

Auckland Regional Public Health Service

Rātonga Hauora ā Iwi o Tamaki Makaurau



Working with the people of Auckland, Counties Manukau and Waitemata

Auckland Regional Public Health Service

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Graham Hill
Clerk of the Committee
Health Select Committee
Select Committee Office
Parliament Buildings
Wellington

Dear Graham

Submission from the Auckland Regional Public Health Service on the Health Select Committee Inquiry into Obesity and Type 2 Diabetes

1. Thank you for the opportunity for the Auckland Regional Public Health Service to provide a submission on the Health Select Committee's Inquiry into Obesity and Type 2 Diabetes.
2. This submission represents the views of the Auckland Regional Public Health Service (the Service). The Service provides public health services for the three district health boards in the Auckland region (Auckland, Counties Manukau and Waitemata District Health Boards), with the primary governance mechanism for the Service resting with Auckland District Health Board. This submission represents the views of the Service and does not necessarily represent the views of the three District Health Boards.
3. The Service understands that all submissions will be available under the Official Information Act 1982, except if grounds set out under the Act apply.
4. The primary contact point for this submission is:

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5. The Service wishes to make an oral submission to the Committee. If the Committee chooses to hear submissions outside of Wellington the Service would prefer to give evidence in Auckland.
6. The Service's submission follows the format of the Committee's terms of reference. This submission is presented in two halves. The first section provides a summary of information, with details and full references provided in the appendices.
7. The Service is a regional public health service provider and works towards improving, promoting and protecting the health of people in the Auckland Region. The Service has an active commitment to working with central and local government, other health service providers, iwi and local communities to develop effective strategies to promote and protect the health of the people of the Auckland Region.
8. The Service takes a whole of population approach but targets resources to those locations and people who will benefit the most. The Service operates in an outcomes based framework which reflects the reality that it cannot create public health by itself, but must work with a range of partners in a whole of community approach to achieve the public health ends sought. The Service has identified six vital few outcomes to be the focus of its efforts, namely:
 - Reduction in the incidence and impact of obesity, diabetes and cardiovascular disease.
 - Reduction in the incidence and impact of infectious disease.
 - Reduction in the incidence and impact of tobacco and alcohol related harm.
 - Reduction in the incidence and impact of cancer.
 - Reduction in the incidence and impact of environmental inequalities.
 - Reduction in the adverse effects of environmental hazards.

To examine the causative factors likely to be driving increases in obesity and type 2 diabetes, including nutrition and physical activity.

9. At the simplistic level, obesity results from an energy imbalance with excess energy (kilojoules) consumed compared to energy expended. Easy access to "fast" and pre-prepared foods, "super-sizing", the low-cost of energy dense manufactured foods, loss of cooking skills and the mechanisation of society all contribute to increased prevalence of obesity. It is now widely accepted that obesity is a normal response to an abnormal environment¹ and the crucial aspect is addressing the specific components of today's environment which are deemed responsible². A joint FAO/WHO Expert Consultation Group has assessed factors contributing to the obesity epidemic and their findings are summarised in the table below.

¹ Egger G, Swinburn B. An "ecological" approach to the obesity pandemic. *BMJ* 1997; 315 (97106): 477-80

² Prentice AM, Jebb, SA. Fast foods, energy density and obesity: a possible mechanistic link. *Obesity Reviews* 2003 4:187-194.

Table 1: Summary of strength of evidence on factors that might promote or protect against weight gain and obesity³.

Evidence	Decreases risk	Increases risk
Convincing	Regular physical activity High dietary intake of non-starch polysaccharide (dietary fibre)	Sedentary lifestyles High intake of energy dense, micronutrient poor foods
Probable	Home & school environments that support healthy food choices for children. Breastfeeding	Heavy marketing on energy dense foods & fast food outlets High intake of sugar sweetened soft drinks and fruit drinks/juices Adverse socioeconomic conditions
Possible	Low glycaemic index foods	large portion sizes High proportion of food prepared outside the home Rigid restraint/periodic disinhibition eating patterns.

10. There is consensus that environmental influences represent the public health arm of the obesity problem with obesogenic environments⁴ overriding the more limited effects of programmes aimed at individual behaviours. Environmental approaches are more likely to be successful in lower socio-economic communities as uptake of specific programmes is noted to be lower.
11. Obesity is the most powerful modifiable risk factor for type 2 diabetes, and has been noted to increase its prevalence up to 93 times⁵. Physical inactivity is recognised as an independent modifiable risk factor whilst a high fat, low fibre diet has a contributing role in the development of diabetes.
12. Evidence of effectiveness for lifestyle change comes from the American Study for Prevention of Diabetes where an average weight loss of 3.5Kg (5-7% body weight) reduced the chances of people with impaired glucose tolerance developing type 2 diabetes by 58%.

³ Egger G, Swinburn B. An “ecological” approach to the obesity pandemic. *BMJ*. 1997; 315 97106): 477-80.

⁴ An obesogenic environment can be defined as “the sum of influences that the surrounding opportunities or conditions of life have on promoting obesity in individuals or populations”. Swinburn B, Edgar G, The runaway weight gain train: too many accelerators, not enough brakes. *BMJ*, 2004, 329(7468).

⁵ Colditz GA, Willet WC, Rotnitzky A, Manson JE. Weight gain as a risk factor for clinical diabetes mellitus in women. *Annals of Internal Medicine* 1995; 122(6): 481-486.

To identify the effects of obesity and type 2 diabetes on the health of both children and adults across ethnic and socio-economic groups and potential future costs.

13. It is estimated that 3154 people die each year from obesity related health problems in New Zealand⁶. The risk of morbidity from hypertension, type 2 diabetes, coronary heart disease, stroke, gall bladder disease, osteoarthritis, sleep apnoea and certain cancers is increased with increased level of body fat. Additionally, evidence is accumulating that adiposity, or increased levels of body fat, is associated with accelerated aging⁷⁸. Obesity can also substantially reduce the quality of life and lead to psychosocial problems.
14. The incidence of obesity and type 2 diabetes are both higher in lower socio-economic groups, including Maori and Pacific people whilst the food intake of lower socio-economic families is known to be higher in fat and sugar⁹. A South Auckland worksite study with 253 participants revealed that 21% Maori, 32% European and 54% Pacific participants were obese at baseline; 30% had high blood pressure¹⁰.
15. The first NZ National Children's Nutrition Survey revealed that older children, Maori and Pacific experience higher rates of overweight and obesity. The prevalence was highest for Pacific males (33.9% & 26.1% respectively) and females (32.9%; 31%), followed by Maori males (19.6%, 15.7%) and female (30.6%, 16.7%), with the lowest levels in NZ European males (18.4%, 4.7%) and females (18.6%, 6%).
16. At the present time, there are 29 cases of type 2 diabetes in children and adolescents in the Auckland Region and 2 cases Impaired Glucose Tolerance (personal communication, A Cheung, Auckland Paediatric Diabetes Service). Up till very recently type 2 diabetes was regarded as a disease which occurred only in adults.

⁶ Ministry of Health. Nutrition and the Burden of Disease - New Zealand 1997-2011. Ministry of Health, Wellington. 2003.

⁷ Heilbronn LK, de Jonge L, Frisard MI. et al. Effect of 6month Calorie restriction on Biomarkers of Longevity, Metabolic Adaption, and Oxidative Stress in Overweight Individuals. *JAMA* 2006;295: 1539-1548.

⁸ Kloting N, Bluher, M. Extended longevity and insulin signalling in adipose tissue. *Exp Geront.* 2005; 40:878-833.

