline*, *Like Minds Like Mine*, *Push Play* and *One Heart Many Lives*.

### Quitline

A smoking cessation campaign has been underway in New Zealand since 1999. It uses media to encourage people who smoke to quit, and to promote the *Quitline* free phone service. The priority audience is smokers aged 25-44 years, in particular Maori.

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<sup>9</sup> Case study on *SunSmart* Campaign, Social Marketing Down Under website, <http://socialmarketing.co.nz/casestudies/SunSmart-case-study.htm>, accessed 26 September 2006



Several lessons have been learned from the experience of this campaign. Although the advertising message is not positive, the campaign has contributed to the reduced social acceptability of smoking, and the 'threat' nature of the ads is thought to encourage behaviour change. It is also important to note, however, that the shifts in public perceptions and behaviour have been assisted by law changes and the increased price of tobacco.

In addition, a key component of the strategy is the personal nature of the helpline, using trained counsellors. This means that the history of callers can be reviewed and the impact of such ads is able to be assessed immediately. Campaign infrastructure continues to monitor the efficacy of the ads in the market, and its impact can be further refined and targeted.

### **Like Minds Like Mine**

This ongoing mass media campaign has been underway since the late nineties. Its purpose is to reduce stigma and discrimination by raising awareness and understanding of mental illness. It is a highly visible and well-resourced campaign, with its message mainly delivered through TV ads, but also through public health and community providers.

A key lesson from the campaign includes the importance of research and evaluation. A survey is conducted biannually to assess attitudinal changes towards mental illness. Information from this is then used to modify and further target the campaign. There has been particular evaluation of the programme's impact on Maori and Pacific peoples. The campaign's success is attributed to a strong partnership between the advertising agency and the research companies.

The campaign has been effective in integrating the perspectives of mental health service users into the programme. Another success factor is a tandem approach, with national-level TV ads reinforced by regional providers.

### **Push Play**

Run by SPARC (Sport and Recreation New Zealand), *Push Play* is an initiative that aims to increase physical activity at the population level with a message to promote 30 minutes a day of moderate-intensity physical activity. It consists of community wide, media led interventions supported by community led programmes and events.

Although it has so far increased awareness of physical activity messages and the *Push Play* brand, as well as the intention to be more active, the campaign has not yet achieved a significant and sustained increase in physical activity behaviours (e.g., there was an increase in physical activity of just 4% between 1997 and 2001). The campaign to date has not had a particular emphasis on Maori and Pacific peoples.

The current campaign segments the population along psycho-behavioural lines, in order to better understand reasons for physical inactivity. It attempts to move people in these segments from awareness to action.

## **One Heart Many Lives**

PHARMAC, the Government's pharmaceutical agency, is responsible for this campaign to raise awareness and reduce the level of cardiovascular risk for men aged over 35 years. The campaign aims to resonate at an emotional level, with information designed to be personally applied.

Success factors included using key 'influencers' (eg, whanau, community and health providers) as conduits and developers of the message. There has also been a strong emphasis on community and use of multiple media to disseminate information.

## **Summary of lessons for social marketing practice**

Overall lessons for social marketing highlighted by the Counties Manukau report include:

- Permanent, large-scale behavioural change is best achieved through changing community norms, which can take generations. There is consequently a need for continuous iteration of social marketing programmes.
- Relationship development and maintenance with key community figures and organisations is an important factor in securing long-term efficacy.
- It is important to establish personal relevancy (an emotive connection) and to initiate people to take the desired action.
- It is important to increase people's readiness for change or at least to consider change.
- The use of community groups is critical in achieving changes.

The report also emphasised the importance of formative research, ongoing monitoring and evaluation, as well as the need for workforce development to support social marketing campaigns (Sheehan, 2005).

## **Learning in relation to Maori and Pacific populations**

A social marketing programme is likely to be most effective for both Maori and Pacific people when it includes the key pre-conditions for effectiveness – leadership and civil readiness (Sheehan, 2005). Other factors that are important for these population groups are similar to the general bullet points above, such as personal relevance, targeting to those who have a reason to care, and use of community groups to support behaviour change efforts (Sheehan, 2005).

A success factor in the *Like Minds Like Mine* campaign has been the strong involvement of Maori and Pacific service users and providers in consumer advocacy and service provision positions (Sheehan, 2005). Early engagement and involvement in the campaign planning and development is also crucial.

The responses to the community consultation for the *One Heart Many Lives* campaign produced significant differences between Maori, Pacific and the rest of the population, with Maori and Pacific communities placing more emphasis on holistic ideas of health (Sheehan, 2005). This campaign also found it was necessary to recognise that each ethnic group had its own motivators and emotional drivers.

## **Specific learning for Maori communities**

Specific lessons regarding Maori and Pacific groups are also discussed elsewhere in this report, as part of the findings for sub-populations.

To summarise here, the Counties-Manukau report emphasised the importance of Maori clinical and community leadership, and the integration and engagement of Maori in all levels of social marketing campaigns (Sheehan, 2005). For instance, in the *Quitline* campaign, mainstream ads are reinforced by a specifically targeted Maori campaign, "It's about whanau". Engagement with Maori is likely to be especially effective when sites that are connected to Maori communities are utilised (Sheehan, 2005), such as marae or kura kaupapa schools.

## **Specific learning for Pacific communities**

Relevant lessons in relation to Pacific groups included the need to use existing Pacific networks and to have credible leadership including Pacific clinical leaders.

The church is viewed as a positive tool for engagement with Pacific peoples, but it is essential to use an appropriate process. Use of Pacific media is important, as well as good understanding of Pacific cultural protocols and sensitivities (Sheehan, 2005).

In summary, there are a range of lessons to be learned from previous New Zealand experience with social marketing. Leadership and relationship building are critical to success, as is the use of community groups and partnerships to support national campaigns. Ongoing research and monitoring are critical, in order to develop iterative campaigns that change to meet the needs of target populations.

# Appendices

## **Appendix 1: Example of a search strategy – Energy-dense, micronutrient-poor foods, Medline**

Ovid MEDLINE(R) 1966 to September Week 2 2006

| #  | Search History  | Results |
|----|---|---------|
| 1  | exp *Nutrition/   | 79506   |
| 2  | exp *Food/  | 239248  |
| 3  | exp *Obesity/   | 47622   |
| 4  | obes\$.mp. [mp=title, original title, abstract, name of substance word, subject heading word]             | 96992   |
| 5  | 1 or 2 or 3 or 4  | 394589  |
| 6  | intervention\$.mp. [mp=title, original title, abstract, name of substance word, subject heading word]     | 257232  |
| 7  | campaign\$.mp. [mp=title, original title, abstract, name of substance word, subject heading word]         | 12721   |
| 8  | program\$.mp. [mp=title, original title, abstract, name of substance word, subject heading word]          | 372295  |
| 9  | mass media.mp. or exp Mass Media/   | 29287   |
| 10 | exp advertising/ or exp "marketing of health services"/ or exp social marketing/                          | 20710   |
| 11 | social marketing.mp. [mp=title, original title, abstract, name of substance word, subject heading word]   | 800     |
| 12 | advertising.mp. [mp=title, original title, abstract, name of substance word, subject heading word]        | 10757   |
| 13 | exp health promotion/ or exp healthy people programs/   | 28629   |
| 14 | 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13  | 664412  |
| 15 | exp Intervention Studies/   | 3512    |
| 16 | exp evaluation studies/ or exp clinical trials/ or exp program evaluation/                                | 602008  |
| 17 | evaluation\$.mp. [mp=title, original title, abstract, name of substance word, subject heading word]       | 738213  |
| 18 | evaluation studies.mp. [mp=title, original title, abstract, name of substance word, subject heading word] | 200303  |
| 19 | effectiveness.mp. [mp=title, original title, abstract, name of substance word, subject heading word]      | 141530  |
| 20 | 15 or 16 or 17 or 18 or 19  | 1191693 |
| 21 | exp social behavior/ or mass behavior/ or social conformity/ or social desirability/                      | 93195   |
| 22 | behavio\$.mp. [mp=title, original title, abstract, name of substance word, subject heading word]          | 552713  |
| 23 | audience\$.mp. [mp=title, original title, abstract, name of substance word, subject heading word]         | 2868    |
| 24 | (pretesting or pre-testing).mp. [mp=title, original title, abstract, name of substance                    | 462     |

|    |  |         |
|----|--|---------|
|    | word, subject heading word]  |         |
| 25 | segment.mp. [mp=title, original title, abstract, name of substance word, subject heading word]   | 97193   |
| 26 | consumer.mp. [mp=title, original title, abstract, name of substance word, subject heading word]  | 38672   |
| 27 | target.mp. [mp=title, original title, abstract, name of substance word, subject heading word]  | 223740  |
| 28 | exchange.mp. [mp=title, original title, abstract, name of substance word, subject heading word]  | 174532  |
| 29 | exp Communication/ or communication.mp. or exp Persuasive Communication/   | 302472  |
| 30 | 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29   | 1346359 |
| 31 | 5 and 14 and 20 and 30   | 1415    |
| 32 | Australasia.mp. or exp Australia/ or exp Australasia/ or exp New Zealand/  | 80018   |
| 33 | New Zealand\$.mp. [mp=title, original title, abstract, name of substance word, subject heading word]   | 31231   |
| 34 | Australia\$.mp. [mp=title, original title, abstract, name of substance word, subject heading word]   | 68077   |
| 35 | Pacific.mp. [mp=title, original title, abstract, name of substance word, subject heading word]   | 9642    |
| 36 | New Zealand.in.  | 23998   |
| 37 | 32 or 33 or 34 or 35 or 36   | 129961  |
| 38 | 31 and 37  | 36      |
| 39 | energy balance.mp.   | 4377    |
| 40 | 5 or 39  | 396869  |
| 41 | 14 and 20 and 30 and 40  | 1418    |
| 42 | 37 and 41  | 37      |
| 43 | exp fats/ or exp dietary fats/ or exp fats, unsaturated/   | 56501   |
| 44 | exp dietary fats/ or butter/ or cholesterol, dietary/ or exp dietary fats, unsaturated/ or fat emulsions, intravenous/ or margarine/ or fats, unsaturated/ or exp fatty acids/ | 300332  |
| 45 | fat intake.mp. [mp=title, original title, abstract, name of substance word, subject heading word]  | 3468    |
| 46 | fatty food\$.mp. [mp=title, original title, abstract, name of substance word, subject heading word]  | 287     |
| 47 | sugary food\$.mp. [mp=title, original title, abstract, name of substance word, subject heading word]   | 39      |
| 48 | unhealthy food\$.mp. [mp=title, original title, abstract, name of substance word, subject heading word]  | 65      |
| 49 | high fat.mp. [mp=title, original title, abstract, name of substance word, subject heading word]  | 7704    |
| 50 | high sugar.mp. [mp=title, original title, abstract, name of substance word, subject heading word]  | 327     |
| 51 | processed food\$.mp. [mp=title, original title, abstract, name of substance word, subject heading word]  | 575     |

|    |  |        |
|----|--|--------|
| 52 | energy-dense food\$.mp. [mp=title, original title, abstract, name of substance word, subject heading word] | 86     |
| 53 | exp "Marketing of Health Services"/ or marketing.mp. or exp Marketing/ or exp Social Marketing/            | 26842  |
| 54 | exp Advertising/   | 9646   |
| 55 | exp Food Industry/   | 61808  |
| 56 | social marketing.mp. [mp=title, original title, abstract, name of substance word, subject heading word]    | 800    |
| 57 | 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                           | 393228 |
| 58 | 41 and 57  | 354    |
| 59 | limit 58 to (humans and english language and yr="1996 - 2006")   | 243    |
| 60 | limit 59 to "review articles"  | 34     |
| 61 | from 60 keep 1, 5, 8-9, 17, 19-22, 26...   | 12     |
| 62 | 42 and 57  | 8      |
| 63 | from 62 keep 1-6, 8  | 7      |

## Appendix 2: Summary table – Energy-dense, micronutrient-poor foods

63 papers were initially included for review. Consultation between two researchers resulted in the exclusion of 32 papers that were not relevant to our research questions, leaving 31 references in total for this topic (note that this included heavy marketing of energy-dense foods as a risk factor). After reading the full text, an additional four papers were excluded as the interventions were not social marketing. This left a total of 27 papers for all components of this topic (including attitudes, risk/protective factors etc).

| First author and year                                | Study type and participants   | Objectives/ Methodologies   | Social marketing intervention  | Outcome measures   | Findings: Efficacy (did it work? Did it work differently for the population groups?)   | Findings: Features (why did it work?) | Market segments, groups and influencers | Quality rating Strengths & weaknesses of study  | Information gaps   |
|--|---|---|--|--|--|---------------------------------------|---|---|--|
| Bowen 2002   | Review of evidence for interventions re dietary change (fat intake, fibre and intake fruit/veg)<br><br>Review of 80 studies<br><br>Includes Netherlands Fat Watch campaign (requested from library) | Includes several social marketing reviews   |  | Fat intake   | Fat Watch, national Dutch annual month long campaign – awareness of the campaign, attitudes re fat and intentions to buy low-fat products changed in expected direction<br><br>Norway national mass media campaign, Danish mass media campaign |                                       |   | High quality evidence (McDermott, Hastings )<br><br>Large RCT<br><br>Targeted to American-Indians | More research needed into grocery store settings – point of purchase interventions - |
| Caballero 2003<br><br>Via McDermott, Hastings review | RCT<br><br>School students involving 1704 children in 41 schools  | To reduce fat intake of American-Indian children<br><br>to evaluate the effectiveness of a school-based, multi-component intervention for | 'Pathways', a culturally tailored intervention<br><br>RCT conducted over 3 consecutive years, from 3rd to 5th grades, in | Lower body fat (primary)<br><br>Lower fat in school meals, improve physical activity and dietary | Produced mixed results. Significant reductions in fat intake but the study did not achieve its primary goal of reducing  |                                       |   |   |  |

| First author and year                               | Study type and participants  | Objectives/ Methodologies   | Social marketing intervention   | Outcome measures   | Findings: Efficacy (did it work differently for the population groups?)  | Findings: Features (why did it work?) | Market segments, groups and influencers | Quality rating Strengths & weaknesses of study                                  | Information gaps |
|---|--|---|---|--|--|---------------------------------------|---|---|------------------|
|   |  | reducing percentage body fat in American-Indian schoolchildren<br>Based on formative research | schools serving American-Indian communities in Arizona, New Mexico, and South Dakota.<br>4 components: 1) change in dietary intake, 2) increase in physical activity, 3) a classroom curriculum focused on healthy eating and lifestyle, and 4) a family-involvement program. | intake and improve KAB re diet and p.a. (secondary outcomes)<br>The main outcome was percentage body fat; other outcomes included dietary intake, physical activity, and knowledge, and attitudes, and behaviours. | percentage body fat.<br>Positive effect on food choice intentions and self efficacy to eat healthy foods<br>More intense or longer interventions may be needed to significantly reduce adiposity in this population.                 |                                       |   |   |                  |
| Delichatsios 2001<br>Via McDermott, Hastings review | Eat Smart  |   | A preventive nutrition intervention, implemented in a primary care setting, sought to influence the fat intake of adult patients.<br>Tailored education materials, physician endorsement, motivational counselling  |  | Intention to treat analysis showed that, when compared with the control group, participants in the intervention condition decreased their saturated fat intake by 0.6% (95%CI = 1.2, 0.0) of energy intake at three-month follow-up. |                                       |   | Medium-level quality of evidence - McDermott, Hastings                          |                  |
| French 2001   | RCT - CHIPs study<br>Sample was 12 worksites (adults) and 12 schools | To examine the effects of pricing and promotion of low-fat snacks from vending machines       | CHIPs = changing individuals purchase of snacks<br>3 levels of promotion - none,  |  | Price reduction was significantly associated with percentage of low-fat snack  |                                       |   | Strengths<br>Large study, naturalistic setting, compared adults and adolescents |                  |