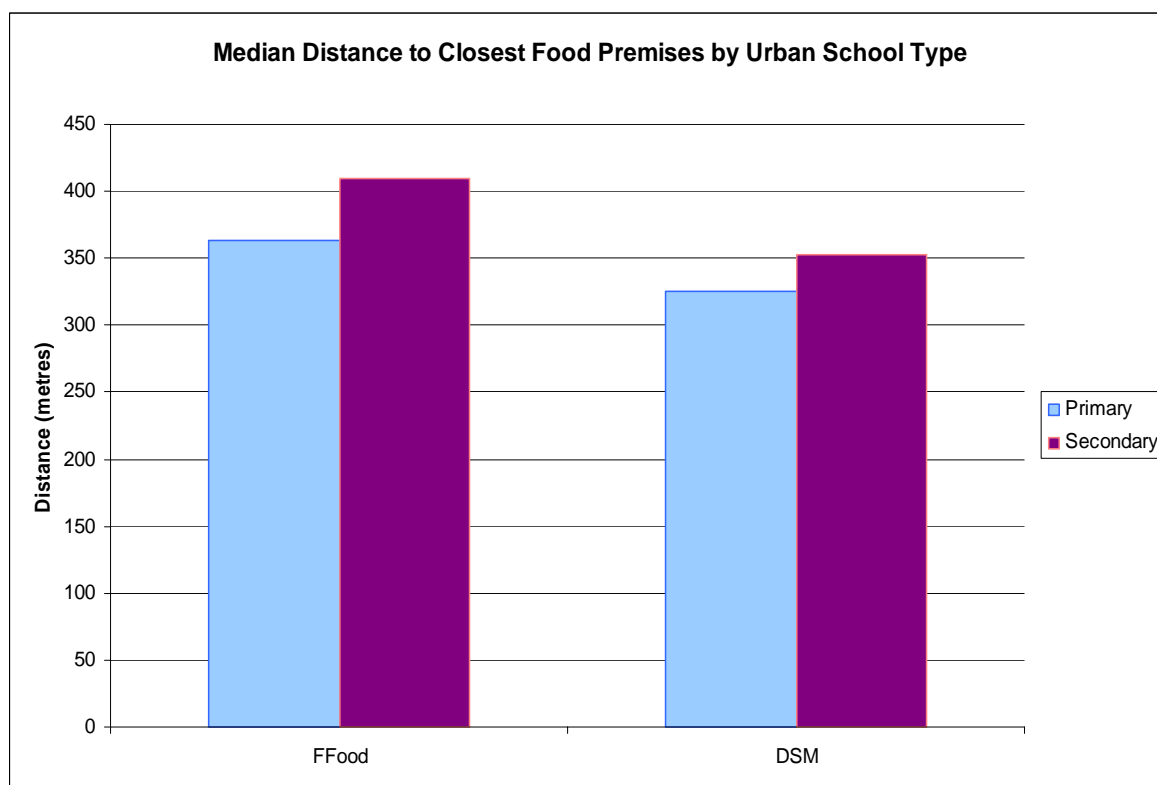
⁹ Ministry of Health. NZ Food NZ People: key Results of the 1997 National Nutrition Survey.: Ministry of Health; Wellington 1999.

¹⁰ Cook C, Simmons G, Swinburn B, Stewart J. Changing risk behaviours for non-communicable disease in New Zealand working men – is workplace intervention effective? *NZ Med J* 2001: 114:175-8.

To inquire into the effectiveness, particularly for children, of current obesity prevention approaches and interventions including primary prevention and screening, information provision, education, physical activity and voluntary steps taken by the food industry.

17. Despite the current lack of evidence for the effectiveness of interventions that help prevent childhood obesity, the seriousness of the obesity epidemic suggests that society must use the evidence that it currently has, what it knows about the causes of childhood obesity, and the evidence that it has on factors influencing physical activity and the consumption of food and drink to start introducing interventions that help prevent people, especially children, from becoming overweight and obese.
18. Current evidence suggests that the following interventions have a part to play in helping to prevent obesity in the population:
 - Regular physical activity.
 - Reduction in sedentary activity.
 - High intake of dietary fibre.
 - Breastfeeding for at least six months.
 - Home and school environments that support healthy choices.
 - Possibly: low glycaemic index foods, increasing dietary calcium through increased dairy intake, and adequate sleeping time.
19. Controlled trials of childhood obesity prevention programmes have shown that the following strategies were effective:
 - Dietary education delivered by multimedia strategies.
 - Education designed to reduce soft drink consumption.
 - Increasing physical activity and interventions aimed at reducing sedentary activities such as watching TV and DVDs, using computers and electronic gaming.
20. In addition, comprehensive strategies that incorporate all aspects of the obesity prevention triad (physical activity, nutrition, and behaviour modification) are generally considered to be more effective than any one strategy.
21. Currently, there are only two Auckland programmes that have been shown to reduce childhood obesity: *Food With Attitude* and *Kids In Action*. However, there are a number of school, pre-school, family, community, and Regional Sports Trusts programmes that might be expected to help reduce/prevent childhood obesity by improving exercise and nutrition outcomes.
22. The primary health care sector has a vital role in obesity prevention and should be encouraged to deliver and support population health programmes that reduce the incidence and impact of obesity and diabetes.

23. Several factors have been shown to affect food consumption, for example, portion sizes, food prices, food variety, food availability, and exposure to obesogenic school food environments and food availability near to schools (see table below). However, evidence for increasing the consumption of healthy foods is limited. Lowering the price of healthy foods has been shown to increase consumption, providing children with free fruit has been shown to increase fruit consumption and decrease consumption of pies, and there are several programmes in Auckland (primarily school-based) that have been shown to increase consumption of healthy foods.



Key: FFood is fast food, takeaways, and lunch bars: DSM are dairies, convenience stores (incl service stations), and supermarkets

24. Changes in the physical, political, economic, and sociocultural environments are needed to improve nutrition and increase physical activity.
25. Despite the establishment of the Food Industry Accord in 2004, few changes in the food environment have yet been implemented. The lack of widespread interventions to help improve the school food environment (e.g. by voluntarily withdrawing sugar-added and high calorie drinks and vending machines from schools) and prohibit marketing of fast foods to children are of particular concern.
26. Further information supporting these comments is set out in Appendix 1.

To inquire into whether additional interventions aimed at changing features of the environment that promote obesity are required.

27. The Service considers that additional interventions aimed at ameliorating the obesogenic environment are essential. This is particularly necessary to protect the health of lower-socioeconomic groups and certain ethnic groups who are disproportionately affected by obesity and type 2 diabetes.
28. The interventions should be targeted at the following contributing factors:
 - Providing an environment conducive to Increasing physical activity.
 - Providing an environment conducive to reducing energy intake.
 - Whole of society interventions.
 - Health sector intervention.
 - Consumer Education.

Providing an Environment Conducive to Increasing Physical Activity

29. Physical activity can be engaged in by necessity and can be discretionary. That taken by necessity is that required by everyday life. Good urban design can encourage physical activity by providing public spaces that are inviting and safe. Improved connectivity (that is safe and attractive) between where individuals live and the places they need to access as part of life means that reliance on the private vehicle can be reduced. This encourages more physical activity as individuals go about their daily lives. Vehicle air pollution is also reduced providing a further health benefit.
30. Discretionary physical activity is undertaken by choice. Urban design and the provision of facilities (both built and open space) can encourage discretionary physical activity. Building the habit of exercise in childhood helps inculcate an active adult life. This means that organised sport and casual recreation need to be part of education and the community needs to provide affordable, accessible facilities for exercise throughout life.

Providing an Environment Conducive to Reducing Energy Intake

31. This can be achieved by individuals choosing to reduce their overall food intake and / or by them choosing to make healthier choices over their diets. Experience has shown that it is very difficult for individuals to 'swim against the tide' in the absence of a supportive environment. While food intake is an individual choice there are a range of possible interventions that will create an environment that guides and support individuals to make (and maintain) healthy choices.

Whole of Society Interventions

32. Obesity and type 2 diabetes have traditionally been viewed as a health sector issue. Experience to date has shown that health sector intervention typically occurs once an individual has become obese. A cross sectoral approach at the whole of society level will be needed to deliver a physical environment that encourages / requires individuals to take sufficient exercise for good health and which provides a nutritional environment where healthy diet choices become the preferred choice of the majority of the population.

33. Such an approach will require that the whole of government (central and local) works cooperatively with the non governmental sector, the community and the commercial sector to deliver the outcomes that are needed to prevent the expense and human suffering that obesity and type 2 diabetes causes.

Health Sector Intervention

34. Treatment of obesity is an expensive, ineffective and inefficient use of resources. Intervention to prevent weight gain is more successful than intervention post weight gain. Primary care provides the best opportunity to provide nutrition and exercise advice; there are however, a range of barriers to this advice being given. These barriers should be removed to ensure that obesity is approached pro-actively by primary health providers.

Consumer Education

35. Changing individual behaviours and creating new healthier lifestyles cannot occur just through the acts of the State. Success will require a range of public education and promotional activities that are repeated and renewed until changed behaviours are internalised. The cultural variety of New Zealand society means that any education needs to be targeted and success is more likely if it is delivered via culturally appropriate methods and by individuals / groups in differing cultures that have mana for the target group.

State Sector Leading by Example

36. The Crown through its control of the wider state sector has a significant opportunity to lead by example in its provision of facilities and services. It can reduce the availability (or eliminate) of food and drink types viewed as contributors to obesity, diabetes and cardiovascular disease (primarily high fat and sugar rich foodstuffs) foodstuffs in vending machines and catering facilities. Through the design of its own facilities it can encourage individuals to invest in higher levels of physical exercise. Individuals in Parliament and the state sector can also lead by personal example and provide role models for the community.

Research and Evaluation

37. No single intervention is likely to be a 'silver bullet' for obesity. The Service recommends that any interventions implemented are supported by appropriate research and evaluation. This will ensure that the most effective interventions are identified and their effects maximised.
38. Further detail on possible interventions is given in Appendix 2.