| First author and year  | Study type and participants  | Objectives/ Methodologies   | Social marketing intervention  | Outcome measures     | Findings: Efficacy (did it work differently for the population groups?)   | Findings: Features (why did it work?)   | Market segments, groups and influencers | Quality rating Strengths & weaknesses of study  | Information gaps |
|--|--|---|--|----------------------|---|---|---|---|------------------|
|  | (adolescents)  | Vending machine snacks as eg, of convenience foods  | low-fat label, label and sign<br>3 levels of price reduction   |                      | sales<br>Promotion of low-fat snacks was significantly and independent associated with greater low-fat snack sales<br>Lowering prices is very effective, and was done without affecting profits |   |   | Limitations:<br>Can't determine if increases in sales were due to substitution of a regular snack with a low-fat snack, increases in the number of purchases by existing customers or new customer sales, also can't tell effect of choosing low-fat snack on other food choices during the day<br>Limited type and number of low-fat snacks available<br>Relatively short time period for each treatment condition |                  |
| Glanz 2004<br>On fruit and vegetables but still relevant lessons | Review of restaurant-based environmental, policy and pricing strategies for increasing intake of fruits and veggies<br>(note most of existing studies emphasise low fat foods not fruit and verge) | Six types of restaurant interventions:<br>- increased availability, increased access, reduced prices and coupons, catering policies, point-of-purchase info, promotion and communication<br>+ community driven health promotion in restaurants<br>(combine increased availability with info and | Useful background point – knowledge base re promoting healthy nutrition is heavily weighted toward individual behaviour/educational approaches.<br>Fewer studies on environmental/policy/pricing interventions | Fruit and veg intake | Evaluation data show some significant impact on healthy diets, especially with point-of-purchase info   | Policy and environmental approaches may have greater impact when they influence the overall environment, reach many people, and are less costly and more enduring than individually oriented or small group educational interventions |   | Need to better understand the extent to which environmental changes lead to individual changes toward healthier eating – emerging evidence suggests that more motivated subgroups may account for most of the change in environmental impacts, and  |                  |

| First author and year  | Study type and participants  | Objectives/ Methodologies  | Social marketing intervention  | Outcome measures   | Findings: Efficacy (did it work differently for the population groups?)  | Findings: Features (why did it work?)   | Market segments, groups and influencers | Quality rating Strengths & weaknesses of study   | Information gaps  |
|--|--|--|--|--|--|---|---|--|---|
|  |  | promotion)<br>Note 'restaurant' includes school cafeterias, fast food outlets, vending machines etc.         |  |  |  | Collaboration between public and private sectors  |   |  | higher need groups may not be equally influenced by structural changes. |
| Havas 2003 (high quality study according to McDermott, Hastings) | Maryland Food for Life programme<br>RCT<br>Participants = low income women<br>We conducted six-month intervention programs for 1055 women at ten WIC sites; 1011 women served as controls. | Conducted formative research<br>Multi-site<br>Programme based on stages of change and social learning theory | Programme comprised monthly-led educational sessions, direct mail and telephone calls by trained peer educators  | Fat, fibre and FV intake   | Positive effect on all three, including fat intake<br>Net difference of -1.6% in calories from fat                               |   |   | Strengths<br>Randomised trial, diverse populations and sites participating<br>Large sample size, consistency of outcomes across diverse populations and sites<br>(high quality evidence – McDermott, Hastings )<br>Limitations:<br>reliance on self-reported data, inability to obtain follow up data on all intervention participants |   |
| Lee 1995   | Evaluation of a nutrition program in a remote Aboriginal community (island Northern Territory)<br>(150 people = whole population of the island,  | To evaluate the long-term impact of the programme (3 yrs)  | Programme promoted an increased intake of fruit, vegetables and wholegrain bread, and discouraged the eating of takeaway foods and sugar.<br>Compared three years before the | Not enough detail on the intervention to decide if it is really social marketing.<br>Sounds like it, but detail of intervention is reported elsewhere. | Programme produced lasting improvements in dietary intake and micronutrients.<br>Over a year there was a significant decrease in | Critical factor: success was linked to an ongoing process of social change. Importance of Aboriginal people owning and controlling the intervention Community |   |  |   |

| First author and year                         | Study type and participants  | Objectives/ Methodologies   | Social marketing intervention   | Outcome measures   | Findings: Efficacy (did it work differently for the population groups?)  | Findings: Features (why did it work?)   | Market segments, groups and influencers | Quality rating Strengths & weaknesses of study   | Information gaps |
|---|--|---|---|--|--|---|---|--|------------------|
|   | compared with a comparison island of 300 people)   |   | programme, with the three years after.  |  | <p>dietary intake of refined sugar and saturated fat, and an increase in the consumption of foods with higher levels of micronutrients</p> <p>Percentage of energy derived from fat and saturated fat continued to decrease after the intervention</p> <p>Concluded need social and political action within a community dev framework. Must address structural and environmental factors</p> | <p>control and participation</p> <p>Other factors including strong traditional beliefs and values, effective strategies were targeted to community needs, brought about structural change to make healthier food choices easier</p> |   |  |                  |
| Luepker 1996<br>In McDermott, Hastings review | RCT<br>School students<br>US<br>"The CATCH programme"<br>Students from ethnically diverse backgrounds<br>A total of 5106 | Implemented in four US states, aimed to lower the fat content of school meals and students' intake of fats.<br>A randomized, controlled field trial at four sites with 56 intervention and 40 control elementary schools. | Intervention:<br>Twenty-eight schools participated in a third-grade through fifth-grade intervention including school food service modifications, enhanced physical education (PE), and classroom health curricula. | Changes in the fat content of food service lunch offerings<br>At the level of the individual student, serum cholesterol change was the primary end point | <p>In intervention school lunches, the percentage of energy intake from fat fell significantly more than in control lunches</p> <p>At two-year follow-up, fat intake significantly reduced</p>   |   |   | High quality study according to McDermott, Hastings et al.<br>RCT<br>Multi-site, large |                  |

| First author and year                             | Study type and participants  | Objectives/ Methodologies  | Social marketing intervention  | Outcome measures  | Findings: Efficacy (did it work differently for the population groups?)   | Findings: Features (why did it work?)   | Market segments, groups and influencers | Quality rating Strengths & weaknesses of study   | Information gaps   |
|---|--|--|--|---|---|---|---|--|--|
|   | initially third-grade students from ethnically diverse backgrounds in public schools located in California, Louisiana, Minnesota, and Texas.   |  | Twenty-eight additional schools received these components plus family education.   |   | Conclusion: able to modify the fat content of school lunches, and improve eating and physical activity behaviours in children during 3 school years.  |   |   |  |  |
| O'Loughlin 1999<br>Via McDermott, Hastings review | Impact evaluation – 3 yr repeat independent sample survey and a 5 yr longitudinal cohort sample survey<br><br>Population group – low income, inner city, one of the most disadvantaged urban communities in Canada | To evaluate the impact of a 4 year, community based CVD prevention programme among adults aged 18-65 yrs living in St Henri (low income neighbourhood in Montreal) | Included more than 40 interventions to promote heart health (eg, menu labelling in restaurants, a point-of-choice nutrition education campaign in local grocery stores, direct-mail print education materials, mailed intervention |   | Few overall programme effects, but some component interventions showed promise re acceptability and impact, eg, point-of-choice info campaigns to encourage healthy food choices were feasible, and in restaurants reached more males, who are often hard to reach. |   |   | Medium level quality of evidence - McDermott, Hastings   | Future research re low income populations should test strategies that promote community control of programme objectives, ensure good fit with local concerns/values, emphasise wide-scale community participation and long-term sustainability |
| Reger 1999  | Quasi-experimental study with one intervention city and one comparison city  | To report on the effectiveness of a media-only approach to change consumption from high-fat milk to low-fat milk   | 6 week media campaign – ads (TV, radio, newspaper) and PR strategies eg, press conf, press release, taste events   | Purchase /consumption of low-fat milk<br><br>Note: six types of food contribute | In the intervention city, low-fat milk sales increased from 29% of all milk sales before the campaign to 46% in the   | Breaking complex behaviour into easy to understand steps (Consumption of saturated fat – choose low fat milk – simple |   | Weaknesses: One intervention and one comparison community only – ideally should use a cluster of randomly assigned |  |

| First author and year                            | Study type and participants     | Objectives/ Methodologies   | Social marketing intervention  | Outcome measures  | Findings: Efficacy (did it work differently for the population groups?)  | Findings: Features (why did it work?)   | Market segments, groups and influencers | Quality rating Strengths & weaknesses of study   | Information gaps |
|--|---------------------------------|---|--|---|--|---|---|--|------------------|
|  |                                 |   | <p>Campaign adv board of community leaders and local health pros provided credibility and guidance</p> <p>Collected milk sales data from supermarkets</p> <p>Pre and post intervention telephone surveys</p> | <p>half of the saturated fat consumed by the average American adult (milk, cheese, margarine, butter, beef, baked goods) - so can break down to simple messages</p> | <p>month after the campaign Increase maintained after 6 months follow up</p> <p>Media-only approach sufficient to encourage change</p> <p>Similar results to a similar media-plus-community programmes campaign previously</p>         | <p>message crucial)</p> <p>Placement / targeting of advertising: Use of paid advertising rather than 'public service announcements'</p> |   | <p>treatment and control communities in Differences in baseline milk drinking may limit comparability</p> <p>A media-only approach may not be effective for some nutrition messages, eg, promoting whole-grain consumption</p> |                  |
| Resnico w 2004<br>Via McDermott, Hastings review | African-American church members | church-based intervention to investigate fat intake (Body and Soul) examined the impact of a multi-component intervention (based on motivational interviewing) on the fat intake of African-American church members | Church-based intervention comprising policy changes, taste-testing, distribution of self-help materials, motivational interviewing, and training for lay church members                                      | Fat intake (also F and V)   | The intervention group showed small but significantly greater changes in the desired direction for percentage calories from fat when compared with individuals in the control condition (p<0.05).<br><br>Positive effect on fat intake |   |   | Medium level quality of evidence - McDermott, Hastings   |                  |

| First author and year  | Study type and participants   | Objectives/ Methodologies   | Social marketing intervention   | Outcome measures  | Findings: Efficacy (did it work differently for the population groups?)  | Findings: Features (why did it work?)   | Market segments, and influencers  | Quality rating Strengths & weaknesses of study  | Information gaps |
|--|---|---|---|---|--|---|---|---|------------------|
| Sallis 2003<br>Key article (although medium quality of evidence) | RCT (single study)<br>US middle school students<br>Note 44.5% of students in the study were non-white | To evaluate the effects of environmental, policy, and social marketing interventions on physical activity and fat intake of middle school students on campus<br><br>Environmental and policy interventions are the least studied component of school health promotion, but eg, of effective programmes include CATCH and Ellison et al (both improved nutritional content of foods served at schools)<br><br>Consumer research was done | 24 middle schools<br><br>2 yr intervention<br><br>Nutrition interventions to provide and market low-fat foods at all school food sources, including cafeteria food, a la carte sources, school shops and bag lunches<br>School staff and students engaged in policy change efforts,<br>interventions with school food staff to increase low-fat options<br>Aimed to change school policies and environments | Fat intake (total and saturated fat from all sources purchased at school or brought home)<br><br>Physical activity<br><br>Primary outcomes measured by direct observation and existing records<br><br>(chose fat as the one nutrition target as it is linked to many health problems) | Intervention was not effective for total fat or saturated fat<br><br>But p.a. interventions increased physical activity of boys<br><br>Was a significant reduction in BMI among intervention boys,<br>compared to control, but no effect for girls |   | Authors noted the powerful financial barriers for schools to reduce avail of popular high-fat items<br><br>Single largest barrier was the requirement for school food services to be financially self-supporting – financial incentives to serve products students preferred (esp. processed foods advertised in mass media)<br>Financial risks, eg, of introducing fruit<br><br>Media efforts hampered by heavy marketing of unhealthy foods | Medium quality of evidence – McDermott, Hastings<br><br>Need research to document barriers to school food environment changes |                  |
| Samuels 1993<br>Early US experience                              | Descriptive study of national US social marketing campaign re dietary fat                             | Objectives of this paper – to describe achievements and lessons learned from first three yrs of the campaign<br><br>Objectives of the programme, Project  | Consumer research was used to develop campaign (motivation most important factor – convenience, habits and taste were main barriers)  | To reduce dietary fat consumption from 37% of calories to 30%   | concern about fat rose significantly in 1990 and 1991, during the campaign (42% compared to 9% in 1983)  | Comprehensive, integrated, use multiple communications channels, target a range of audiences<br><br>Importance of | No specific info<br><br>Although local programmes/voluntary sector could be viewed as 'influencers'   | Strengths:<br>Large national campaign, lessons learned from experience<br><br>Limitations:<br>Descriptive study not           |                  |

| First author and year | Study type and participants | Objectives/ Methodologies   | Social marketing intervention  | Outcome measures | Findings: Efficacy (did it work differently for the population groups?)   | Findings: Features (why did it work?)   | Market segments, groups and influencers | Quality rating Strengths & weaknesses of study                     | Information gaps |
|-----------------------|-----------------------------|---|--|------------------|---|---|---|--|------------------|
|                       |                             | <p>LEAN, were to bring about major change in the US's food supply, food marketing and consumer practices</p> <ul style="list-style-type: none"> <li>- comprehensive programme aimed at reduction of dietary fat</li> <li>Programme designed to promote dietary change among people, reinforce the change through organisations, and facilitate the change in settings where people are making food choices</li> </ul> | <p>to change)</p> <p>4 elements:</p> <ol style="list-style-type: none"> <li>1) media strategies</li> <li>2) chefs and food journalists demonstrate how to influence behaviours and popular taste</li> <li>3) Partnerships with government, volunteer and industry reinforce the message</li> <li>4) community programmes create and institutionalise change</li> </ol> <p>First campaign by private sector organisation, with support of broad coalition of groups</p> |                  | <p>Accomplishme nts of programme: -contribution of govt and private industry (national coalition could act quickly, make decisions, had political clout, could extend programme)</p> <p>-TV advertising reached over 50% of TV viewing audiences in the first yr</p> <p>Heavy response to the ads thru the hotline</p> <p>Key finding: public service ads achieved less than well-placed publicity</p> <p>Publicity provided immediately usable info, created image of an action oriented campaign, publicity tailored to needs of target</p> | <p>raising awareness AND reducing environmental barriers to behaviour change</p> <p>Coordination across govt, industry and voluntary sectors (but guidelines on corporate collaboration were important, to ensure message not compromised and no specific commercial product promoted)</p> <p>Partnership with other organisations essential ingredient for success</p> <p>Collaborations with private sector expanded the campaign</p> |   | <p>experimental</p> <p>Just useful in terms of lessons learned</p> |                  |