To consider what policy or legislative mechanisms, if any, should be used to give effect to any findings of the inquiry.

39. Generally, there are two overarching goals of New Zealand's health policy – increase the quality and number of years of healthy life and to reduce health inequalities.

40. For chronic diseases such as obesity and diabetes, these goals necessitate a comprehensive strategy that includes interventions for prevention and control of diseases and their risk factors, individual behavioural change, environmental change, improvements in clinical and preventive services, and organisational change. These interventions can be accomplished through a variety of mechanisms, including health education, development and use of information systems, and development and implementation of policies and guidelines. Policies, in turn, can be implemented as regulations, ordinances, other laws, or as organisational practices¹¹.
41. While much has been written on the use of policy and legislation for the management of communicable diseases, there has been little consideration of these mechanisms for the management non-communicable diseases such as obesity and diabetes.
42. New Zealand's review of the Health Act 1956, however, provides an outstanding opportunity to address the management of both communicable and non-communicable diseases through a range of legal and policy interventions.
43. Any policy or legal response must be viewed as an escalating scale of actions from the provision of health education information to powers to regulate individuals or organisations. While not specifying the exact nature of significant policies and legislation, the Service considers that the Committee should view the recommendations in relation to policy and legislation in light of the following principles:
 - The relevance of evidence-based approaches to determine effective public health strategies that are proportionate to the issues they are designed to address.
 - The contribution of broad determinants of health in effecting positive influences on a range of social, economic, cultural and physical factors.
 - Processes that involve government, non-government, community and private sector groups as the basis of action for addressing risk factors relevant to non-communicable diseases.
 - Consultation, cross-sectoral collaboration and joint planning and implementation between national and local government levels.
 - The wellbeing and mutual interdependence of whanau, hapu, and iwi and families and their communities.
 - The focus of public health action in promoting, maintaining and enhancing the health status and wellbeing of the general population and communities working towards the development of social and cultural environments conducive to health and wellbeing.
 - Implementing public health objectives through coordinated action to the health sector and in particular, ensuring a continuum of care between public health and primary health.

¹¹ Mensah GA, Goodman RA, Zaza, S, Moulton AD, Kocher, PL, Dietz WH et al. Law as a tool for preventing chronic diseases: expanding the range of effective public health strategies. Preventing Chronic Disease [serial online] 2004 Jan [April 2006] Available from URL: http://www.cdc.gov.pcd/issues/2004/jan/03_0033.htm

To report the inquiry's findings and recommendations to the House of Representatives.

44. The Service looks forward to the results of the Select Committee's Inquiry. Obesity is one of the greatest long term challenges facing New Zealand society and failure to turn the tide of increasing obesity will mean that "better health for all¹²" will not be achieved. An urgent investment into the prevention of obesity and diabetes will reduce significant costs across society now and into the future.

Yours sincerely

Monica Briggs
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Auckland Regional Public Health Service

¹² <http://www.dpmc.govt.nz/dpmc/publications/government-priorities.html>

Appendix 1

Specific Comments for Term of Reference 3

To inquire into the effectiveness, particularly for children, of current obesity prevention approaches and interventions including primary prevention and screening, information provision, education, physical activity and voluntary steps taken by the food industry.

Introduction

It is widely acknowledged that evidence is currently largely lacking on the effectiveness of interventions to prevent childhood obesity. As noted by the most recent Cochrane Review of controlled trials for childhood obesity prevention [1]:

“Current research lacks the power to set clear directions for obesity prevention activity at a time when obesity prevention is a public health priority”.

It is also acknowledged that society can not use this lack as an excuse to do nothing because of the alarming trends in overweight and obesity. In the words of John Catford [2]:

“We must guard against nihilists and procrastinators who require top-level evidence from randomized controlled trials before action is taken”.

Therefore, it is particularly important that note is taken of the known **causes** of obesity and that where evidence of effective interventions is lacking, interventions are planned that target the causes of obesity. For example, while sufficient evidence exists that the marketing of energy-dense food and drink is associated with childhood obesity [3-5] there is no evidence that a shift towards marketing nutritious, low energy food is associated with a reduction in childhood obesity. Nevertheless, it makes good sense to intervene to reduce the marketing of energy-dense food and drink and increase the marketing of nutritious, low energy food in order to decrease childhood obesity. Evidence for the causes of obesity is presented under the terms of reference 2 for this inquiry.

In addition to considering the causes of obesity when planning interventions, interventions that improve nutrition and physical activity outcomes should also guide obesity prevention interventions, as there is another body of literature that examines nutrition/consumption and physical activity endpoints rather than measuring obesity. For example, there is evidence around the effect on consumption of the following: food pricing, food variety, availability of food and drink, and the school food environment. In addition, studies have identified some of the barriers to fruit and vegetable consumption.

Obesity **treatment** interventions must form a strong component of prevention interventions to aid in effective targeting of people at high risk of obesity. Staff involved with family-based obesity treatment programmes such as Auckland District Health Board’s “Food With Attitude”, have long known that treatment for one family member helps prevents obesity in other family members who are almost invariably also at high risk of obesity.

Evidence for the Effectiveness of Interventions that Reduce Obesity

Summary

A review of the available evidence suggests that the following interventions help prevent obesity (Table 1). This table was produced by the World Health Organisation to summarise the research shown to promote or protect against weight gain and obesity, according to the strength of the available evidence [6].

Table 1: Summary of strength of evidence on factors that might promote or protect against weight gain and obesity^a [6].

Grading of Evidence	Decreased risk	No relationship	Increased risk
Convincing	Regular physical activity High intake of dietary fibre ^b		Sedentary lifestyles High intake of energy-dense micronutrient-poor foods ^c
Probable	Home and school environments that support healthy food choices for children ^d Breastfeeding		Heavy marketing of energy-dense foods and fast-food outlets ^d High intake of sugars-sweetened soft drinks and fruit juices Adverse socioeconomic conditions (in developed countries, especially for women) ^d
Possible	Low glycaemic index foods	Protein content of the diet	Large portion sizes High proportion of food prepared outside the home (developed countries) "Rigid restraint/periodic disinhibition" eating patterns
Insufficient	Increased eating frequency		Alcohol

^a Strength of evidence: the totality of the evidence was taken into account. The World Cancer Research Fund schema was taken as the starting point but was modified in the following manner: randomised controlled trials (RCTs) were given prominence as the highest ranking study design (RCTs were not a major source of cancer evidence); associated evidence and expert opinion was also taken into account in relation to environmental determinants (direct trials were not usually available).

^b Specific amounts will depend on the analytical methodologies used to measure fibre.

^c Energy-dense and micronutrient-poor foods tend to be processed foods that are high in fat and/or sugars. Low energy-dense (or energy-dilute) foods, such as fruit, legumes, vegetables, and whole grain cereals, are high in dietary fibre and water.

^d Associated evidence and expert opinion included.

Dietary Fibre

The WHO summary, above, lists regular physical activity and a high intake of dietary fibre as the two factors that most convincingly prevented excess weight gain. However, dietary fibre studies were conducted with adults rather than children [7, 8], as were most of the physical activity trials [9]. In adults, the majority of dietary fibre studies have demonstrated increased satiety, reduced hunger, reduced energy intake, and body weight loss during consumption of high-fibre diets [7, 8]. Thus, there is considerable reason to conclude that fibre-rich diets containing non-starchy vegetables, fruits, whole grains, legumes, and nuts, may also be effective in the prevention and treatment of obesity in children.

In addition to the WHO list above, there is also evidence that increasing dietary calcium and getting sufficient sleep are associated with lower BMI.

Calcium

There is now evidence from human trials, observational studies, and physiological studies that diets high in dairy products are associated with lower BMI and also with greater weight loss when on calorie-restricted diets [10-16]. A study of obese adults has shown that this effect is also observed with calcium supplementation of the diet although these effects were attenuated compared to a diet high in dairy products (3-4 servings of milk, yoghurt, or cheese daily, equivalent to a calcium total of 1200-1300 mg/d) [16]¹³. In addition, high dairy diets have also been associated with a lower incidence of insulin resistance (a marker for later diabetes) [17] and improvements in fat distribution by reducing truncal fat even in the absence of weight loss [18] (truncal fat is associated with an increased risk of cardiovascular disease and diabetes). A full listing of clinical trials examining the relationship between calcium/dairy products and body weight is available at http://www.milknewsroom.com/role_overview.htm

Sleep

Several studies have now shown an association between inadequate sleeping time and obesity. In particular, a large study of adults has shown that people getting six hours of sleep per night were 27% more likely to become obese than those getting seven to nine hours [19]. Another study of adults showed that total sleep time decreased as BMI increased with those having a normal BMI sleeping for 112 minutes longer per week on average than those who were overweight or obese [20]. A recent study has also shown that children aged 5-10 years who slept for 10.5-11.5 hours per night instead of the average 12-13 hours had a 40% increased risk of becoming overweight or obese [21]. The evolutionary explanation proposed for this phenomenon is that humans may have evolved to store fat in summer when days are long and nights (and sleeping hours) are short, thus sleeping less may serve as a trigger to the body to increase food intake. The physiological explanation is that sleep deprivation is associated with a fall in leptin levels (a hormone associated with appetite suppression) and a rise in ghrelin levels (a hormone associated with appetite stimulation). However, current studies do not establish a cause-and-effect relationship between restricted sleep and obesity. This would require studies that show weight loss resulting from extensions of sleep.

Controlled Trials of Childhood Obesity Prevention Programmes

As noted above, most physical activity trials (Table 1) were conducted with adults rather than children [9] - except for several controlled trials of physical activity +/- dietary interventions conducted with children in educational institutions or family setting (Table 2) [22]

¹³ For a comparison, milk contains approximately 400mg per 200ml.

Table 2: Controlled trials evaluating childhood obesity prevention programmes.

Author, Country, Year	Participants	Interventions	Results	Comments
Dietary Education				
Epstein USA 2001	Non obese children from families with at least one obese parent. Mean age: I=8.6 yrs, C=8.8 yrs. 65% female	Both groups received same 6-month treatment and followed the 'traffic light' diet, but targeted different dietary goals. Treatment meetings were facilitated by therapists: I: increased fruit and vegetable intake (n=13) C: decreased intake of high fat/high sugar foods (n=13) Follow-up: one year.	<i>Percentage of overweight:</i> Parents in the increased fruit and vegetable group showed significantly greater decreases ($p<0.05$) in percentage of overweight than parents in the decreased high-fat/high-sugar group, while children showed a stable percentage of overweight over time.	Random allocation: method not described. Blinding: *children: unclear *providers: unclear *outcome assessors: unclear
Simonetti Italy 1986	Children aged 3-8 yrs in kindergarten or primary school.	Two school groups received dietary education interventions that differed in intensity, and there was one control school as follows: School 1: multimedia action strategy (MA), n=367. School 2: written action strategy (WA) - pamphlet only n=358. School 3: control, n=596. Follow-up: one year.	A 12.2% reduction in obesity and a 12.1% reduction in overweight was found in the MA school. There were no significant changes in overweight or obesity in the WA or control schools.	Non-randomised allocation. Did not adequately describe attrition, the potential of contamination between study groups or the generalisability of the study.
James UK 2004	Children aged 7-11 yrs in primary schools.	Twenty-nine classes from six primary schools were randomized into the intervention group (15 classes) or control group (14 classes). Intervention group: 4X 1 hr educational sessions to reduce the consumption of carbonated drinks (n=325). Control group: no sessions (n=319). Follow-up: one year (the end of the intervention).	A drop in consumption of carbonated drinks was observed in the intervention group of 0.6 glasses over 3 days compared with an increase of 0.2 glasses in the control group (mean difference 0.7, 95% CI 0.1-1.3). There was an increase of 7.5% in overweight and obese children in the control group compared with a decrease of 0.2% in the intervention group (mean difference: 7.7%. 95% CI 2.2-13.1%).	Random allocation: randomisation of classes stratified by school. Blinding: *children: at time of consent *outcome assessors: unclear

Author, Country, Year	Participants	Interventions	Results	Comments
Physical Activity				
Mo-Suwan Thailand 1998	Kindergarten children. Mean age: 4.5 yrs 44% female.	Intervention: Kindergarten-based physical activity programme conducted by specially trained staff and including a 15 minute walk and a 20 minute aerobic dance session 3x a week (n=158 baseline, 147 at end of study). Control: no intervention (n=152 baseline, 145 at end of study). Follow-up: 29.6 weeks (the end of the intervention) and 29.6 weeks + 6 months.	<i>Prevalence of obesity (triceps-skinfold thickness):</i> Baseline: I=12.9%, C=12.2%. 29.6 weeks: I=8.8%, C=9.4%. 26.6 weeks + 6 months: I=10.2%, C=10.8%	Random allocation: randomisation of classes stratified by school. Blinding: *children: unclear *providers: unclear *outcome assessors: unclear
Flores USA 1995	School children (aged 10-13 yrs). Mean age: 12.6 yrs 54% female.	Intervention: Thrice weekly aerobic dance classes plus health education in place of regular school physical education programme (n=43). Control: Usual physical activity (n=38). Follow-up: 12 weeks.	<i>Girls:</i> Change in BMI: I=-0.8, C=0.3, p<0.05. Change in heart rate (beats per minute): I= -10.9, C=-0.2, p<0.01. <i>Boys:</i> There were no differences between I and C groups.	Random allocation: randomisation of classrooms. Blinding: *children: unclear *providers: unclear *outcome assessors: unclear. Generalisability of study outcomes not considered; follow-up numbers of participants (n) not reported.

Author, Country, Year	Participants	Interventions	Results	Comments
Robinson USA 1999	School children (aged 8-10 yrs). Mean age: 8.9 yrs 47% female.	Intervention school: 18 lessons aimed at reducing sedentary behaviours (TV, videotape and videogame use) (n=92). Control school: usual school curriculum. Follow-up: 6 months (the end of the intervention).	<p><i>Intervention vs control change:</i></p> <p>*BMI: intervention vs control change: 18.38 to 18.67 kg/m² vs 18.10 to 18.81 kg/m², respectively, adjusted difference -0.45kg/m² (95% CI -0.73 to -0.17), p=0.002;</p> <p>*Triceps skinfold thickness: intervention vs control change: 14.55 to 15.47mm vs 13.97 to 16.46mm, respectively, adjusted difference, -1.47mm (95% CI, -2.41 to -0.54), p=0.002;</p> <p>*Waist circumference: intervention vs control change: 60.48 to 63.57 cm vs 59.51 to 64.73cm, respectively, adjusted difference, -2.30cm (95% CI, -3.72 to -1.33), p<0.001); and</p> <p>*Waist to hip ratio: intervention vs control change: 0.83 to 0.83 cm vs 0.82 to 0.84 cm, respectively; adjusted difference, -0.02 (95% CI,-0.03 to -0.01), p<0.001.</p> <p>*Intervention group watched significantly less TV (p<0.001) and played fewer video games (p<0.01).</p> <p>*Groups did not differ for videotape viewing, daily servings of high fat foods, physical activity levels, or cardiorespiratory fitness.</p>	<p>Random allocation of schools.</p> <p>Blinding:</p> <p>*children: unaware of primary hypothesis</p> <p>*providers: unaware of primary hypothesis</p> <p>*outcome assessors: blinded</p>

Author, Country, Year	Participants	Interventions	Results	Comments
Robinson USA 2003	Sixty-one African-American girls (and their parents/guardians) aged 8-10 yrs from low-income neighbourhoods. Girls had BMI>50th percentile for age and/or at least one overweight parent/guardian.	Intervention: after-school dance classes at community centres, and five educational sessions at family homes designed to reduce sedentary behaviours (TV, videotape and videogame use). Control: newsletters and health education lectures. Follow-up: 12 weeks (the end of the intervention).	<p><i>Intervention vs control change:</i></p> <p>Trends towards -</p> <ul style="list-style-type: none"> *Lower BMI: adjusted difference = -0.32 kg/m², 95% CI -0.77 to 0.012. *Lower waist circumference: adjusted difference = -0.63 cm, 95% CI -1.96 to 0.67. *Increased after school activity: adjusted difference = 55.1 counts/minute, 95% CI -115.6 to 225.8. *Reduced TV, videotape and video game use: adjusted difference = -4.96 hours/week, 95% CI -11.41 to 1.49. *Improved school grades: Cohen's d=0.51, p=0.07. <p>Significantly -</p> <ul style="list-style-type: none"> *Reduced household television viewing: d=0.40, p=0.007. *Fewer dinners eaten while watching TV: adjusted difference = -1.60 meals/week. 95% CI -2.99 to -0.21. *Less concern about weight: d=0.60, p=0.03. 	Random allocation. Blinding: *children: unclear *providers: unclear *outcome assessors: blinded