| First author and year                             | Study type and participants   | Objectives/ Methodologies  | Social marketing intervention  | Outcome measures  | Findings: Efficacy (did it work? Did it work differently for the population groups?)   | Findings: Features (why did it work?)  | Market segments, groups and influencers | Quality rating Strengths & weaknesses of study   | Information gaps   |
|---|---|--|--|---|--|--|---|--|--|
| Steenhuijs 2004<br>Via McDermott, Hastings review | RCT<br>Dutch supermarket shoppers<br>In total, 2203 clients of 13 supermarkets were included in the sample.   | Supermarket intervention – Dutch<br>Environmental and Educational Nutrition Programmes in the Netherlands<br>The purpose of this study is to assess the effect of nutrition education with and without shelf labelling on reduced fat intake in Dutch supermarkets | Intervention comprised labelling of healthy foods, increasing the range of healthy foods available, brochures and a 'self-help' manual<br>Three experimental conditions – control, educational programme with labelling, educational programme without labelling | Total fat intake  | No impact on the fat intake of supermarket shoppers.<br>Results at six months were fairly similar.   |  |   | Medium level quality of evidence – McDermott, Hastings<br>Info gap: should do studies in supermarket settings to combine labelling with price reduction strategies.  |  |
| Story 2003  | RCT to evaluate effectiveness of a school-based multi-component intervention to reduce fatness in American-Indian school children<br>Study involved over 1700 children in 41 schools in 7 different American-Indian communities in four states (multi centre) | Goal of the intervention was to reduce the fat in school lunches to no more than 30% of energy from fat, All schools located on or near Indian reservations  | 3 yr intervention by school food service staff in intervention schools<br>Based on formative research<br>And CATCH programme<br>Used social learning theory<br>5 components: Nutrient guidelines, behavioural guidelines for school food service                 | Lower body fat (primary)<br>Lower fat in school meals, improve physical activity and dietary intake and improve KAB re diet and p.a. (secondary outcomes) | Programme was successful in reducing fat in school lunches to less than 30% - in all four field sites<br>Process evaluation showed high implementation rates for the behavioural guidelines at end of study, with gradual changes over | Duration of intervention important (needed all three years to sustain change in implementation of behavioural guidelines – interventions may need to be at least 2 yrs duration<br>Staff development that was enjoyable, experiential and skill based (and ongoing |   | Strengths – large number of schools serving American-Indian children, representation of seven Indian tribes from diverse regions, well designed multi-component intervention, standardised data collection<br>Process evaluation lends credence to the results | Need more interventions/ research aimed at vending machines (food is energy-dense, micronutrient poor) |



| First author and year | Study type and participants | Objectives/ Methodologies | Social marketing intervention   | Outcome measures | Findings: Efficacy (did it work differently for the population groups?)                                      | Findings: Features (why did it work?)   | Market segments, groups and influencers | Quality rating Strengths & weaknesses of study  | Information gaps |
|-----------------------|-----------------------------|---------------------------|---|------------------|--|---|---|---|------------------|
|                       |                             |                           | personnel, school food service personnel training, school kitchen visits, intervention materials (eg, posters, videos, incentives). |                  | the 3 yr intervention period (it took all three years to achieve 70% implementation with most achieving 90%) | consultations were essential to success |   | Should be used as a model for other schools, not just American-Indians<br><br>Limitations – involvement of school food service staff in data collection methods (may have led to a bias in reporting positive results (did try to minimise this though) |                  |

| First author and year        | Andreasen's Six Benchmarks of Social Marketing Included |  |  |  |  |  |  |  |  |
|------------------------------|---|--|--|--|--|--|--|--|--|
| Bowen 2002<br>Review article |   |  |  |  |  |  |  |  |  |
| Caballero 2003               | Reviewed by McDermott et al                             |  |  |  |  |  |  |  |  |
| Delichatsios 2001            | Reviewed by McDermott et al                             |  |  |  |  |  |  |  |  |

|   |   |
|---|---|
| French 2001   | <p><b>Behaviour change</b> – purchase of low-fat snacks from vending machines<br/> <b>Audience research</b> – intervention based on results of other studies looking at pricing effects for low-fat vending snack purchases<br/> <b>Segmentation</b> – secondary schools and worksites<br/> <b>Exchange</b> – four pricing levels (equal price, 10% reduction, 25% reduction, 50% reduction)<br/> <b>Marketing mix</b> – four pricing levels and three promotional conditions (none, low-fat label, low-fat label plus promotional sign)<br/> <b>Competition</b> – lower price options for low-fat products seek to minimise competition from high-fat products</p>   |
| Glanz 2004  |   |
| Review of the literature on increasing fruit and vegetable intake by changing environments, policy and pricing in restaurants |   |
| Havas 2003  | Reviewed by McDermott et al   |
| Lee 1995  | <p><b>Behaviour change</b> – Programme promoted an increased intake of fruit, vegetables and wholegrain bread, and discouraged the eating of takeaway foods and sugar measured by turn over of food items in community store<br/> <b>Audience research</b> – ?<br/> <b>Segmentation</b> – remote Aboriginal community Minjilang<br/> <b>Exchange</b> – ?<br/> <b>Marketing mix</b> – ?<br/> <b>Competition</b> – ?</p>  |
| Details of program reported elsewhere   |   |
| Luepker 1996  | Reviewed by McDermott et al   |
| O'Loughlin 1999   | Reviewed by McDermott et al   |
| Reger 1999  | <p><b>Behaviour change</b> – Purchase /consumption of low-fat milk<br/> <b>Audience research</b> – campaign messages, advertisements and public relations strategies were the same as those used in a previous campaign<br/> <b>Segmentation</b> – ?<br/> <b>Exchange</b> – community leaders and health professional used to support campaign<br/> <b>Marketing mix</b> – 6 week media campaign – ads (TV, radio, newspaper) and PR strategies eg, press conf, press release, taste events<br/> Campaign advisory board of community leaders and local health profs provided credibility and guidance<br/> Placement / targeting of advertising: use of paid advertising rather than 'public service announcements'<br/> <b>Competition</b> – taste testing undertaken to stress that low-fat milk tastes good</p> |

|                                     |  |
|-------------------------------------|--|
| Resnicow 2004                       | Reviewed by McDermott et al  |
| Sallis 2003                         | Reviewed by McDermott et al  |
| Samuels 1993<br>Early US experience | <p><b>Behaviour change</b> – Project LEAN (Low-fat Eating for Americans Now) aimed to reduce dietary fat consumption</p> <p><b>Audience research</b> – Consumer research was used to develop campaign</p> <p><b>Segmentation</b> – ?</p> <p><b>Exchange</b> – motivation most important factor – convenience, habits and taste were main barriers to change, practical information about how to select and prepare low-fat alternatives within a balanced diet was a key strategy, campaign had a 'Hotline' to answer any questions related to the campaign</p> <p><b>Marketing mix</b> – 4 elements:</p> <ol style="list-style-type: none"> <li>1) media strategies</li> <li>2) chefs and food journalists demonstrate how to influence behaviours and popular taste</li> <li>3) Partnerships with government, volunteer and industry reinforce the message</li> <li>4) community programmes create and institutionalise change</li> </ol> <p><b>Competition</b> – campaign was also run through local supermarket chains, neighbourhood grocery stores, restaurants and churches</p> |
| Steenhuis 2004                      | Reviewed by McDermott et al  |
| Story 2003                          | Reviewed by McDermott et al  |

Summary table of attitudes/behaviours and barriers (real and perceived)

| First author and year | Study type and participants   | Objectives/ Methodologies  | Findings: Attitudes and behaviours  | Findings: Real and perceived barriers eg, cost, cultural values..... | Quality rating Strengths & weaknesses of study | Information gaps  |
|-----------------------|---|--|---|--|--|---|
| Amosa 2001            | Comparative study using diet diaries<br>82 female participants  | To examine the frequency of eating in young Polynesian and European women as measured by 7 day diet diaries, and to compare meal frequency in those classified as obese with their non-obese counterparts  | European women ate breakfast more often than Polynesian women<br>Polynesian women ate fewer breakfasts and fewer meals<br>Eating breakfast is shown (in other research – Schlundt) to reduce intake of dietary fat and minimise impulsive snacking.<br>Study showed that young women in NZ, both Polynesian and European, are not eating breakfast every day.<br>Polynesian women ate breakfast about 3x wk on average, while Euro women ate breakfast about 4x wk.   |  |  |   |
| Cook 2001             | Controlled trial<br>Male workers  | To test the hypotheses that a relatively low intensity workplace intervention with male workers could significantly improve dietary behaviours (including less high fat food), increase physical activity and reduce blood pressure and body weight. | Fewer than 20% of participants achieved the recommended fat score (30-34% of energy as fat)<br>A higher fat intake was associated with younger age, lower nutrition knowledge and reduced belief in the importance of healthy eating.<br>Fat consumption decreased as a result of the intervention.<br>43% of obese participants were not contemplating losing weight.<br>Study showed that a low intensity intervention can improve nutrition knowledge and change behaviours in a hard to reach population. |  |  |   |
| Utter 2006            | Secondary data analysis of the 2002 National Children's Nutrition Survey (large, cross-sectional population survey<br>Children in the | To provide info relevant to improving nutrition and p.a. among Maori, Pacific and NZ European/other children<br>- to describe how prevalences vary   | Behaviours:<br>Topic 3....<br>Maori and Pacific children may be consuming more fatty and sugary foods than NZEO children, as have higher consumption of soft drinks, hamburgers and meat pies<br>Generic.....<br><i>Breakfast-skipping</i><br>Both Maori and Pacific children significantly more  |  |  | Need further research to determine the factors mediating meal consumption among Pacific children and Maori children |

| First author and year | Study type and participants   | Objectives/ Methodologies   | Findings: Attitudes and behaviours   | Findings: Real and perceived barriers eg, cost, cultural values.... | Quality rating Strengths & weaknesses of study | Information gaps |
|-----------------------|---|---|--|---|--|------------------|
|                       | <p>survey, Maori and Pacific children over-sampled</p> <p>Study sample 3,275 students (Maori and PI students were over-represented in indicators of deprivation)</p> <p>Large nationally representative survey with over-sampling of M and PI</p> <p>Limitation: broader aspects determining food choices and how they may be moderated by ethnicity are not understood</p> | <p>by ethnicity</p> <ul style="list-style-type: none"> <li>- to identify appropriate points of intervention for ethnic populations</li> </ul> <p>Secondary data analysis of the 2002 National Children's Nutrition Survey</p> | <p>likely to skip breakfast than NZ European/other children</p> <p>More than 40% of Pacific children and 23% of Maori skipped breakfast either sometimes or always (previous findings from CNS show skipping breakfast associated with obesity)</p> <p>And Amosa 2001 showed Euro women more likely to eat breakfast than Poly women</p> <p>May be more likely to eat more snacks or buy takeaway food...</p> <p><i>School tuckshop</i></p> <p>Although common for all children to buy some or most of their school food at the tuckshop, M and PI students significantly more likely to do so</p> <p>High avail and low cost of unhealthy foods from school food outlets (Carter, Swinburn 2004)</p> <p><i>Dairy or takeaway food</i></p> <p>Maori 3.3 x more likely, and PI 4.7 times more likely to buy some of their school food from a dairy or takeaway</p> <p>Foods prepared away from home higher in fat and saturated fat</p> <p>And consuming food at school from a dairy/takeaway correlated with BMI among NZ children (Scragg et al 2004)</p> <p><i>Bringing food from home</i></p> <p>NZEO children significantly more likely to bring all of their school food from home</p> <p>Food-specific</p> <p>No significantly differences between Maori and NZEO re fruit/veg, milk, fruit drinks, hot chips, but Maori children twice as likely to consume fizzy drinks five or more times a week and Pacific children more than three times compared to NZEO</p> <p>Pacific children more likely to eat fruit</p> |   |  |                  |

| First author and year | Study type and participants  | Objectives/ Methodologies  | Findings: Attitudes and behaviours   | Findings: Real and perceived barriers eg, cost, cultural values....   | Quality rating & strengths & weaknesses of study | Information gaps |
|-----------------------|--|--|--|---|--|------------------|
| Worsley 1991          | Early survey on NZ attitudes<br>Over 1000 shoppers were interviewed during each survey, as part of the evaluation of the Heart Food Festival in 1988-89. | To assess NZ food shoppers' nutrition and food concerns and attitudes to cholesterol screening | <p>Results relevant to fat and sugar: 27 percent were concerned about the presence of fat in foods, 18 percent were concerned about salt, and 14 percent were concerned about sugar.<br/>Over half indicated that reductions in fat intake would make their diets healthier.<br/>Also, one in five reported they were aware of the New Zealand nutrition guidelines. Only one third of respondents could correctly identify the bottom row of the healthy food pyramid.</p> <p>Few differences were observed between the responses of early and late school leavers. In contrast, pronounced differences were associated with gender and the respondents' age groups. The results suggest that awareness of links between nutrition and heart disease is widespread.</p> | <p>The authors of this study noted that the cost of food relative to household income is a major barrier to healthy food choices.</p> <p>Info gap:<br/>More info needed on associations between nutrition knowledge and attitudes, and social class, age and gender. (from 1991 though)</p> |  |                  |