Author, Country, Year	Participants	Interventions	Results	Comments
Combined Dietary Education and Physical Activity				
Gortmaker USA 1999	School children (year 6-8). Mean age: 11.7 yrs. 48% female.	Intervention: school-based interdisciplinary intervention focused on decreasing TV viewing, decreasing consumption of high-fat foods, increasing fruit and vegetable consumption and encouraging increases in physical activity (n=641). Control: no intervention (n=654). Follow-up: 18 months (2 school years).	<i>Change in prevalence of obesity in girls (%)</i> : C=2.2, I=-3.3 Adjusted OR=0.47 (95% CI: 0.24 to 0.93, p=0.03). <i>Change in prevalence of obesity in boys (%)</i> : C=-2.3, I=-1.5 Adjusted OR=0.85 (95% CI: 0.52 to 1.39, p=0.48).	Random allocation: ten schools matched according to town, size and ethnic composition, randomised using random number table. Blinding: children: unclear providers: unclear outcome assessors: unclear.
Donnelly USA 1996	School children (years 3-5). Mean age: 9.2 yrs. % female: not given.	Intervention: school-based multi-component programme of nutrition education, modified school lunches and increased physical activity (n=102). Control: no intervention (n=236). Follow-up: two yrs (the end of the intervention).	No impact on obesity (BMI C vs I at baseline (SD): 18.1(2.6):17.9(3.8); C vs I at 2 yrs: 19.3(3.2):18.9(4.3)). There was a statistically significant decrease in total energy and fat content of school foods and an increase in carbohydrate and fibre content and physical activity during school hours. However, over 24 hrs there were no significant differences in diet and physical activity between intervention and control groups.	Random allocation: unnamed number of primary schools paired according to ethnicity, level of social disadvantage, and baseline characteristics randomised to intervention or control. Poor rates of follow-up. Blinding: children: unclear providers: unclear outcome assessors: unclear.
Sahota UK 2001	School children (aged 7-11 yrs). Mean age: I=8.36 yrs, C=8.42 yrs. Sex: I=49% female, C=41% female.	Intervention: Active Programme Promoting Lifestyle in Schools (APPLES). Programme designed to influence diet and physical activity and not simply knowledge. Targeted at the whole school community including parents, teachers and catering staff. The programme consisted of teacher training, modifications of school meals and the development and implementation of school action plans designed to promote healthy eating and physical activity (n=301 baseline, n=292 follow-up). Control: no intervention (n=312 baseline, n=303 follow-up). Follow-up: one year.	<i>Weighted mean difference in BMI (I-C)</i> : Overweight children: -0.07 (95% CI: -0.22 to 0.08). Obese children: -0.05 (95% CI: -0.22 to 0.11). All children: 0 (95% CI: -0.1 to 0.1).	Random allocation: ten schools paired according to size, ethnicity and level of social disadvantage, randomised by coin toss. Blinding: children: unclear providers: no outcome assessors: no.

Author, Country, Year	Participants	Interventions	Results	Comments
Mueller Germany 2001	School children. Mean age: 11.7 yrs. 48% female.	Intervention: 8-hour school course of nutrition education including 'active' breaks given by a skilled nutritionist and a trained teacher. Included the following messages: 'eat fruit and vegetables every day', 'reduce intake of high fat foods', 'keep active at least 1 hr each day', 'decrease TV viewing to <1 hr per day'. (Additional family-based intervention plus a structured sports programme were offered to families with overweight or obese children and to families with normal weight children but obese parents), n=136. Control: no intervention (n=161). Follow-up: one year.	<i>Median BMI (baseline, 1 yr):</i> I=15.2, 16.1 C=15.4, 16.3 p=ns. <i>Median triceps skinfold (mm) (baseline, 1 yr):</i> I=10.9, 11.3 C=10.7, 13.0 p<0.01.	Random allocation: method not described. Blinding: Children: unclear Providers: unclear Outcome assessors: unclear
Stolley USA 1997	African-American girls (aged 7-12 yrs) and their mothers. Mean age: I=9.9 yrs, C=10.0 yrs. 62% of mothers and 19% of daughters were obese.	Intervention: 12-week culturally specific obesity prevention programme, focused on adopting a low fat, low calorie diet and stressing the importance of increased activity (n=32). Control: general health programme, focused on communicable disease control, effective communication skills, relaxation techniques, and stress reduction (n=33). Both groups led by either a doctoral clinical psychology student or registered dietitian. Follow-up: 12 months (only 12 week data reported).	Significant between group differences with treatment mothers consuming less daily saturated fat (-2.1 oz, p<0.05) and a lower percentage of calories from fat (-7.9%, p<0.001). Weight remained unchanged. Differences among treatment and control groups were noted for the daughters' percentage of daily calories from fat (-3.9%, p<0.05).	Random allocation: method not described. Blinding: Children: unclear Providers: unclear Outcome assessors: unclear

Author, Country, Year	Participants	Interventions	Results	Comments
Caballero USA 2003	American Indian school children (aged 7-9 yrs). Mean age: 7.6 yrs 48% female.	Intervention: Pathways intervention to school children with four components: change in diet, increase in physical activity, classroom curriculum focus on healthy eating and lifestyle, and a family involvement programme (n=879 baseline, n=727 follow-up). Control: no intervention (n=825 baseline, n=682 follow-up) Follow-up: three yrs (the end of the intervention).	<i>Intervention vs control change:</i> *No significant reduction in percentage body fat (-0.2 kg/m ² , 95% CI: -0.84 to 1.31, p=0.004). *No significant difference in total energy intake (5.8 kcal, 95% CI: -40.0 to 51.5, p=0.80). *No significant difference in physical activity (20.43 average vector magnitude/min, 95% CI: -19.05 to 59.92, p=0.31). *Significant reduction in % energy from fat in school meals (-4.2%, 95% CI: -7.1 to -1.3, p=0.005). *Improved knowledge, attitudes and behaviours.	Random allocation of schools: stratified randomisation based on % body fat. Blinding: *children: unclear *providers: unclear *outcome assessors: blinded
Neumark-Sztainer USA 2003	Mainly overweight high school girls who performed little daily activity. Mean age: 15.4 yrs.	Intervention: New Moves intervention instead of regular PE classes 5 days a week for 4 months. Physical activity four times a week, and nutrition and social support education sessions every other week. Each component consisted of several interventions based on a framework of Social Cognitive Theory. The intervention was followed by a two month maintenance component consisting of weekly healthy-lunch meetings and discussions. Control: written materials on healthy eating and physical activity that were distributed at baseline assessment. Follow-up: eight months.	<i>Intervention vs control BMI:</i> *No difference in mean BMI (I:C BMI: 26.64:26.65 kg/m ² , p=0.96). *Significant progression in stage of change for physical activity in the intervention (38% progressed, 11% regressed) compared with the control girls (20% progressed, 24% regressed), p=0.0004.	Random allocation of 6 schools. Blinding: *girls: unclear *providers: unclear *outcome assessors: unclear.
Sallis USA 2003	School children in grades 6 to 8. Ages: 12-14 years. 49% female.	Intervention: Daily PE; promotion of PA at school during leisure times; more low-fat food choices at all school food sources; and policy changes to create healthier school environments that support these interventions (n=12 schools). Control: No interventions (n=12 schools). Follow-up: two years (the end of the intervention).	<i>Intervention vs control BMI:</i> *Boys: significant difference in mean change in BMI between the intervention group (20.12 to 19.84 kg/m ²) and control group (19.68 to 20.04 kg/m ²) for baseline and 2-yearly measurements, respectively (F=4.6). *Girls: no significant difference in mean change in BMI between the intervention group (19.76 to 19.88 kg/m ²) and control group (19.52 to 19.73 kg/m ²) for baseline and 2-yearly measurements, respectively (F=0.0).	Random allocation of 24 schools. Blinding: *children: unclear *providers: no *outcome assessors: unclear.

As shown above, studies examining combined dietary education and physical activity interventions in children have thus far failed to demonstrate any significant impact on BMI or obesity [23-30].

Dietary education delivered by multimedia strategies to primary and kindergarten children [31], and education designed to reduce soft drink consumption in primary school children [32], were significantly associated with reductions in obesity prevalence.

Physical activity interventions and interventions aimed at reducing sedentary activities (such as watching TV and DVDs, using computers, and electronic gaming) were also associated with significant reductions in BMI in two studies [33, 34] and a trend towards significant reductions in BMI in the remaining two studies [35, 36].

Since conducting the literature review in 2004 that is summarised above, further reviews have supported the effectiveness of comprehensive school-based programmes, and multi-faceted family based behaviour modification programmes, that include the following components in improving diet and reducing the rates of obesity [37, 38]:

1. **environmental**
 - modification of school meals and tuck shops
2. **educational**
 - nutrition education
 - physical activity promotion
 - reduction in sedentary behaviour
 - behavioural therapy
 - teacher training
 - training of parents (child management, parenting, and communication skills)
3. **policy**
 - adding nutrition/physical activity education to the curriculum
 - tuck shop food policy.

Summary of Literature

The difficulties in conducting research or interventions in this area and hence the limited data at hand, makes it difficult to conclude that one strategy or combination of strategies is more important than others in the prevention of childhood obesity. While existing literature suggests that limiting children's sedentary behaviours, increasing physical activity, reducing soft drink consumption, and dietary education delivered by multimedia strategies may be effective in certain groups of children, and comprehensive strategies are more effective than interventions targeting only one aspect of the obesity triad (nutrition, physical activity, and behaviour), there remains an urgent need for well-designed studies in the area.

Evidence for the Effectiveness of Auckland Programmes that Reduce Obesity

The Service conducted interviews with 40 providers of children's physical activity or nutrition programmes in the Auckland region in 2004, and this section presents the findings of that review. Most of the physical activity and nutrition programmes operating in the Auckland region did not have obesity prevention as a goal and did not measure weight-related outcomes, although they might be expected to help prevent childhood obesity by increasing physical activity and reducing the energy-density of food and snacks eaten. Programmes that had collected weight-related measures i.e. Food With Attitude, Well Child, Kids In Action, and the Pacific Islands Heartbeat Church project, had significant data collection/recording problems, with the possible exception of Kids In Action where the 2003 evaluation showed that 70% of children had maintained or lost weight and 42% had lost weight.

Auckland District Health Board's Food with Attitude programme is a one-on-one programme to treat obesity in children with family-based nutrition education and physical exercise. The physical activity component is delivered via Sport Auckland's Young & Active programme. Despite poor record keeping for BMI, a relationship was found between family members who had increased their physical activity and made positive dietary changes and a decrease in their children's BMI, suggesting that whole-family participation may be the key to this programme's effectiveness [39].

The Pacific church-based nutrition and physical activity programme run by Heartbeat Pacific has been shown to significantly reduce weight compared to other Pacific Churches [40]. Of note, the Food With Attitude and Kids In Action programmes are both aimed at *treatment* of obesity rather than prevention, the PI Church project targeted families rather than children, and the Well Child programme had not reported any weight-related findings.

All of the remaining Auckland programmes had either increasing physical activity or improving nutrition as goals, with one exception (the Adolescent Obesity & Diabetes Prevention Programme) having obesity and Type 2 diabetes prevention as a specific goal. The Children and Young People's Diabetes Prevention & Management Project and two large obesity prevention trials (the Pacific Obesity Prevention in Communities Trial in Auckland, and Energize in Waikato) also have obesity prevention as a goal and will measure weight-related outcomes.

Programmes currently reaching the greatest number of children and youth are as follows:

- School-based programmes such as those coordinated by Waitemata District Health Board, Health Promoting Schools, National Heart Foundation's School Food and Jump Rope For Heart programmes, and 5+ A Day.
- Pre-school programmes such as the National Heart Foundation's Healthy Heart Award, the Well Child programme, and other services provided by Auckland District Health Board.
- Family programmes such as Food With Attitude and Young & Active.
- Community programmes provided by city councils particularly Walking School Buses and Waitakere City Council's youth programmes.
- Regional Sports Trusts physical activity programmes including two specific programmes targeting children: Sport Waitakere's Fitt Kidz and Harbour Sports' More Kids More Active More Often programmes.

In 2004, primary care was only playing a small role in childhood obesity prevention and no Auckland programmes had been developed by Primary Health Organisations, although Procure had the Modified Green Prescription Project for adults, and TaPasifika helped provide the Kids in Action programme. However, both of these programmes involved targeting and treatment of overweight and obese people, rather than prevention in the general population or at-risk groups. Currently, Auckland PHO plans that aim to reduce obesity continue to focus on Green Prescriptions (whereby GPs prescribe physical activity and nutrition lifestyle advice to high-risk individuals) and various types of physical activity classes.

Evidence for the Effectiveness of Interventions that Increase Consumption of Healthy Food

As has already been stated, while there is some fairly good evidence for interventions that inspire over-consumption of obesogenic¹⁴ foods, such as lowering food prices, increasing food varieties, increasing the availability of food and drink, increasing portion sizes, and exposing children to obesogenic school food environments, there is very little evidence available that shows how these strategies might be utilised to reduce the consumption of obesogenic foods and increase the consumption of unprocessed, low energy-density, and nutritious foods. However, some evidence is available for food pricing, and the Service found that some of the programmes provided for children in the Auckland area did result in healthier food consumption.

Food Pricing

Food pricing has been shown to affect sales and consumption. The use of cheap sugars and saturated fats in fast foods, snack foods and processed foods encourages consumption both by reducing price and improving palatability [41-43]. Overseas studies show that fats and sweets provide dietary energy at a very low cost while the energy cost of lean meats, fish, vegetables and fruit is higher [44-47]. A New Zealand study found that foods highest in saturated fat were cheaper than the low saturated fat equivalents [48].

Studies have shown that lower pricing is as effective in promoting sales of healthy foods such as fresh fruit and vegetables as it is for sales of energy-dense vending snacks [49-51]. For example, a USA study of 12 secondary schools and 12 work sites showed that price reductions of 10%, 25%, and 50% on low-fat snacks in vending machines increased the percentage of sales by 9%, 39%, and 93%, respectively [50].

Examples of Public Health Programmes

The School Food Programme

This programme encourages schools to produce nutrition policies that support healthy school food consistent with the Food and Nutrition Guidelines, provide nutrition education developed around the school's Health & Physical Education school curriculum, and promote healthy food to students and the wider school community. Evaluations of the programme have shown an improvement in the school food environment, and a study done in 1999 showed that increasing levels of participation in the programme was associated with a reduction in sales of doughnuts, cream buns, pies, sausage rolls, crisps and sweets, and an increase in sales of sandwiches and filled rolls [52].

¹⁴ Obesogenic foods are primarily those high in, fat and sugar).

Breakfast in Schools Programme

An evaluation of the Breakfast in Schools campaign run by the NZ Nutrition Foundation showed that 71% of participants reported changes in their eating habits including having breakfast and choosing cereals in place of left-over dinner [53].

Healthy Heart Award

Evaluation of the effects of the National Heart Foundation's Healthy Heart Award on preschools compared with preschools not involved with the Award, showed that Award Centres were more likely to have nutrition policies, lunchbox guidelines, food menus offering a variety of healthy choices, and children were more likely to have a piece of fruit or vegetable and less likely to have a salty pre-packaged snack food in their lunchboxes [54].

Mangere Healthy Kai Programme

The Mangere Healthy Kai programme run by Auckland Regional Public Health's Health Outcomes Team in collaboration with the National Heart Foundation, three local community health providers, and twelve retailers in the Mangere town centre, aims to encourage food retailers to provide healthy food choices via nutrition promotion activities (healthy eating messages, nutrition quizzes, cooking demonstrations). Evaluation has shown that amongst shoppers aware of the Mangere Healthy Kai programme, the proportion of shoppers that ate a healthy kai choice for their last meal or snack at Mangere Town Centre increased from 32% to 57% over a seven month period. Amongst retailers, positive changes included more fish being grilled than fried and more sandwiches and fewer pies being sold (Christine Cook, personal communication).

Food Health Promotion Labelling

The effect of food health promotion labelling on the prevalence of overweight and obesity has not been studied; nor has its effect on food consumption. However, the Waitemata Beverage Pilot Project has shown good evidence for reducing the consumption of sugary drinks in secondary schools in the Waitemata District. The project is based on a simple traffic light system where beverages are categorised into either 'Green', 'Orange' or 'Red' based on their sugar content and portion size. Under the guidelines, beverages classified as 'Green' represent the healthiest choice, offering some nutritional value and containing less energy than 'Amber' or 'Red' category beverages.

Currently over half the secondary schools in the district are involved. The impact on the beverage environment in these schools has been noteworthy. Prior to the project, all schools sold carbonated sugary drinks (CSDs). Schools became actively engaged in the project in May 2005, by November 2005, 87% of participating schools had removed or partially removed all CSDs. Sales of 'Green' beverages (water and low fat milk) in participating schools rose from 6.5% to 30.0% of total sales, whilst 'Red' beverage sales almost halved, 67.5 to 38.5%.

The Beverage Project is now in the process of expansion as follows: The expansion has three components:

- The implementation of healthy food and beverage guidelines in schools, throughout the wider Auckland region.
- Work to encourage legislative change with regard to school food, and
- Establish DHBs as role models for healthy food and beverage environments.

Macroenvironmental Interventions

Currently there are no studies that have directly examined the effects of changes in the physical/ political, economic, or sociocultural macroenvironments (Table 3), on the population prevalence of overweight and obesity. However, most authors agree that action at societal level is required to counter the macroenvironmental influences on physical activity and dietary intake, and changes are being considered and implemented in policy, transportation/town planning, and the food industry at global and national levels. The International Obesity TaskForce (IOTF) has developed an international framework for guiding decision-making in obesity prevention that acknowledges both the paucity of evidence available for obesity prevention interventions, and the importance of macroenvironmental factors [56].