## Summary table of risk factors – energy-dense, micronutrient-poor foods

| First author and year   | Study type and participants   | Objectives/ Methodologies   | Findings:<br>Risk factors (modifiable, non-modifiable, how modified?)  |
|---|---|---|--|
| <b>Risk factor: Heavy marketing of energy-dense, micronutrient-poor foods</b> |   |   |  |
| Block 2004 (cited in Utter 2006)  |   |   | Re heavy marketing of fast food<br>Geographic analysis of fast food restaurants in the US showed that predominately black neighbourhoods had more fast food outlets per square mile than predominantly white neighbourhoods  |
| Hastings 2004   | Systematic review of all published research into effects of food advertising to children  |   | Food is promoted to children more than any other product (apart from toys, but then only at Xmas)<br>TV is the main form of ads, and mostly for breakfast cereals, soft drinks, confectionary, savoury snacks and fast food<br>Advertised diets contrast sharply with nutritional guidelines (consistently higher in salt, sugar and fat)<br>A few studies in the review examined other forms of food promotion – packaging, vending machines in schools.<br>Evidence that food promotion influences children's food preferences and purchase behaviour<br><br>Conclusion: not cast-iron proof of an effect, but there is sufficient evidence of an effect – commercial food promotion has a significant influence on children |
| Henderson 2005 (cited in Utter 2006)  |   |   | More food ads are aired during African-American TV programmes than general market programmes, and these ads more likely to be for high fat/high sugar foods  |
| Lobstein 2005   | Correlational study? compares two data sets to look for correlation/associations<br><br>Population group – children in the US, Australia and 8 European countries | To examine ecological evidence for a link between advertising to children and the risk of overweight.<br><br>Used survey data re ads and prevalence data re overweight<br><br>Notes the evidence base for effective prevention of childhood obesity is poor | Evidence for association between obesogenic food advertising and child overweight – significant association between the proportion of children overweight and the numbers of ads per hr on children's TV, especially those that encourage consumption of energy-dense foods (nature of ads appear significant)<br><br>Few ads for healthy foods were shown (at most, in Finland – 6% of all ads)<br><br>Conclusion: need for restriction of advertising to children, as children have less understanding of persuasive intent, less able to judge ads critically   |

| First author and year | Study type and participants | Objectives/ Methodologies   | Findings: Risk factors (modifiable, non-modifiable, how modified?)  |
|-----------------------|-----------------------------|---|---|
|                       |                             | Hastings review 2003 – probable direct link between advertising and child obesity   |   |
| Maher 2005            | Pilot study                 | To examine the extent and content of outdoor food ads and food availability from outlets in the vicinity of secondary schools<br><br>Small pilot study in just two regions, so may not generalise | NZ evidence that food marketing is heavy around NZ schools – 61.5% of all outdoor ads near schools were for food. Of food ads, 70.2% were for 'unhealthy' foods – main ones soft drinks 21.6%, frozen confectionary 16.2%, savoury snacks 11.4%, alcohol 8.1% (probably an underestimate as took conservative definition of 'healthy')<br><br>Food outlets were closer to sec schools than other outlets. Of schools that sold meals, the proportion with a salad option was significantly lower in the low SES neighbourhoods.<br><br>NZ research shows that food ads on TV during children's hours are predominantly for foods high in sugar, fat and/or salt (Wilson et al 1999).<br><br>Prop of food ads greater in high SES areas, but food ads in low SES were significantly closer to the secondary schools relative to those in high SES areas.<br><br>Also higher prop of outlets selling alcohol in the high SES neighbourhoods |
| Wilson 1999           | Observational study?        | To examine the nutritional quality of food in TV food ads that are targeted at children<br><br>Study limited by brief sampling period, and use of just one channel                                | An Australian study also found that low SES areas had higher exposure to fast-food outlets<br><br>Of 269 food ads, 63% were for foods high in fat and/or sugar (higher than Australian study – 46%)<br><br>Snack foods shown in 76% of ads<br><br>No food ads included the healthy foods eaten by M and PI (eg, fish, taro, bananas, coconut, kumara)<br><br>The only nutritional low-cost foods advertised were low-sugar breakfast cereals (9% of ads) – implications re food security for low income people<br><br>Food ads for children generally reflect poor dietary patterns   |



### Appendix 3: Summary table – Sugar-sweetened beverages

There were 24 references initially selected. Two researchers then excluded 18 not relevant to our research Qs, leaving 6 references in total for this topic. A further five papers were excluded after reading the full text, as they were not social marketing interventions.

| First author and year | Study type and participants   | Objectives/ Methodologies   | Social marketing intervention   | Outcome measures   | Findings: Efficacy (did it work? Did it differently for the population groups?)  | Findings: Features (why did it work?)  | Market segments, groups and influencers                                   | Quality rating Strengths & weaknesses of study                                       | Information gaps |
|-----------------------|---|---|---|--|--|--|---|--|------------------|
| McGarvey et al, 2004  | Nonrandomised controlled 1 year prospective study of two WIC states, Virginia, USA.<br><br>336 WIC parents with 2-4 year old children were recruited at baseline. 186 completed the study, with 121 in the intervention group and 65 in the comparison group. | Objectives of this paper – to test the benefits of a programme that targeted 6 parental behaviours to prevent obesity.<br><br>'FIT WIC' childhood overweight prevention programme grounded in social cognitive theory and self efficacy theory.<br><br>Three pronged intervention: education, staff reinforcement, community reinforcement.<br><br>Control group received standard WIC programme, educational groups every 2 months and an individual session | Clear behaviour change goals based in theory.<br><br>Audience research by WIC staff reviewing WIC statistics and clinic operations to choose the two sites.<br><br>Marketing mix using promotion, people (training of staff to model appropriate behaviours) and place (making the intervention materials available within community activity/service centres).<br><br>Intangible exchange of long term benefits. | Care-givers report on child's behaviour in the last seven days on a 6 point scale (zero times a day) - 6 (five or more times a day). English and Spanish questionnaires. | Participants in both groups reported increased frequency of offering the child water, and the increase was significantly greater for participants at the intervention site. Spanish speaking participants reported a greater increase in frequency of offering water instead of sweetened beverages than English speaking participants.<br><br>Community coalition members and WIC nutritionists | Influencing parental behaviour to promote healthy eating in children is possible. Authors describe significant difficulties and costs with the intervention. Least costly components were the materials and their development, and the scheduled sessions. Most costly component was the staff time contacting community partners, educating WIC staff about use of the materials and monitoring staff as the intervention participated in | Segmentation carried out via standard demographic survey only, eg income. | 55 % retention and small sample size. Not randomised. Outcome measure not validated. |                  |

| First author and year | Study type and participants | Objectives/ Methodologies   | Social marketing intervention | Outcome measures | Findings: Efficacy (did it work differently for the population groups?) | Findings: Features (why did it work?)  | Market segments, groups and influencers | Quality rating Strengths & weaknesses of study | Information gaps |
|-----------------------|-----------------------------|---|-------------------------------|------------------|---|--|---|--|------------------|
|                       |                             | with a WIC nutritionist every 6 months.<br>Intervention group received same frequency and duration of standard WIC programme, but modified the educational content and activities to reinforce the nutritional messages, one of which was 'drink water instead of sweetened beverages'. |                               |                  | formed strong active partnerships over the course of the programme.     | staff modelling activities.<br>Prioritising staff time for community outreach was crucial. |   |  |                  |

| First author and year | Andreassen's Six Benchmarks of Social Marketing Included  |
|-----------------------|---|
| McGarvey et al, 2004  | <p><b>Behaviour change</b> – intervention educational content and activities to reinforce the nutritional messages, one of which was 'drink water instead of sweetened beverages'</p> <p><b>Audience research</b> – significant formative research</p> <p><b>Segmentation</b> – WIC parents with 2-4 year old children</p> <p><b>Exchange</b> – Intangible exchange of long term benefits</p> <p><b>Marketing mix</b> – Marketing mix using promotion, people (training of staff to model appropriate behaviours) and place (making the intervention materials available within other community activity/service centres)</p> <p><b>Competition</b> – three pronged intervention: education, staff reinforcement, community reinforcement</p> |

### Appendix 4: Summary table – Television viewing

44 papers were initially selected for review. Two researchers excluded 38 not relevant to our research questions, leaving 6 references in total for this topic. A further five papers were excluded after reading the full text, as they were not on social marketing interventions, and the remaining paper was included.

| First author and year | Study type and participants   | Objectives/ Methodologies   | Social marketing intervention  | Outcome measures   | Findings: Efficacy (did it work? Did it work differently for the population groups?) <sup>4</sup>  | Findings: Features (why did it work?)  | Market segments, groups and influencers  | Quality rating Strengths & weaknesses of study   | Information gaps |
|-----------------------|---|---|--|--|--|--|--|--|------------------|
| Robinson et al, 2003  | Twelve week, two arm RCT carried out in low income neighbourhoods in California USA. Sixty-two 8-10 year old African-American girls and their parent's. | Objectives of this paper – to test the benefits of a programme that targeted behaviours to prevent weight gain. The intervention was grounded in Bandura's social cognitive model. Two pronged intervention: dance classes after school; television reduction lessons. Control group received newsletters and health education lectures. Intervention group received five home based lessons about TV reduction. African-American history | Clear change goals based in theory. Significant formative research into design of programme via focus groups and feasibility trials. Marketing mix using place (multiple sites for the intervention); promotion (newsletters, lectures, lessons, activity classes), product (the intervention was carefully tailored) people (African-American role models). Intangible exchange of long term benefits, including improved academic performance. | Media use behaviour was collected with previously validated instruments, TV time was self-reported by the girls, and parents self reported overall household television viewing. | The trial was not designed to have sufficient statistical power to detect changes in BMI and other outcomes. Having said that, they were analysed, and the intervention was statistically successful at reducing media use by 23%, reducing total household television viewing, and reducing dinners eaten with the television turned on, in the intervention group relative to the control group. | Integrating the design of the intervention into the community via focus groups and feasibility trials. Health, Culture and School Performance values were tied in together. The focus was not weight loss as this was not valued by the community. | None described, apart from the obvious choice of a low income African-American sample. | High retention >80% across most intervention components. Small pilot sample size restricted ability to observe statistically significant differences. Randomised. Some outcome measures validated, but watching time was a self-report. High quality study design and execution. |                  |

| First author and year | Study type and participants | Objectives/ Methodologies   | Social marketing intervention | Outcome measures | Findings: Efficacy (did it work? Did it work differently for the population groups?) | Findings: Features (why did it work?) | Market segments, groups and influencers | Quality rating Strengths & weaknesses of study | Information gaps |
|-----------------------|-----------------------------|---|-------------------------------|------------------|--|---------------------------------------|---|--|------------------|
|                       |                             | and cultural themes were integrated into the lessons. Behavioural goals included self monitoring; a two week TV-turnoff; budgeting viewing hours, and 'intelligent viewing'. Electronic TV time managers were provided. Five newsletters were mailed to parents/guardian. |                               |                  |  |                                       |   |  |                  |

| First author and year | Andreasen's Six Benchmarks of Social Marketing Included   |
|-----------------------|---|
| Robinson et al 2003   | <p><b>Behaviour change</b> – reduction in television viewing</p> <p><b>Audience research</b> – significant formative research</p> <p><b>Segmentation</b> – low income families with 8-10 year-old African-American girls</p> <p><b>Exchange</b> – intangible exchange of long term benefits including improved academic outcomes</p> <p><b>Marketing mix</b> – Marketing mix using place (multiple sites for the intervention); promotion (newsletters, lectures, lessons, activity classes), product (the intervention was carefully tailored) people (African-American role models).</p> <p><b>Competition</b> – Behavioural goals included self monitoring; a two week TV-turnoff; budgeting viewing hours; and 'intelligent viewing'. Electronic TV time managers were provided. Five newsletters were mailed to parents/guardian</p> |

## Appendix 5: Summary table –Home environments

Nine social marketing interventions aimed at home environments supporting healthy food choices for children were identified from the 72 abstracts initially identified and the 24 papers retrieved for consideration. The 12 papers in this table relate to these interventions. A further eight papers and reports not classified as social marketing, but were reviewed for attitudes, risk/protective factors and background information.

| First author and year | Study type and participants  | Objectives/ Methodologies  | Social marketing intervention  | Outcome measures  | Findings: Efficacy (did it work? Did it work differently for the population groups?)  | Findings: Features (why did it work?)   | Market segments, groups and influencers  | Quality rating Strengths & weaknesses of study  | Information gaps   |
|-----------------------|--|--|--|---|---|---|--|---|--|
| Anderson (2001)       | Low income, women with children enrolled in the 'Special Supplemental Nutrition Program for Women, Infants and Children' (WIC) programme and Community Action Agency Supplemental Food Program (CSFP) in Michigan. | Michigan Farmers' Market Programme Evaluation of 5 A Day fruit and vegetable consumption Project FRESH – to determine effectiveness of fruit and vegetable coupons and education in changing consumption behaviour in low-income women | Behaviour change – fruit and vegetable consumption and behaviour Formative research of audience WIC & CSFP women. Research elements pretested Marketing mix – communication / education element, coupons | Increase attitudes towards fruit and vegetable cost accessibility and consumption behaviour in low income women | Combining education about use, storage and nutrition value of fruit and vegetable coupons important 2 groups that received education were more likely to have heard phrase 5 A Day for Better Health, 2 groups with coupons more likely to visit farmers' market Education sign pos effect on post-test and attitude scale and on reducing belief that preparing fruit and vegetable is bothersome. Coupons had sign_pos effect | Maximum impact on attitudinal and consumption behaviours achieved thru combined coupon and education intervention components Reduced perceived barriers to change in attitudes and consumption for fruit and vegetable (cost, availability, personal and family preference and convenience) | Low income women – pregnant, breastfeeding and caring for young children Maximum impact on combined attitudinal and consumption behaviour achieved through combined coupon and education intervention components | Subjects were randomly assigned to one of four interventions (control group included), low attrition rate, good response rate to all components. Questionnaire was self-administered which could have resulted in bias, minor pre-existing differences between groups | Authors note future research following participants over time needed to verify the direct and indirect impact of education and coupons of fruit and vegetable consumption over time. |

| First author and year | Study type and participants   | Objectives/ Methodologies  | Social marketing intervention  | Outcome measures   | Findings: Efficacy (did it work differently for the population groups?)   | Findings: Features (why did it work?)  | Market segments, groups and influencers   | Quality rating Strengths & weaknesses of study  | Information gaps   |
|-----------------------|---|--|--|--|---|--|---|---|--|
|                       | (19.3% attrition)   | education intervention component   |  |  | on belief that Vegetables are more costly<br>Both sign pos effects on perceived availability of fruit and vegetable and change in self-rep consumption behaviour.                                 |  | (cost, availability, personal and family preference and convenience)<br>Reducing perceived barriers can help low-income women increase fruit and vegetable intake |   |  |
| Baranowski (2003)     | Baylor GEMS pilot study – The Fun, Food and Fitness Project<br>Randomised controlled pilot study 12 week<br>Participants – 35 African-American girls age 8 years and their parents or caregivers<br>treatment (n=19)<br>control (n =16) | Increase fruit and vegetable consumption, increase water, physical activity<br>Formative assessment with 73 girls and 82 parents<br>Two groups – Both attended summer day camps<br>Internet programme aimed at 4 groups control girls, control parents, treatment girls and treatment parents. | 4 week summer day camp<br>8 week internet based programme plus one Saturday meeting for the girls<br>Education, internet education, lottery to increase log on rates | Behaviour change<br>- Increase in fruit and vegetable intake<br>Reduction in high fat and related calories<br>Increase in water – decrease in soft drinks and sweetened fruit drinks<br>Increase mod to vigorous physical activity to 60 minutes per day | Increase fruit and vegetable consumption – lower total calories and percent calories from fat, increase water – less consumption of sweetened drinks, increase physical activity<br>Change in BMI | Day camp was more successful than live-in would have been (girls wouldn't have attended)<br>\$100 lottery incentive increased log in rates among parents / caregivers in control and intervention group<br>Internet allowed programme to be delivered as designed, home based, minimise inconvenience, appeals to children | African-American girls and family caregivers<br>Middle and upper income girls   | Randomised controlled pilot study, intervention based strong theoretical framework<br>Authors note small sample size and self-reporting of dietary intake are limitations of study design | More research on identifying procedures that maximize internet log-on rates. |
| Beech (2003)          | Memphis GEMS pilot study  | Objective to assess the feasibility,   | Intervention – family based  | Behaviour change – increase in water   | Hypothesis that compared with   | Compared with the girls in the   | African-American  | Pilot study only, small   |  |