Table 3: Environmental influences on food intake and physical activity [57]

Type of Environment	Physical Environment		Economic environment		Sociocultural environment	
	Food	Activity	Food	Activity	Food	Activity
Macro	Food laws and regulation Food technology Low fat foods Food industry policies	Labour saving devices Cycleways and walkways Fitness industry policies Transport system	Food taxes and subsidies Cost of food technology Marketing costs Food prices	Cost of labour versus automation Investment in parks and recreational facilities Costs of petrol and cars Costs of cycleways	Traditional cuisine Migrant cuisines Consumer demand Food status	Attitudes to recreation National sports Participating versus watching culture Gadget status
Micro	Food in house Choices at school cafeterias Food in local shops Proximity of fast food outlets	Local recreation facilities Second cars Safe streets Household rules for watching TV and video	Family income Other household expenses Subsidised canteens Home grown foods	Gym or club fees Owning equipment Subsidised local events Costs of school sport	Family eating patterns Peer attitudes Pressure from food advertising Festivities	Peers' activities Family recreation School attitude to sports Safety fears

Food Industry Interventions

The Food Industry in New Zealand has undertaken several interventions to date, initiated by the industry or a health partner, and these are summarised in Table 4. None of the interventions shown in Table 4 have been evaluated for weight-related outcomes although evaluation of the National Heart Foundation's 'Pick the Tick' programme (which aims to encourage a healthy food supply by allowing industry to use the tick logo for foods meeting criteria for healthy levels of fat, added sugar, sodium, and fibre) has shown that while the food industry has responded by reducing salt content in frequently eaten foods [58], the public were confused by the significance of the logo [59]. It is not known if 'Pick the Tick' has impacted on BMI (body mass index), chronic disease, the dietary quality of the population, or whether it influences the food choices of one demographic more than another. Similarly, national media campaigns, such as '5 + a day' that aims to increase consumption of fresh fruit and vegetables, and the healthy food pyramid that aims to illustrate recommended dietary guidelines, have lacked obesity prevention goals or outcome measures [60, 61]. There has also been limited international research on the health effects of food industry interventions – in the USA, labelling of foods with nutrition information has shown an association between label readers and female gender [62],

higher educational attainment [63], greater nutrition knowledge [64], and a reduction in percentage of energy in the diet obtained from fat [63, 65]. This suggests that nutrition labelling of food needs to be accompanied by strategies that influence the food choices of less educated and lower socioeconomic groups [64].

Table 4: Industry interventions with a Role in Improving Nutrition and Physical Activity

Health Initiatives		
Programme	Health Partner	Food Industry Partner
5+ A Day	MoH	United Fresh NZ Inc.
Pick The Tick	National Heart Foundation	Various
Jump Rope For Heart	National Heart Foundation	Pump water (Coca-Cola)
Mangere Healthy Kai	ARPHS	Mangere food retailers
Food in Schools	Manukau City Council	Various local industries
Industry Initiatives		
'Eat Smart Be Active' campaign and the Salads Plus menu	Sarah Ulmer	McDonalds
'Go Kids' PA programme	National Assoc. of Out of School Care & Recreation	Coca-Cola
'Activity, Balance, Choice' campaign	-	Coca-Cola
'Be Active Be Healthy' manual providing advice on physical activity	Millenium Institute of Sport and Health	Nestle
Nutrition pamphlets	Plunket	Watties

The Food Industry Accord

In September 2004, members of the food industry involved in a coalition of food industry groups chaired by the ANZA (Association of NZ Advertisers Inc) became signatories to the 'Food Industry Accord' [66]. This is a collaborative document involving representatives of major groups within the food industry and its associated business partners that aim to help reduce obesity, improve nutrition, and increase exercise. Accord members have agreed to develop relationships with the nutrition and PA industries, develop strategies to support the promotion of healthy eating with priority given to ensuring appropriate messages to children, promote industry-specific initiatives consistent with the MoH's Health Eating-Healthy Action (HEHA) Plan, and develop a communication strategy for implementing the Accord objectives. Counties Manukau District Health Board (CMDHB) began negotiations with local members of the Food Industry Accord in 2005 to enlist their help with obesity prevention as part of CMDHB's diabetes prevention plan. Table 5 shows the initiatives undertaken by the Accord to date. In addition, the Accord has been involved with a review of advertising codes, some sports sponsorship, and has undertaken to improve the food environments in some member organisations. Interventions have not yet been evaluated with respect to fat and energy density of products, pricing, portion sizes and consumption, and marketing of obesogenic foods, and progress in introducing interventions has been disappointingly slow. The challenge will be to introduce effective interventions and to find ways of evaluating nutrition outcomes.

Table 5: Food Industry Accord initiatives.

Accord Initiatives		
Intervention	Health Partner	Food Industry Partner
'Willie Munchright' TV advert promoting healthy eating and physical activity.	Various including SPARC	Food Industry Accord
Review of the evidence for obesity prevention: <i>Childhood obesity prevention: the facts, the evidence, what we can do.</i>	CMDHB <i>Let's Beat Diabetes</i> (LBD) team.	Food Industry Accord
Co-funded job position to coordinate Accord actions (Brian Weaver) – action strategy 2005/06.	CMDHB	Food Industry Accord
Expand CM / Accord working group to include local supermarket retailers.	CMDHB	Food Industry Accord, Local supermarket retailers
MacDonalds diet soda default with combo meals for branches within CMDHB – active, and has been going for a year. CMDHB has developed professional stance on diet drinks / artificial sweeteners before informing the local community.	CMDHB	MacDonalds, Food Industry Accord.
Evaluation of the Food Accord interventions as part of the LDB plan – in development	School of Population Health, Auckland University, CMDHB	Food Industry Accord

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Appendix 2

Specific Comments for Term of Reference 4

To inquire into whether additional interventions aimed at changing features of the environment that promote obesity are required.

PROVIDING AN ENVIRONMENT CONDUCIVE TO INCREASING PHYSICAL ACTIVITY

Land Use Planning

Public health considerations should be part of urban planning and design. Appropriate urban design can ensure that the positive public health impacts of future urban development outweigh any negative effects.

People who live in spread out, sprawling areas are less likely to have easy opportunities to get physical activity in the course of a day. They may live in housing subdivisions that are isolated from stores, schools, or other destinations that they or their children may want to reach on foot. The combination of public transport that is inconveniently located or provides an infrequent service and communities that link directly to busy high speed arterial roads means that the private car becomes the default means of transport.

The Service supports the adoption of land use policies and urban and regional development plans to enable people to have easy access to settlements, housing and working areas, and shopping and leisure facilities by cycling, walking and public transport. Reducing the reliance on private vehicle transport as part of the development of “active living communities” is seen as an important step to improving the overall health and wellbeing of the population as it helps integrate physical activity into the population’s daily life.

Transport

Transport has significant direct and indirect impact on individuals’ and communities’ health, and it is interconnected to urban development. To make a contribution to health and wellbeing, the transport system needs to be organised to further encourage physical activity, reduce dependence on motor vehicles and improve safety, especially with an increased focus on vulnerable and at-risk road users. Reducing dependence on cars and other motorised forms of travel can lead to more physical exercise and reduce levels of heart disease and other chronic illnesses. It also has other health benefits through the reduction of air pollution.

The patterns of physical activity established in childhood are perceived to be a key determinant of adult behaviour. A growing number of children do not get regular exercise through travelling to school. Offering a wider choice of transport modes, by creating facilities more accessible to people walking, cycling and a more efficient public transport system promotes physical exercise¹⁵ as people walk the first and last part of their journey to connect with public transport.

¹⁵ Barton H & Tsourrou C (2000). *Healthy Urban Planning* Spon Press published on behalf of the World Health Organisation 2000

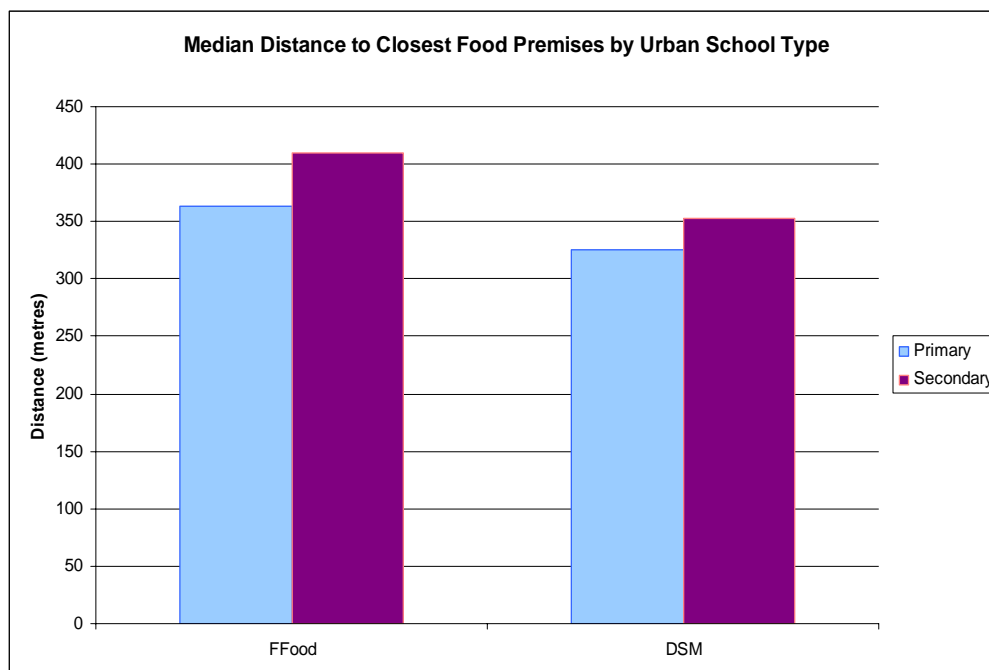
The Education Sector

The Tripartite agreement with the Ministry of Education, Ministry of Health and SPARC and the establishment of Active Schools Facilitators will allow a co-ordinated approach to increasing opportunities for and participation in physical activity in schools. However there also need to be National Administrative Goals (NAGs) and National Education Goals (NEGs) set which address the nutrition environment in schools.