| First author and year | Study type and participants   | Objectives/ Methodologies  | Social marketing intervention   | Outcome measures  | Findings: Efficacy (did it work differently for the population groups?)   | Findings: Features (why did it work?)  | Market segments, groups and influencers | Quality rating Strengths & weaknesses of study  | Information gaps |
|-----------------------|---|--|---|---|---|--|---|---|------------------|
|                       | 3-arm 12 week randomised controlled pilot trial<br>Based on formative assessments and feasibility study<br>Participants = 60 African-American girls 8-10 years and parents / caregivers | acceptability and outcomes of 2 versions of a culturally relevant, family-based intervention to prevent excess weight gain in pre-adolescent African-American girls<br>2 family based active interventions – girls only (GEMS – Jamboree) and family targeted, child intervention with parents only (Eating and Activity Skills for Youth – EASY)<br>both focusing on nutrition and physical activity. Based on a 'train the trainer' approach.<br>1 comparison group focusing on self-esteem and general health | Marketing mix – Girls: Education sessions, incentives, taste testing, take home recipes<br>Parents: Education sessions, take-home materials to reinforce key points<br>Training of local community centre staff to assist with education<br>Audience research prior to the pilot trail in the form of a feasibility study to help develop the programme | consumption, decrease in sweet drinks, increase in physical activity<br>Change in BMI and waist circumference | the comparison group the 2 active intervention groups would result in a:<br>10% increase in minutes of moderate to vigorous activity<br>10% decrease in sweet beverage consumption<br>10% increase in water consumption | comparison group the intervention girls demonstrated trend towards lower BMI<br>11.7% increase in minutes of physical activity<br>A 34.1% decrease in servings of sweet beverages<br>A 1.5% increase in water servings<br>Outcomes of the study showed that treatment of parents and children together is a preferred option for participants. Outcomes were better in the session with mother and child together although the authors note research with white girls shows the opposite outcome | girls aged 8-10 years and parents       | sample size and limited power for outcome analysis, therefore only some outcome variables considered RCT design |                  |
| Birmingham (2004)     | Educational intervention<br>Low income, women with children enrolled in the 'Special Supplemental   | Identify perceived barriers and behaviours related to fruit and vegetable<br>Estimate impact of the 'Market Basket.  | Behaviour change in form of increasing use of fruit and vegetable in mothers and in the home  | Mothers' Use of the Booklet<br>Change in Confidence of the Mothers<br>Changes in fruit                        | MBB enhanced mothers' confidence in handling and serving fruit and vegetable more freq  | No impact on barriers possibly because of short-term exposure to MBB<br>Greater confidence in purchase and   | Low income women with children          | Multisite quality control no group Pre-test, post-test questionnaires used (not                                 |                  |

| First author and year | Study type and participants   | Objectives/ Methodologies   | Social marketing intervention  | Outcome measures   | Findings: Efficacy (did it work differently for the population groups?)   | Findings: Features (why did it work?)                       | Market segments, groups and influencers | Quality rating Strengths & weaknesses of study | Information gaps |
|-----------------------|---|---|--|--|---|---|---|--|------------------|
|                       | <p>Nutrition Program for Women, Infants and Children' (WIC) programme Washington State</p> <p>Participants - pretest n = 225 / post-test n =167</p> | <p>'Booklet' on those barriers with part of the WIC Five-A-Day education</p> <p>Educational intervention provided by WIC personnel supported nutrition education resource</p> | <p>Audience research. Low-income women who purchase and prepare food ie, influence over food choices of adults and children in household.</p> <p>WIC Focus groups used to pretest of the MBB and to design the intervention</p> <p>Marketing Mix: Communication - 'Market Basket Booklet' (MBB) / People trained WIC personnel</p> | <p>and vegetable Served to the Family</p> <p>Change in Barriers Related to fruit and vegetable Consumption</p> <p>Use of the MBB and the Farmer's Market</p> | <p>No reduction in overall barriers related to fruit and vegetable or increase in consumption among mothers. Possible explanations given (eg, food insecurity, lack of follow-up education after initial with MBB)</p> <p>Increase in mothers serving more fruit and vegetable to the family reflects benefit to whole family</p> <p>54% thought it can be expensive to eat fruit and vegetable on a daily basis</p> <p>Family preferences not a barrier - respondents stated a majority of adults and children in households like fruit and vegetable and are interested in trying new fruit and vegetable</p> | <p>storage of quality produce related to content of MBB</p> |   | <p>validated)</p>                              |                  |



| First author and year | Study type and participants   | Objectives/ Methodologies   | Social marketing intervention   | Outcome measures   | Findings: Efficacy (did it work differently for the population groups?)  | Findings: Features (why did it work?)   | Market segments, groups and influencers   | Quality rating Strengths & weaknesses of study  | Information gaps |
|-----------------------|---|---|---|--|--|---|---|---|------------------|
| Coleman (2005)        | Nutrition Education Aimed at Toddlers (NEAT) Curriculum (based on Social Cognitive Theory (SCT) – personal factors, environmental influences and behaviour interactions. Rural low income parents of toddlers | Content for NEAT curriculum based on focus groups of target audience low income parents of toddlers<br>NEAT lessons and reinforcing activities – responsible for what food served. Children responsible for how much to eat or whether to eat.            | Behaviour change in terms of parents gaining knowledge and skills to help toddlers acquire healthy eating habits<br>Formative research undertaken with target group<br>Marketing mix – education, instructors trained to undertake education sessions and home visit activities |  | Parents in the evaluation intervention group increased knowledge, allowed children more independence when eating and had the TV on less freq   |   | Low income  | Paper gives no details of study design – not possible to assess quality   |                  |
| Dixon (1998)          | '2 Fruit 'n' 5 Veg Every Day' Campaign<br>Four annual post-campaign telephone surveys of 500 Victorians aged 20+ (identical sampling frames and common questions).<br>Total sample                            | Objectives of this paper – to describe achievements and lessons learned from the four years of the campaign. One of the first reports on impact of large-scale community-wide campaign promoting increased fruit and vegetable intake<br>Objective of the | '2 Fruit 'n' 5 Veg Every Day' campaign<br>Communication and social marketing mix - TVCs/ mass media promotion (radio and print) / point-of-sale materials / education and health education  | No industry or other health sector advertising re fruit and vegetable during campaign<br>To increase awareness of the consumption of fruit and vegetable in the three groups population groups | Awareness of slogan, campaign and advertisements - High levels of awareness established in 1 & 2. Decline overall in line with reduced media buy<br>Women, younger people, those with less education and | Mass media budget<br>Suggests that future campaigns promoting fruit and vegetable in Victoria should continue to target broadly with extra focus on those with low consumption – men and young people | (1) Consumers (women with children / men / young men) (2) health and education professionals (3) food retailers and food service providers (4) industry participant and | Low quality<br>Descriptive cross sectional survey<br>Response rate not reported<br>Large increase in drop outs during the study<br>Post campaign survey only – pre- |                  |

| First author and year | Study type and participants   | Objectives/ Methodologies   | Social marketing intervention  | Outcome measures                              | Findings: Efficacy (did it work differently for the population groups?)   | Findings: Features (why did it work?) | Market segments, groups and influencers                         | Quality rating Strengths & weaknesses of study  | Information gaps |
|-----------------------|---|---|--|---|---|---------------------------------------|---|---|------------------|
|                       | 2044  | campaign was to increase awareness of the need to eat more fruit and vegetables and encouraging increased consumption among:<br>(1) Consumers (women / children / young men) (2) men and health education professionals (3) food retailers and food service providers. A 4th phase looked at industry participant and partnerships / alliances to support the campaign aims | professionals<br>Consumer surveys in 1980s and 1990s showed many adults and children consume lower than recommended amounts of fruit and vegetable                                 |   | 'blue collar' households all more likely to be aware of campaign<br><br>Across all phases, reported consumption and beliefs about consumption were strongly associated for both fruit and vegetable.<br><br>The overall rate of change in the consumption and belief variables paralleled the level of advertising presence for each phase. |                                       | partnerships / alliances to support the campaign aims           | campaign data<br>Consumption was self report only – dietary assessment method not given<br>Other confounding factors not controlled for   |                  |
| Foley (1998)          | Low income earners, women and usual household shoppers in Western Australia including those holding a Health Care Card (HCC)<br><br>Participants:<br>148 = trained advisers | Increase consumption of fruit and vegetable, bread and plain cereals<br>Decrease consumption of high fat, sugar and salt foods<br>Change amounts of money used to purchase foods in line with healthy food pyramid<br><br>Strategies developed to   | Formative research undertaken (pilot)<br><br>Intervention incorporated: - education sessions including budget (using the Kilocent\$ counter) and cooking sessions<br>Marketing mix | Dietary spending behaviour changes<br><br>and | For budget session group dietary behaviour results indicate:<br>Dietary change results indicated sign changes in fat and sugar consumption<br>Positive trends in fruit and vegetable, bread and cereal consumption.<br><br>Authors note the Food Cent\$   |                                       | Low income earners<br><br>Women<br><br>Usual household shoppers | Low quality<br>Small sample size, no details on participant selection<br>No control group, pre-test, post-test questionnaire<br>Loss of paired data so unpaired data analysed<br>Authors note some limitations in |                  |

| First author and year | Study type and participants   | Objectives/ Methodologies  | Social marketing intervention  | Outcome measures  | Findings: Efficacy (did it work? Did it work differently for the population groups?)  | Findings: Features (why did it work?) | Market segments, groups and influencers | Quality rating Strengths & weaknesses of study  | Information gaps |
|-----------------------|---|--|--|---|---|---------------------------------------|---|---|------------------|
|                       | 373 = budget and cooking session participants<br>89 = Adult supermarket tours   | facilitate behaviour change – increase in positive dietary change, and to create an infrastructure for project delivery (piloting the programme)   | communications (recipes and other project publications)<br>Volunteer advisor training – based on premise that a person can be both an agent of change and a respondent to change.<br>Advisors<br>Media campaign (television, radio and press ads, leaflets and posters to raise awareness and recruit advisers<br>Community interventions  |   | advisors successfully delivered a health promotion program with a nutrition outcome to community members – low income, women and usual shoppers   |                                       |   | long term follow up with advisors   |                  |
| Havas (1998)          | Low income women enrolled in the Maryland WIC program or with children enrolled<br>Randomised trial design<br>16 WIC sites<br>Control n = 1679<br>Intervention n = 1443 | Focus groups and interviews used to establish participants' shopping, preparation and eating practices concerning fruit and vegetable perceived barriers to consumption, reactions to potential messages and interventions | (1) Nutrition intervention sessions conducted by peer educators, printed materials (clue cards for education sessions, recipe book, children's activity book, video of child singing about fruit and<br>(2) Nutrition intervention sessions conducted by peer educators, printed materials (clue cards for education sessions, recipe book, children's activity book, video of child singing about fruit and | Increase in participants' fruit and vegetable consumption (aim to reduce risk of developing chronic diseases, including cancer) | Statistically significant changes overall - fruit and vegetable intake and positive effect on fruit and vegetable knowledge and positive effect on fruit and vegetable stage of change and positive effect on Self efficacy for |                                       | Low income women caring for children    | High quality study according to McDermott et al<br>RCT<br>Multisite<br>Authors note that there are numerous challenges facing |                  |

| First author and year | Study type and participants  | Objectives/ Methodologies  | Social marketing intervention  | Outcome measures                          | Findings: Efficacy (did it work differently for the population groups?)  | Findings: Features (why did it work?) | Market segments, groups and influencers | Quality rating Strengths & weaknesses of study   | Information gaps |
|-----------------------|--|--|--|---|--|---------------------------------------|---|--|------------------|
|                       |  | Pilot test used to refine the interventions<br>Based on Prochaska and DiClement's stage of change model.     | vegetable and refrigerator magnet, calendar reminder sheets and visual reminders (3) direct mail (letters with tip sheet and club card |   | fruit and vegetable positive effect<br>For stages of change positive results significant changes only in Whites and those with high school education.<br>Despite Black educators less able to motivate Black and less education participants |                                       |   | programmes seeking to prevent disease among low-income populations   |                  |
| Havas (2003)          | Maryland WIC Food for Life programme<br>RCT<br>Participants = low income women<br>We conducted six-month intervention programs for 1055 women at ten WIC sites; 1011 women served as controls. | Conducted formative research<br>Multi-site<br>Programme based on stages of change and social learning theory | Programme comprised monthly-led educational sessions, direct mail and telephone calls by trained peer educators                        | Fat, fibre and fruit and vegetable intake | Positive effect on all three, including fruit and vegetable intake<br>Net difference of 0.4 servings of fruit and vegetable  |                                       |   | High quality study according to McDermott et al<br>Strengths<br>Randomised trial, diverse populations and sites participating<br>Large sample size,<br>consistency of outcomes across diverse populations and sites<br>(high quality evidence – McDermott, Hastings) |                  |

| First author and year | Study type and participants   | Objectives/ Methodologies  | Social marketing intervention | Outcome measures | Findings: Efficacy (did it work? Did it work differently for the population groups?) | Findings: Features (why did it work?) | Market segments, groups and influencers | Quality rating Strengths & weaknesses of study  | Information gaps |
|-----------------------|---|--|-------------------------------|------------------|--|---------------------------------------|---|---|------------------|
| Obarzanek 2003        | (GEMS) Girls health Enrichment Multi-site Studies obesity prevention research programme targeting young African-American girls aged 8-10 years.<br><br>This paper describes the background and formative research undertaken for GEMS | 2 phase, 7 year programme initiated in 1999.<br><br>Phase 1 (2-3 years) conducted collaboratively among 4 field centres, a co-ordinating centre and the project office – formative assessment research and pilot test over 12 week period.<br><br>Phase 2 (4-5 years) will test the interventions that appear most promising in preventing excessive weight gain in young African-American girls |                               |                  |  |                                       |   | Limitations: on reliance on self-reported data, inability to obtain follow up data on all intervention participants |                  |
| Rochon (2003)         | (GEMS) Girls health Enrichment Multi-site Studies obesity prevention  | Design of the studies in field centres – Memphis, Minnesota, Stanford and Baylor plus a coordinating   |                               |                  |  |                                       |   | Extensive quality control procedures were developed to ensure data  |                  |

| First author and year | Study type and participants   | Objectives/ Methodologies  | Social marketing intervention   | Outcome measures   | Findings: Efficacy (did it work differently for the population groups?)  | Findings: Features (why did it work?)  | Market segments, groups and influencers | Quality rating Strengths & weaknesses of study   | Information gaps |
|-----------------------|---|--|---|--|--|--|---|--|------------------|
|                       | research programme targeting young African-American girls aged 8-10 years. This paper describes the design and methods of GEMS  | centre at George Washington Uni. Assessment studies at the centres focusing on African-American population. Randomised clinical trials – interdependent  |   |  |  |  |   | collection between the four sites was consistent   |                  |
| Story (2003)          | Minnesota GEMS pilot study for 'Girlfriends for KEEPS' (Keys to Eating, Exercising, and Playing Sharing) Formative research to develop the intervention Two arm parallel group randomised controlled trial 54 African-American girls aged 8-10 years and parents / caregivers | After school community programme twice weekly Intervention focused on increasing physical activity and healthy eating – family component included Control group programme unrelated to nutrition or physical activity Trained GEMS staff delivered the programme | Behaviour change – goals to increase physical activity, decrease consumption of high-fat foods, increase consumption of fruit and vegetable, decrease consumption of sweet beverages and adopt healthy eating practices Family component goals to help families with the intervention and create an environment that reinforces and supported regular and | Measures included height and weight, percent body fat, physical activity | At 12 week follow up differences between the intervention and control groups were in the hypothesized direction of change for both girls and parents. Process evaluation showed programme was well attended and received by girls and parents. Community after-school intervention programme targeted toward African-American girls at high risk for obesity was | Low income, African-American. Authors note that the after-school obesity prevention programme for this group of girls is a promising model for future efforts. |   | Medium quality This was a two-armed parallel group RCT Authors note small sample size and limitations of 12 week duration for differences in BMI |                  |

| First author and year | Study type and participants | Objectives/ Methodologies | Social marketing intervention  | Outcome measures | Findings: Efficacy (did it work differently for the 4 population groups?)                           | Findings: Features (why did it work?) | Market segments, groups and influencers | Quality rating Strengths & weaknesses of study | Information gaps |
|-----------------------|-----------------------------|---------------------------|--|------------------|---|---------------------------------------|---|--|------------------|
|                       |                             |                           | <p>enjoyable physical activity and healthy eating – increasing availability of healthy foods in the home and decreasing physical inactivity</p> <p>Education sessions, family packets (healthy eating and PA suggestions fridge magnets, tip sheets, sometimes food ingredients for low fat snacks) sent home to parents, GEMS staff support, organised neighbourhood walks.</p> |                  | <p>well received. Authors noted it offers a promising model for health behaviour interventions.</p> |                                       |   |  |                  |

| First author and year | Andreasen's Six Benchmarks of Social Marketing Included  |
|-----------------------|--|
| Anderson (2001)       | <p><b>Behaviour change</b> – increase in fruit and vegetable consumption</p> <p><b>Audience research</b> – formative research used to design intervention</p> <p><b>Segmentation</b> – WIC and Community Action Agency populations</p> <p><b>Exchange</b> – coupons and cash incentives provided to reduce cost barrier</p> <p><b>Marketing mix</b> – promotion of fruit and vegetables through price reduction and also through education about the use, storage and nutritional value</p> <p><b>Competition</b> – education component included to reduce identified barriers to purchase and consumption</p> |

| First author and year | Andreasen's Six Benchmarks of Social Marketing Included  |
|-----------------------|--|
| Baranowski (2003)     | <p><b>Behaviour change</b> – change in BMI, change in consumption of fruit, vegetables and juice</p> <p><b>Audience research</b> – formative research conducted with 73 girls and 83 parents</p> <p><b>Segmentation</b> – 8-year old African-American girls</p> <p><b>Exchange</b> – association of fun with increasing exposure to fruit and vegetables, intervention focused on increasing self-efficacy and skills, goal setting, decision making and problem solving all included in intervention, star rating system initiated to encourage healthy lunches to be brought to camp</p> <p><b>Marketing mix</b> – promotion of fruit and vegetables via internet activities, camp activities and home activities (place)</p> <p><b>Competition</b> – parents trained to increase fruit, vegetable and juice availability at home</p>  |
| Beech (2003)          | <p><b>Behaviour change</b> – healthy eating generally targeted but only change in sweetened beverage consumption and water, change in BMI measured as outcomes in this pilot study (because of limited study power)</p> <p><b>Audience research</b> – culturally tailored pilots study based on extensive formative research</p> <p><b>Segmentation</b> – African-American girls aged 8-10 years</p> <p><b>Exchange</b> – incentives were given to the girls at the completion of each session</p> <p><b>Marketing mix</b> – promotion of healthy eating and reinforcement at home (place)</p> <p><b>Competition</b> – skills modification sessions including avoiding eating while watching TV, meal skipping, snacking when not hungry, strategies and practical demonstrations for parents to provide healthy meals and snacks at home</p>  |
| Birmingham (2004)     | <p><b>Behaviour change</b> – increase in fruit and vegetable consumption</p> <p><b>Audience research</b> – intervention based on focus group formative research</p> <p><b>Segmentation</b> – mothers with children enrolled in the WIC program</p> <p><b>Exchange</b> – recipes personalised to participant</p> <p><b>Marketing mix</b> – promotion of fruit and vegetable intake using seasonality (price incentive), health benefits and advice on how to use recipes with fruit and vegetables that the participants liked at home (place)</p> <p><b>Competition</b> – goal setting and use of WIC food package encouraged, intervention designed to increase confidence to increase fruit and vegetable intake</p>   |
| Coleman (2005)        | <p><b>Behaviour change</b> – change in dietary intake of toddlers, knowledge of parents, TV watching</p> <p><b>Audience research</b> – intervention based on focus group research</p> <p><b>Segmentation</b> – rural, low-income parents of toddlers</p> <p><b>Exchange</b> – interventions were both educational and hands on practical techniques, problems discussed and solutions designed to overcome them, peer support from other parents, incentives provided to parents, such as child development wheel and child sized utensils</p> <p><b>Marketing mix</b> – trained instructors took classes (people), strengths-based approach used to reinforce parents positive behaviours in feeding their toddlers</p> <p><b>Competition</b> – strategies for introducing new foods, dealing with 'picky' eaters, development parenting skills related to feeding and involving toddlers in food preparation</p> |
| Dixon (1998)          | <p><b>Behaviour change</b> – self report of fruit and vegetable servings</p> <p><b>Audience research</b> – based on formative research from other similar campaigns and also survey data from local population</p> <p><b>Segmentation</b> – consumers (focus on women with children, adults aged 16-54 years and mean aged 18-34 years across the 3 phases), health education professionals, food retailers and food service providers</p> <p><b>Exchange</b> – ?</p> <p><b>Marketing mix</b> – direct targeting of consumers via TV commercials, community and industry based initiatives, caterers kit, recipe books</p> <p><b>Competition</b> – focus on food retailers and restaurants</p>   |



| First author and year  | Andreasen's Six Benchmarks of Social Marketing Included   |
|--|---|
| Foley (1998)   | <p><b>Behaviour change</b> – increase in fruit and vegetable consumption, decrease in fat, sugar and salt</p> <p><b>Audience research</b> – concept testing undertaken</p> <p><b>Segmentation</b> – low income earners directed at women</p> <p><b>Exchange</b> – weekly family menus, recipes and shopping lists designed, a ready-reckoner developed to show price per kilogram to assess value for money</p> <p><b>Marketing mix</b> – food advisors trained to deliver programme, media campaign included TV, radio and press advertisements</p> <p><b>Competition</b> – classes run to develop practical skills in budgeting, cooking, shopping</p> <p>Reviewed by McDermott et al</p>   |
| Havas (1998)   |   |
| Havas (2003)   | Reviewed by McDermott et al   |
| Obarzanek 2003<br>Describes background to GEMS study – see Rochon (2003) for details of social marketing components  | <p><b>Behaviour change</b> –</p> <p><b>Audience research</b> –</p> <p><b>Segmentation</b> –</p> <p><b>Exchange</b> –</p> <p><b>Marketing mix</b> –</p> <p><b>Competition</b> –</p>  |
| Rochon (2003)<br>Describes the common design elements in the GEMS study see Baranowski (2003), Beech (2003) and Story (2003) for individual intervention specifics | <p><b>Behaviour change</b> – interventions designed to prevent excess weight gain, included measurements of dietary intake and changes in BMI</p> <p><b>Audience research</b> – formative research, needs assessment, focus groups, interviews and surveys conducted to develop and fine tune intervention</p> <p><b>Segmentation</b> – targets 8-10 year old African-American girls</p> <p><b>Exchange</b> –</p> <p><b>Marketing mix</b> –</p> <p><b>Competition</b> –</p>   |
| Story (2003)   | <p><b>Behaviour change</b> – intervention aimed to decrease intake of high fat foods, increase consumption of fruits and vegetables, decrease consumption of sugar-sweetened beverages and encourage adoption of healthy eating practices</p> <p><b>Audience research</b> – formative research using qualitative and quantitative methods used to design intervention</p> <p><b>Segmentation</b> – targets 8-10 year old African-American girls and their families</p> <p><b>Exchange</b> – incentives provided to encourage family participation, benefits of eating healthy diet reinforced in after school program and incentives provided for attendance and short term goal setting</p> <p><b>Marketing mix</b> – African-American staff trained to deliver after school program (people), promotion of healthy eating with merchandise included in after school and family components</p> <p><b>Competition</b> – family component included to reinforce behaviour learnt in after school program</p> |

## Appendix 6: Summary table – School environments

78 papers were initially included for review. Consultation between two researchers resulted in the exclusion of 38 papers that were not relevant to our research questions, leaving 40 references in total for this topic. After reading the full text, an additional 6 papers were excluded as the interventions were not social marketing. This left a total of 22 papers which were reviewed for all components of this topic and a further 12 papers that were not classified as social marketing, but were reviewed for attitudes, risk/protective factors etc.

| First author and year  | Study type and participants   | Objectives/ Methodologies   | Social intervention  | Outcome measures  | Findings: Efficacy (did it work differently for the population groups?)  | Findings: Features (why did it work?)   | Market segments, groups and influencers   | Quality rating Strengths & weaknesses of study  | Information gaps |
|------------------------|---|---|--|---|--|---|---|---|------------------|
| Baranowski et al 2000. | Sixteen elementary schools randomly assigned to intervention or control. Students were grade 3-5. N = 1253. GIMME 5 | 3 year intervention to ascertain the effectiveness of the Gimme 5 intervention for fruit, juice and vegetable consumption | Intervention was based on Social Learning Theory curriculum (12 X 45 minute sessions per year) targeting behaviour change. Intervention also included take home materials, video, point of purchase demonstrations in stores and changing the school lunch menu. | 7 day food record used for dietary intake. Questionnaires used to measure fruit and vegetable preferences, outcome expectations and self-efficacy, social norms and asking behaviours. Parent questionnaire used to assess fruit and vegetable availability and accessibility at home | No difference in school lunch servings of fruit and vegetable offered between control and intervention groups. While there was no increase in fruit and vegetable for the intervention group there was a significant higher intake of 0.2 servings in the intervention group at the end of the study | Increases in fruit and vegetable consumption occurred only in the two lowest intake quintile groups, with higher increases in the intervention group (+.47 and +.82 servings respectively). | Preference and availability identified as key predictors of consumption behaviour for fruit and vegetable. The general decline in fruit and vegetable consumption from third to fifth grade appeared to be halted by the intervention | High quality RCT. Strong assessment methodology |                  |

| First author and year   | Study type and participants   | Objectives/ Methodologies   | Social marketing intervention   | Outcome measures   | Findings: Efficacy (did it work differently for the population groups?)   | Findings: Features (why did it work?)  | Market segments, groups and influencers  | Quality rating Strengths & weaknesses of study  | Information gaps |
|---|---|---|---|--|---|--|--|---|------------------|
| Birnbaum, Lytle, Story, & Murray, 2002 et al 2002   | Teens Eating for Nutrition and Energy at School (TEENS)<br>Randomised controlled trial of 16 middle and junior schools in Minneapolis                                     | Are levels of exposure to a multi-component school based nutrition intervention associated with varying dietary outcomes?                         | 1 year intervention – schools exposed to varying levels of multi-component intervention, which included 3 intervention groups within each school:<br>1. environment only<br>2. environment + classroom<br>3. environment + peer leaders   | Student self report of fruit and vegetable intake and usual food scores (higher scores reflect a tendency to choose lower fat foods)   | Those in the intervention including environment + classroom + peer leaders increased fruit and vegetable consumption by 0.5 serving and also increased tendency to choose lower fat foods<br>Other interventions and control showed no difference | Intervention with adolescents a peer leader plus environment school based nutrition intervention was successful where environment only and environment + curriculum were not.<br>There was a decline in consumption of fruit and vegetables in the environment only group. | The peer leaders themselves increased their fruit and vegetable intake by a 1 serving compared with an increase of 0.5 serving for those in the environment + peer leaders group | High quality RCT<br>Valid and reliable outcome measures, variance by school accounted for.<br>Selection bias may have led to contamination of intervention classes in same school.        |                  |
| Caballero et al 2003, Davis et al 2003, Gittelsohn et al 1999, Gittelsohn et al 2003, Snyder et al 1999, Steckler et al 2003, | Randomised controlled trial of 41 schools in American-Indian schools with a nested cohort component (1704 children) over 3 years from Grade 3-5.<br><i>Pathways Study</i> | To evaluate the effectiveness of a school-based multi-component intervention for reducing percentage body fat in American-Indian school children. | Classroom curriculum 12 weeks/year, twice weekly for 45 minutes linked to adventures of imaginary American-Indian characters on their journey to healthy living.<br>Food service guidelines for reducing fat content of school meals.<br>Family component included to create supportive home environment. | Anthropometry, % body fat, knowledge, attitudes and behaviour, self-efficacy related to dietary factors, healthy food intentions, dietary intake data measured by direct observation of lunch, 24-hour dietary recall, menu analysis | No significant differences in anthropometric results, % body fat or BMI between control and intervention.<br>24-hour recall showed significant decrease in total energy and % energy from fat. Menu analysis and                                  | Formative research was undertaken to identify risk behaviours and to guide and target the intervention components. There was strong cultural partnership with the American-Indian tribes.  |  | High quality RCT<br>Systems for data management and quality control were a fundamental part of all research protocols – ensuring accuracy, precision and completeness of data collection. |                  |

| First author and year                 | Study type and participants  | Objectives/ Methodologies   | Social marketing intervention   | Outcome measures   | Findings: Efficacy (did it work differently for the population groups?)   | Findings: Features (why did it work?)  | Market segments, groups and influencers   | Quality rating Strengths & weaknesses of study      | Information gaps |
|---------------------------------------|--|---|---|--|---|--|---|---|------------------|
| Stevens et al 2003, Stone et al 2003. |  |   |   |  | lunch direct observation confirmed lower fat intake but showed no difference in energy. Knowledge was higher in intervention schools, self-efficacy to choose healthy foods was not changed but healthy food intentions improved in the intervention schools. | Quality control was tightly monitored. Multi-component – addressed school environment, curriculum and home environment. Theory-based on Social Learning Theory |   |   |                  |
| Fitzgibbon et al 2002                 | 5 year randomised intervention (Hip Hop to Health Jr) in Chicago US area among pre-school African-American and Latino children (3-5 years) in Head Start programs. | To ascertain whether an intensive intervention in preschool minority children and their parents can prevent childhood obesity Focus on reducing fat, increasing fibre and increasing fruit and vegetable intake | 45 minute class three times a week for 14 weeks including, 20-minute interactive hands on activity, food pyramid food groups were represented by puppets. Parent component included homework, newsletter following class themes with a reward for completion. | Children and parents – height, weight, dietary intake measured by 24-hour recall and food frequency questionnaire, nutrition knowledge Parents only – parental support for healthy eating, stages of change for fruit and vegetable and fat intake | Results not reported yet  |  | The intervention focuses on both preschool children (3-5 years) and their parents as parental influence is key for younger children<br>Low income, ethnic minority population | High quality RCT<br>2 methods of dietary assessment |                  |

| First author and year         | Study type and participants  | Objectives/ Methodologies   | Social marketing intervention   | Outcome measures   | Findings: Efficacy (did it work differently for the population groups?)  | Findings: Features (why did it work?)   | Market segments, groups and influencers   | Quality rating Strengths & weaknesses of study  | Information gaps  |
|-------------------------------|--|---|---|--|--|---|---|---|---|
| Levine et al 2002, USDA 1999. | 7 US school districts – not random (chosen on ability to complete pilot) 19 selected elementary (kindergarten through to 4 <sup>th</sup> grade) schools were randomly assigned to intervention or control matched pairs<br>Team Nutrition (TN) | USDA Team Nutrition (TN) pilot to investigate the feasibility of changing eating behaviours (reduce fat consumption, increase fruit, vegetables and grains) through interactive classroom lessons that are reinforced by activities and messages in a variety of settings | Based on Social Learning Theory – two component intervention. Training and technical assistance for foodservice staff including chef activities and school-wide cafeteria events Nutrition education through modules that included food tasting, lunchroom activities. Wider community involvement through district wide media and events | Outcome evaluation of skills, knowledge and motivation to eat healthier via questionnaire by observation of school lunch<br>Telephone survey of parents perceptions of behaviour change<br>Process evaluation – interviews with stakeholders | Small improvements were seen in the amount of grains consumed at lunchtime as well as the diversity of food items and food groups tasted<br>Small improvements were seen in knowledge and motivation to make healthier choices in the intervention group | Classroom lessons were generally incorporated well using resources and school lunch room activities about two-thirds of the time  |   | Moderate quality RCT<br>Dietary methodology based only on observation<br>Intervention was short – only one semester and follow up at 6 months                     | How can the effect size of positive changes be increased?<br>How can longer term results be achieved? |
| Lowe et al 2004               | 3 British primary schools, selected to represent low or high deprivation areas (not randomly selected)<br>402 children aged 4-11 years<br>'Food Dudes'   | To measure children's liking for and consumption of fruit and vegetables and how these were altered by a peer modelling and rewards based intervention  | Six 6 minute peer modelling videos featuring the heroic 'Food Dudes' battle the evil 'Junk Punks' who plan to deprive the world of fruit and vegetables<br>Rewards were 'Food Dudes' merchandise (pens, pencils, stickers etc)<br>Letters from the 'Food Dudes' were also read in class   | Lunch time and snack time consumption of fruit and vegetables offered was measured by observation (10% were validated by actual weight consumed)<br>Children's liking of the 16 fruit and vegetables offered was measured using a visual     | Snack time consumption increased significantly from 48% to 71% (mean percentage of serving offered) as did lunch time consumption (27% to 71%)<br>Liking for all of the 16 fruit and vegetables offered in the study increased significantly             | Peer modelling with tightly specified rewards for specific behaviour change<br>Authors note that increase in liking of fruit and vegetables is important as increased consumption results from reward-based | Children consuming the least fruit and vegetables at baseline showed the largest increases in consumption<br>The increases for the poorest eaters increased from 2 to 56% for lunchtime fruit, 3 to 50% for lunchtime vegetables, 3 to 50% for snack time fruit and 4 to 42% for snack time | Low quality – not randomised and not controlled<br>Good quality dietary methodology – consumption was not self-report but observation and actual plate waste data |   |

| First author and year                 | Study type and participants  | Objectives/ Methodologies   | Social marketing intervention  | Outcome measures  | Findings: Efficacy (did it work differently for the population groups?)   | Findings: Features (why did it work?)  | Market segments, groups and influencers  | Quality rating Strengths & weaknesses of study  | Information gaps |
|---------------------------------------|--|---|--|---|---|--|--|---|------------------|
| Nicklas et al 1998, O'Neil et al 2002 | 4 year intervention 12 high schools in Louisiana randomly assigned to intervention or control<br>N = 2213 students aged 14-15 years at baseline and 17-18 years at completion<br>GIMME 5 | To increase daily fruit and vegetable consumption by high school students to 5 or more servings a day by increasing awareness and positive attitudes and developing a supportive school environment | 4 year intervention using PRECEDE model – focus on awareness, skills development, training, reinforcement, application and maintenance<br>Included a school media-marketing campaign with monthly themes, cafeteria displays, giveaways of fruit or vegetables, point of service signs, poster etc<br>Five 55 minute workshops<br>Changing the availability, variety and desirability of fruit and vegetables in the school food service<br>Parental involvement to increase availability of fruit and veg at home | Likert scale<br>Servings of fruit and vegetables were measured by self report<br>food frequency questionnaire<br>Knowledge, self-efficacy and stages of change were also measured using standardised psychometric tests | from baseline.<br>Knowledge scores were significantly higher for intervention schools at follow up. Self-efficacy increased in both the control and intervention groups. There was an increase in awareness of the Gimme 5 program in both the control and intervention groups – it was significantly higher in the intervention group.<br>There was a linear increase in consumption over the first two years in the intervention group of 14%<br>At follow up there was no difference | intervention but is not sustained if liking is unchanged<br>During the first two years the intervention was aggressive and implemented weekly. By 1997, the last year of the trial the intervention effort was minimal. There were district wide changes to school menus during 1997 in response to USDA mandate for all schools | vegetables<br>Impact of individual program components were not broken down<br>Focus group formative research identified lack of availability, lack of variety and inconsistency of taste as the primary barriers to consumption of fruit and vegetables. | Moderate quality RCT<br>Contamination of intervention probably occurred in the last year.<br>Intake was self report |                  |

| First author and year | Study type and participants  | Objectives/ Methodologies   | Social marketing intervention   | Outcome measures  | Findings: Efficacy (did it work differently for the population groups?)  | Findings: Features (why did it work?)  | Market segments, groups and influencers   | Quality rating Strengths & weaknesses of study           | Information gaps |
|-----------------------|--|---|---|---|--|--|---|--|------------------|
| Perry et al 1998      | 20 elementary schools in Minnesota randomly assigned to control or intervention<br>1750 4 <sup>th</sup> grade students<br>5-a-day Power Plus Program | To increase fruit and vegetable consumption using a multi-component school intervention   | Intervention based on Social Learning Theory with 4 components, school curriculum (skill building, preparation and problem solving), food service changes (encouraging fruit and vegetable consumption at point of purchase, increasing attractiveness and availability), parental involvement/education and industry involvement/support | 24-hour dietary recall and lunch room observation completed on a sample of students<br>All students completed a health behaviour questionnaire<br>Parental telephone survey | The intervention increased lunchtime consumption of fruit and combined fruit and vegetables for girls and boys. There was no difference in % energy from fat.<br>Daily fruit consumption increased in the intervention group as did the proportion of total daily energy attributable to fruit and vegetables. | Teaching training included for new curriculum<br>Fruit and vegetable intake was more likely to change at lunch time    | Lunch time vegetable consumption increased for girls but not for boys.<br>Favourable trends for decline in daily % energy from fat were largely due ethnic differences. Asian and African-American students showed a decline while Hispanic students did not and there was no change among other American children. | High quality RCT<br>Two forms of dietary assessment      |                  |
| Reynolds et al 2000   | 28 elementary schools in Alabama randomly assigned to intervention or control<br>N = 1,698 families of fourth grade students<br>High 5               | To ascertain whether the High 5 project would result in higher intake of fruit and vegetables and lower percentage of calories from fat in the intervention | Three intervention component<br>Classroom component included modelling, self-monitoring, problem solving, reinforcement, taste tests in a 14 lesson curriculum<br>Parent component included completing  | A single 24-hour dietary recall was used to collect dietary data – across all days of the week<br>A sample of children was observed during the                              | Intervention group had higher intakes at 1 year and 2 year follow up (1.68 and 1.00 serving)<br>Total calories consumed and % protein did not differ between the   | Full or partial completion of 95% of the classroom activities<br>Newsletters and brochures read by over 80% of parents | Intervention was effective for boys and girls, African-Americans and European Americans, low, middle and high income families and with parents of low, medium and high educational attainment.  | High quality RCT design<br>2 forms of dietary assessment |                  |

| First author and year | Study type and participants  | Objectives/ Methodologies | Social marketing intervention  | Outcome measures  | Findings: Efficacy (did it work differently for the population groups?)   | Findings: Features (why did it work?)   | Market segments, groups and influencers  | Quality rating Strengths & weaknesses of study  | Information gaps  |
|-----------------------|--|---------------------------|--|---|---|---|--|---|---|
| Saksvig et al 2005    | Pre-test post-test pilot study in one school in Ontario Canada<br>122 students (7-14 years) Native Canadian Children living in Sandy Lake, a Native Canadian | children and parents      | homework with child activities<br>Food service component included training on purchasing, preparing and promoting fruit and vegetable – judged by a star rating for cafeterias | lunch hour and fruit vegetable intake estimated (validated method)<br>Knowledge, of stages, skills, change, outcome expectancies, social norms using a validated questionnaire<br>Parents fruit and vegetable consumption, knowledge, self-efficacy, of stages, change, outcome expectancies, availability of fruit and vegetable were measure by questionnaire | two conditions but there was a decrease in % calories from fat and an increase in % calories from carbohydrate in the intervention group.<br>Fruit and Vegetable servings increased at 1 year for intervention parents but not significant at 2 years | Lunch time observation of fruit and vegetable intake did not differ significantly between control and intervention groups suggesting that either the 24-hour dietary recall data were not accurate or the increase in fruit and vegetable did not occur at lunch time | Isolated community accessible only by air<br>Baseline and follow up parent purchase indicated a significant increase in mean | Low quality<br>Small study with no control group<br>Dietary change measured with only a single 24-hour recall | One year may not have been long enough to see true changes in anthropometric results<br>Without a control group it is not |



| First author and year | Study type and participants   | Objectives/ Methodologies  | Social marketing intervention  | Outcome measures   | Findings: Efficacy (did it work differently for the population groups?)   | Findings: Features (why did it work?)  | Market segments, groups and influencers   | Quality rating Strengths & weaknesses of study                | Information gaps   |
|-----------------------|---|--|--|--|---|--|---|---|--|
|                       | Reserve   | skills and self-efficacy and positively change behaviours related to diet and physical activity                        | based on CATCH material adapted to include story telling and cultural aspects), family (newsletters, community radio shows and other information), peer (video and radio) environmental (school policy) and school meal (healthy lunches and snacks) | recall<br>Knowledge using CATCH questionnaire adapted to be culturally relevant<br>Parental questionnaire measuring knowledge, perceptions and behaviour and exposure to intervention                                  | the study period for boys but not for girls<br>There were significant improvements in all aspects of diet related knowledge, dietary intention and self-efficacy for boys and girls and for students who were obese at baseline | dietary fat knowledge, high curriculum knowledge score and a higher score for dietary self-efficacy<br>Intervention exposure was also significantly associated with meeting the dietary fibre recommendation                                     | purchase of foods lower in fat and sugar and higher in fibre  |   | possible to say what the changes in anthropometric results and dietary behaviours would have been without an intervention – it is possible that the intervention did have a positive impact without achieving significant pre to post changes. |
| Sallis et al 2003     | 24 middle schools in California randomly assigned to intervention or control<br>Mean enrolment per school was 1109 students | To evaluate the effects of environmental, policy and social marketing intervention of physical activity and fat intake | 2 year intervention to market low fat foods at all school food sources included changes in school food policy, parental education and school incentives  | Outcome information on calorie and fat consumption was estimated from direct observation of what students ate<br>Changes to the school cafeteria and shop were assessed by keeping records and analysing the food sold | The intervention was not effective for total fat or saturated fat   | One of the barriers identified to removing high-fat foods in the schools was financial as many high-fat foods are popular and good revenue generators. Schools relying on off-site food service systems had problems controlling preparation and | It was not possible to obtain gender specific analysis for dietary fat intake because most data were from sales | Moderate quality<br>RCT<br>Dietary intake by observation only |  |

| First author and year | Study type and participants   | Objectives/ Methodologies   | Social marketing intervention  | Outcome measures   | Findings: Efficacy (did it work differently for the population groups?)  | Findings: Features (why did it work?)   | Market segments, groups and influencers   | Quality rating Strengths & weaknesses of study  | Information gaps   |
|-----------------------|---|---|--|--|--|---|---|---|--|
| Trevino et al 1998    | Pilot study N = 102 fourth grade students predominantly Mexican American children from two poor schools in Texas 8 month intervention | To reduce overweight and dietary fat intake using the Bienstar Health Program                   | Based on Social Learning Theory school classroom, school cafeteria and after-school care Parent component included nutrition seminar, education, taste tests, a theatrical play and newsletters (from children) Curriculum was made up of 28 ready to use lessons School cafeteria component included training, recipes, label reading and purchasing healthy foods After school program (Bienstar Health Club) included literary, visual and performing arts activities | Self-esteem, locus of control, self-efficacy and nutrition knowledge Dietary intake measured by 3 24-hour recalls Body fat measured by bioelectrical impedance | Significant differences were found comparing baseline and post-intervention for decreased dietary fat, increased fruit and vegetable intake Body fat levels did not change significantly | All children were exposed to the curriculum and school cafeteria interventions however the program had mixed attendance. Those attending more than 50% of the after school sessions had a significantly higher increase in health knowledge, suggesting that classroom curricula benefit from reinforcement | Focused on low income, minority children and parents  | Low quality Pilot study – not controlled, randomised, small numbers                         |  |
| Wechsler et al 1998   | Randomised controlled trial – 6 inner city US elementary schools (3 interventions, 3 controls).                                       | To examine the effects of a school-based intervention to promote consumption of low-fat milk at | Clear change goals – to increase consumption of low-fat milk. "Lowfat Lucy a cow was the campaign mascot; all messages   | Discarded milk cartons were collected after lunchtime.   | Immediately after intervention the number of low-fat milk cartons doubled in the intervention  | A strong focus on the specific eating behaviour and the use of social   | The increase in low-fat milk consumption amongst first and second grade children was greater than third | Medium quality Small study – may not be generalisable. Study design was RCT consumption was | The study design was not factorial therefore cannot say which of the intervention components was |

| First author and year | Study type and participants                               | Objectives/ Methodologies | Social marketing intervention   | Outcome measures | Findings: Efficacy (did it work differently for the population groups?)  | Findings: Features (why did it work?)  | Market segments, groups and influencers   | Quality rating Strengths & weaknesses of study   | Information gaps         |
|-----------------------|---|---------------------------|---|------------------|--|--|---|--|--------------------------|
|                       | 6902 children predominantly Hispanic and African-American | school lunchtimes         | were delivered by Latino people. Intervention activities were not classroom based and included promotion with competitions, merchandise and flyers as well as placement of messages in cafeteria. |                  | schools (from 25% to 57%). The proportion remained the same in the control schools at 28%. The increase was higher among first and second grade students (27% to 69%) than third and fourth grade students (24% to 47%). 3-4 months post-intervention the effects remained | marketing techniques. The acceptability and attractiveness of the intervention. Compared to education alone in two other studies a greater change was seen – 12% to 17% and 40% to 48% were achieved with the education interventions. | and fourth grade children (155% and 96% respectively) – authors note that intervention may need further segmentation of audiences. Predominantly Hispanic and African-American children | actual discarded milk cartons collected rather than reported – which are strengths in design | responsible for success. |

| First author and year   | Andreasen's Six Benchmarks of Social Marketing Included   |
|---|---|
| Baranowski et al 2000.  | <p><b>Behaviour change</b> – aims to increase fourth and fifth grade children's consumption of fruit, juice and vegetables</p> <p><b>Audience research</b> – intervention is based on audience research using identified barriers related to social cognitive theory</p> <p><b>Segmentation</b> – intervention targets fourth and fifth grade children</p> <p><b>Exchange</b> – Students earned points towards a small prize for attaining each of the three dietary change goals</p> <p><b>Marketing mix</b> – fruit and vegetables were promoted in school food service and also in local stores (place)</p> <p><b>Competition</b> – training given to food service staff on using more fruit and vegetables, take home messages sent to parents to increase fruit and vegetable availability at home</p> |
| <b>Birnbaum, Lytle, Story, Perry, &amp; Murray, 2002</b> et al 2002 | <p><b>Behaviour change</b> – changes in dietary intake including fruit and vegetable intake and fat</p> <p><b>Audience research</b> – ?</p> <p><b>Segmentation</b> – students in middle or junior high school, schools eligible if 20% or more of students approved for free and reduced price lunch programme</p> <p><b>Exchange</b> – peer leaders trained to motivate other students and lead problem solving activities with classmates</p>   |

| First author and year   | Andreasen's Six Benchmarks of Social Marketing Included   |
|---|---|
| Caballero et al 2003, Davis et al 2003, Gittelsohn et al 1999, Gittelsohn et al 2003, Snyder et al 1999, Steckler et al 2003, Stevens et al 2003, Stone et al 2003. | <p><b>Marketing mix</b> – promotion of fruit, vegetables and lower fat foods in school foodservice (place) + training of peer leaders (people)<br/> <b>Competition</b> – schools promoted fruit, vegetables and lower fat foods, family component included education and activities</p> <p>Reviewed by McDermott et al</p>  |
| Fitzgibbon et al 2002   | <p><b>Behaviour change</b> – intervention aims to alter the trajectory toward overweight/obesity<br/> <b>Audience research</b> – intervention tailored to developmental and cultural needs of preschool minority children, based on findings of feasibility and acceptability from 3-week pilot study<br/> <b>Segmentation</b> – preschool minority children (African-American and Latino) in the US Head Start Program<br/> <b>Exchange</b> – incentives were provided for parents to take part, education for parents on dealing with 'fussy eaters' and how to introduce new foods, games for children and puppets used<br/> <b>Marketing mix</b> – promotion of 'go and grow' foods vs 'slow' foods at school and at home (place), training for teachers (people)<br/> <b>Competition</b> – coupons given to parents to purchase lower fat milk</p> |
| Levine et al 2002, USDA 1999.   | <p><b>Behaviour change</b> – change in eating behaviour of students, change in use of healthy recipes and food preparation practices by food service staff<br/> <b>Audience research</b> – pilot study assessed characteristics and needs of school teachers, students and food service staff<br/> <b>Segmentation</b> – intervention targets children kindergarten to grade 4<br/> <b>Exchange</b> – coordinators employed to increase motivation of teachers and food service staff to participate<br/> <b>Marketing mix</b> – teacher training given (people),<br/> <b>Competition</b> – parents were part of the intervention to change home environment, community partners, chefs and other agencies involved in running supportive events</p>  |
| Lowe et al 2004   | Reviewed by McDermott et al   |
| Nicklas et al 1998, O'Neil et al 2002   | <p><b>Behaviour change</b> – intervention aims to increase daily fruit and vegetable consumption<br/> <b>Audience research</b> – focus groups run to inform intervention development identified key barriers to fruit and vegetable consumption<br/> <b>Segmentation</b> – school students, grade 9-12 (cohort)<br/> <b>Exchange</b> – intervention focused on developing knowledge, skills and positive attitudes to overcome the three barriers, availability, variety and inconsistency in taste<br/> <b>Marketing mix</b> – changes made to cafeteria (place) to promote availability, variety and taste, media marketing strategy provided appealing messages to students (promotion)<br/> <b>Competition</b> – parents involved to encourage increased availability and variety of fruit and vegetables at home, school meals were modified</p>   |

| First author and year | Andreasen's Six Benchmarks of Social Marketing Included   |
|-----------------------|---|
| Perry et al 1998      | <p><b>Behaviour change</b> – increase in fruit and vegetable consumption<br/> <b>Audience research</b> – intervention guided by formative research<br/> <b>Segmentation</b> – St Paul, Minnesota fourth and fifth grade students<br/> <b>Exchange</b> – students rewarded with individual and team prizes on completion of each component, parents and students completed activities at home which were signed off by parents and then entered into a prize draw<br/> <b>Marketing mix</b> – point of purchase promotion at school, enhanced attractiveness of fruit and vegetables at school, increased variety and choice, increased options (policy), snack packs donated by industry for at home taste testing, teacher training given (people)<br/> <b>Competition</b> – skill building and problem solving activities included in curriculum component as well as practical snack preparation and taste testing</p> |
| Reynolds et al 2000   | <p><b>Behaviour change</b> – increase in fruit and vegetable consumption<br/> <b>Audience research</b> – based on successful components of other interventions<br/> <b>Segmentation</b> – elementary school students<br/> <b>Exchange</b> – star rating system for cafeterias, classroom component included modelling, self-monitoring, problem solving, reinforcement, taste testing, homework included a character book promoting behaviour with rewards<br/> <b>Marketing mix</b> – training provided for food service staff to purchase, prepare and promote fruit and vegetables<br/> <b>Competition</b> – parents encouraged to support behaviour change at home, food service promoted behaviour change</p>  |
| Saksvig BI et al 2005 | <p><b>Behaviour change</b> – intervention designed to decrease energy intake and % energy from fat<br/> <b>Audience research</b> – the intervention was based on formative research collected in the Sandy Lake Diabetes Project<br/> <b>Segmentation</b> – Ojibway-Cree North American children grades 3-5<br/> <b>Exchange</b> – role modelling from elders used to emphasise inter-generational learning, emphasis on tradition and story telling<br/> <b>Marketing mix</b> – local radio show used to promote healthy eating (promotion), messages reinforced at school and home (place), sponsored healthy meals (price)<br/> <b>Competition</b> – family component reinforced healthy eating at home, healthy school lunches sponsored by the local store, school sponsored healthy breakfast with low fat milk and fruit</p>   |
| Sallis et al 2003     | Reviewed by McDermott et al   |
| Trevino RP et al 1998 | <p><b>Behaviour change</b> – to decrease overweight and dietary fat intake<br/> <b>Audience research</b> – based on culturally relevant learning material, pre-testing of written materials<br/> <b>Segmentation</b> – targeted at fourth grade Mexican American children<br/> <b>Exchange</b> – a theatrical play was used to provide affective motivation, reinforcement via newsletters written by children to inform parents of ongoing activities, Bienstar Health Club provides after school activities aimed at reinforcing and rehearsing classroom learning</p>  |

| First author and year | Andreassen's Six Benchmarks of Social Marketing Included  |
|-----------------------|---|
|                       | <p><b>Marketing mix</b> – training for teachers to deliver curriculum component, training for food service staff in healthy meal preparation,<br/> <b>Competition</b> – individual dietetic consultation for parents to discuss their child's nutritional needs and provide recommendations for further modifications at home</p>   |
| Wechsler et al 1998   | <p><b>Behaviour change</b> – increase consumption of low-fat milk<br/> <b>Audience research</b> – pre-intervention data on milk consumption collected, a previous study to promote low-fat milk was used to inform the design of the intervention<br/> <b>Segmentation</b> – inner city elementary schools<br/> <b>Exchange</b> – incentives such as pens, magnets, t-shirts used to promote low-fat milk<br/> <b>Marketing mix</b> – 'Low-fat Lucy' character used to promote low-fat milk (product) in schools<br/> <b>Competition</b> – low-fat milk positioned as the cool choice, supported by educational material and changes to school food service</p> |

## **Appendix 7: Models and Theories of Behaviour Change**

Models and theories of behaviour change that were considered but deemed to be less relevant for informing a healthy eating social marketing programme are outlined and discussed in full below.

### **Knowledge – Attitude – Behaviour Model (KAB)**

Knowledge, at some level, is a logical prerequisite to intentional behaviour change. The KAB has been proposed as a model to explain how the accumulation of knowledge leads to a change in attitude and ultimately to a change in behaviour. This model assumes that people operate in rational ways, although the majority of research does not support this assumption. Scientific support for the KAB model is weak and there is no evidence that knowledge-based interventions lead to behavioural change (**Baranowski et al., 2003**).

Knowledge may be an important part of a more complex conceptual model such as skills development or perceived personal vulnerability (in terms of risk of chronic illness). However, on its own knowledge does not seem to be useful in promoting behaviour change. Likewise when attitudes are used to predict specific food behaviours the correlations are generally low (**Baranowski et al., 2003**).

The KAB model seems to be inadequate as a mechanism for fully understanding or promoting dietary behaviour change, and interventions based on this model have had limited success.

### **Health Belief Model (HBM)**

The HBM is a psychological model that attempts to explain and predict health behaviours through a person's perception of their own health risk. Perceived severity and personal susceptibility to a health problem combine to form the perceived threat. Perceived benefits and perceived barriers (costs) to action are personally weighted and determine behaviour. More recent additions to this model are cues to action, which activate a person's readiness to act, and self-efficacy (a person's belief that they can successfully perform an action).

Cues to action include events that act as personal triggers to change a person's perception of their own susceptibility, for example, a close relative has a heart attack, the person experiences symptoms of a disease, or the person relates to media stories about a health issue. Cues to action to initiate change are highly personal and vary greatly. Internal cues, such as feeling healthier after taking an action, are rated highly. Receiving information from a doctor, particularly the results of tests, is also rated highly as a cue to action. While these cues to action are rated highly, they do not always predict action in terms of dietary change, particularly in younger people (Nutbeam & Harris, 1998).

The primary resource for change in the HBM is self-efficacy or confidence. People with higher levels of self-efficacy are more likely to make a behavioural change, persevere until they get it right and maintain the change (Nutbeam & Harris, 1998).

Fear is sometimes used as a mechanism to increase perceived severity and susceptibility of a health risk. There are large discrepancies between perceived and actual risk of an adverse health event. Fear-based communications have been investigated as a way of promoting behaviour change by influencing perceptions of severity and susceptibility. A meta-analysis of this literature showed that fear is only modestly effective at changing behaviour (Witte & Allen, 2000).

For the HBM to be useful for obesity prevention, more needs to be known about the perceived threat and susceptibility to obesity, as well as the cues to action and perceived costs and benefits of healthy eating. However, health beliefs are only one of many influences on behaviour related to nutrition. What and when people eat is also influenced by factors such as social rituals, trends, economic factors and social desirability of slimness, for example, and consequently the HBM is unlikely to provide the whole picture.

In particular, the HBM may not be very relevant for children or adolescents, as they do not perceive long term health outcomes as an immediate threat or believe that they are personally relevant. Since young people are highly motivated by the desire to fit in with peer group norms, the 'costs' of obesity are more likely to be viewed in terms of appearance than health.

## **Theory of Reasoned Action (TRA) or Theory of Planned Behaviour (TPB)**

TRA was originally formulated to explain the relationship between attitudes and behaviour. TRA proposed that people are more likely to perform a particular behaviour if they *intend* to perform that behaviour. The level of intention to perform a behaviour is higher among those who have a more positive attitude, and when there is a subjective norm toward the behaviour. The attitude toward the behaviour is an interaction of the strength of a person's beliefs about what will happen as a result of doing the behaviour and the strength of the extent to which a person positively or negatively values those outcomes.

A person's subjective norm is an interaction of the strength of the person's belief about whether specific people want them to do the behaviour and the strength of the person's desire to please or comply with those people. Attitudes and subjective norms combine to cause intention, and intention influences behaviour.

TPB is an expansion of TRA which proposes that intention to perform a behaviour is also influenced by perceived behavioural control. Perceived behavioural control is an interaction of control beliefs and perceived power.

TRA and TPB are useful in predicting and understanding healthy and unhealthy intentions and behaviours and the outcomes of these behaviours. The motivating factors within TRA and TPB are the positive or negative values placed on outcomes of the behaviour and the desire (or lack of desire) to comply with the expectations of others. When high levels of behavioural control and high levels of intentions are present, they result in behavioural change.

In studies of dietary behaviours, attitude predicted most of the variability in food intake, with progressively lower proportions of variability predicted by perceived behavioural control and subjective norms. Among adolescents, TPB accounted for only 7% of the variance in fruit and vegetable intake but 35% of the variance in soft drink intake (Baranowski, Cullen, Nicklas, Thompson, & Baranowski, 2003).

To relate TPB to obesity, it is necessary to identify the behaviours most likely to be related to increased risk of obesity, such as consumption of sugary drinks, consumption (and marketing) of energy-dense foods, television watching, unhealthy school and home environments, and then to understand the other parts of the model, particularly attitudes and subjective norms.

Some researchers believe that as the public better understands the public health importance of obesity, attitudinal and normative expectations will facilitate the use of TPB as an important model for behaviour change in relation to obesity prevention. However, the rise of obesity has occurred in societies where it is desirable to be slim and where there are negative attitudes and stigma associated with obesity. This suggests that attitudes and norms may not be the most significant influence on obesity rates.



## Stages of Change or Transtheoretical Model (SOC)

The Transtheoretical Model was originally introduced as an integration of theories and concepts across clinical psychology. The underpinning conceptual framework is that change occurs in a series of stages as a process rather than an event. Motivation to move between the stages is predicted by a person's willingness and readiness to change. The most common set of stages used are pre-contemplation (not thinking about change or suppressing thoughts of change), contemplation (considering change but taking no action), planning or preparation (anticipating making efforts to change and considering the behaviour), action (actually engaging in efforts to change) and maintenance (expending effort to retain the behaviour change).

The motivation to change comes from decisional balance, or the 'pros and cons' of performing a specific behaviour. The resources needed to change include self-efficacy and processes of change. The processes of change are tailored to correspond to the stage. More research is needed into the stage of change of different healthy behaviours for those at risk of becoming obese, compared with those not at risk.

The 'stages of change' model assumes that people are aware that their current behaviour is not ideal and that they know what they 'should' be doing. This is problematic when applied to dietary behaviours because people are often not aware how much of a food or micronutrient they are consuming. In Cancer Society/SPARC<sup>10</sup> research on fruit and vegetable and physical activity behaviours, 38% of people who were not eating the recommended servings of fruit and vegetables daily incorrectly believed that they were (Sullivan, Oakden, Young, Lau, & Lawson, 2004). More research is needed into the differences in stage of change, and mechanisms for processes of change between those at risk of obesity and those not at risk.

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