The education sector, councils and the local community should work together to improve the health of the wider school environment by discouraging access to junk-food outlets. The following table indicates the proximity of food outlets to schools in the Auckland Region (urban areas only).

Schools within 500m of :	Fast food & Takeaway	Dairy & Supermarket	Any Food Premises	Total Schools
Intermediate - Secondary	77 (64%)	90 (75%)	95 (79%)	120
Primary - Full	216 (58%)	246 (66%)	259 (70%)	370
Food Premises within 500m of:	Intermediate - Secondary	Primary - Full	Any School	Total Food Premises
Fast food & Takeaway	305 (18%)	724 (43%)	863 (51%)	1702
Dairy & Supermarket	252 (19%)	599 (44%)	725 (54%)	1350
Schools within 100m of :	Fast food & Takeaway	Dairy & Supermarket	Any Food Premises	Tot Schools
Intermediate - Secondary	12 (10%)	11 (9%)	15 (13%)	120
Primary - Full	27 (7%)	32 (9%)	46 (12%)	370
Food Premises within 100m of:	Intermediate - Secondary	Primary - Full	Any School	Tot Food Premises
Fast food & Takeaway	26 (2%)	34 (2%)	60 (4%)	1702
Dairy & Supermarket	15 (1%)	34 (3%)	49 (4%)	1350

Distance to Closest Food Premises for Schools within Statistics NZ Urban Areas.



Key: FFood is fast food, takeaways, and lunch bars; DSM are dairies, convenience stores (incl service stations), and supermarkets

	Urban	FFood	DSM	Any
Median	Primary	363	325	305
	Secondary	410	353	301

Concerted action between; the education sector, local councils and the community to develop; safe cycleways and walkways is needed. Disincentives to delivering children to school by private car are also needed. This will also reduce the traffic hazard associated with school entrances at the start and finish of the school day. It will also assist in reducing rush hour congestion and the costs that congestion imposes on the economy.

PROVIDING AN ENVIRONMENT CONDUCIVE TO REDUCING ENERGY INTAKE

The Food Sector

The food supply has a profound effect on food intake. Food ingredients are comparatively inexpensive and packaging expensive, this is one of the factors leading to "super-sizing". The proliferation of varieties of food (both differing types of food and flavours within a food type) encourages consumers to "eat more". Health claims on food labels are known to have benefits for the food industry, for example in the United States of America, sales of "Tropicana" increased 54% one month after this fruit cordial drink was allowed to make a potassium content claim. There is however no evidence that health claims on food have benefits for consumers. The Service urges that the following recommendations are incorporated in to the Nutrition, Health and Related Claims standard:

Application of disqualifying criteria to all Health claims on food (FSANZ Proposal 293)

Disqualifying criteria should be applied to nutrient content claims as well as general level health claims due to content claims' ability to mislead consumers and to the high use of these claims by industry. The Service contests the viewpoint that nutrient content claims do not have a negative impact on food choices and consequently dietary patterns.

Consumers can be misinformed if a content claim does not consider the total nutrient profile and the food's impact on health. It requires a certain level of consumer sophistication to evaluate the nutrient content claim in light of the comparative level of other nutrients e.g. fat reduced crackers with high sodium content or fat free claims on non-chocolate confectionary. Allowing content claims without applying disqualifying criteria would have a disproportionate negative effect on lower socio-economic groups who tend to be less well-educated, have poorer eating patterns and consequently a higher burden of nutrition-related diseaseⁱ.

Nutrition Information Panel on Foods

The absence of specified serving sizes in the proposed Nutrition, Health and Related Claims Standard provides a major opportunity for manufacturers to manipulate these so that disqualifying criteria are met. The Service recommends that all nutrient information is provided per 100mls/100g to allow consumers to easily compare products and to avoid manipulation and unrealistic depiction of serving sizes. The nutrient profile per serve should also be provided but ideally these should be based on official standard serve sizes.

Labelling should also provide the consumer with immediate information about energy content that will not require mathematical calculation. For example, for snack foods such as packets of crisps, chocolate bars, cans of drink etc, the energy content of the whole snack is more helpful than for a portion of the snack.

The use of a health warning/symbol on energy dense food/beverages should be investigated.

General Labelling

Care is also needed to ensure that appropriate rules are in place covering issues such as print size, field of vision, juxtaposition with other information and prominence to ensure that information important to guide healthy choices is not crowded out by marketing and brand promotion messages.

The size of the package should not provide a basis for exemption from labelling requirements.

Availability of Energy Dense Products

Vending machines cater for the snacking market and are predominately stocked with sugar-sweetened drinks, high-energy drinks and energy-dense snacks. Vending machines, in pre-schools, schools and workplaces should be stocked with water, diet drinks, and possibly low-fat milk drinks, and low-energy density snacks. The sale of large sugary drink units, i.e. higher than one can (355 mls) should also be discouraged.

Water, diet drinks and possibly low-fat milk drinks at fast food outlet chains like McDonalds, KFC and Burger King could be promoted. These chains could also make diet drinks the default choice on offer so that, for example, diet Coke would be given unless a non-diet Coke was specifically requested by the consumer (this intervention is to be implemented by the Food Industry Accord in Counties Manukau in future).

Levels of sugar, fat and salt in products could be reduced. Where technologically possible, low salt, low sugar and low fat options for pre-existing foodstuffs could be developed. This would provide safe and acceptable healthier choices to the public.

Saturated fats should be replaced with mono and poly-unsaturated fats wherever possible.

Advertising to Children

If voluntary codes do not stop the advertising of energy-dense snacks or fast foods during children's TV viewing times and the use of celebrity/sports stars endorsement to promote these products and affiliated menu items (even if they are lower in energy), then mandatory measures should be introduced. This should also apply to the cinema before children's movies.

Sponsorship and Fundraising

Where local school and community events, activities, and programmes seek sponsorship, any sponsorship arrangements should feature healthier branded products rather than products featuring high fat and sugar levels.

High energy food and drink should not be used for fund raising. The contradiction between selling chocolate and other energy dense snacks and teaching children about healthy eating should be realised.

Portion Sizes

Reducing portion sizes of high-energy snacks and fast-foods e.g. discontinuing King and up-sized options would encourage a healthier diet.

Pricing

Price signals should be used to help switch consumers from high-energy snacks, foods, and drinks towards healthy choices. An excise tax regime could be used to capture the current costs imposed on society from obesogenic foodstuffs. A stepped tax rate may also encourage innovation from the food industry as it seeks to gain a competitive advantage by developing and selling products meeting lower tax rates.

Encouraging 'healthier' choices to be the easiest by making fresh fruit, vegetables, fresh fish and less-fatty meats more affordable for vulnerable families could also assist change. Short term subsidies in lower socio-economic areas for healthier foods e.g. substituting wholemeal / wholegrain bread for white bread in local bakeries and lunchbars may be worth considering as a tool to encourage consumers towards healthier options.

Product Placement in Retail Outlets

Placement of differing brands on retail outlet shelves is viewed by the industry as being an important influence on sales. Ensuring that healthy choices take 'centre stage' and occupy the central layers of shelves and aisle end displays would encourage consumers towards healthier options.

Removal of Food and Beverage Vending Machines

Removing vending machines from schools or ensuring that school vending machines stock only water or low energy nutrient rich beverages, e.g. low fat milk, in appropriate portion sizes would encourage healthy choices.

Environmental Support for Healthy Options in Low Socio-Economic Shopping Centres

An effective example is the Healthy Kai programme operating in Mangere, Otara and Glen Eden in Auckland. This programme promotes healthy eating choices through signage in participating retailers whilst supporting information is disseminated through local Primary Healthcare Organisations, churches and marae. This programme has been shown to effect beneficial change in the food supply increasing both the proportion sold and range of healthy food choices available.

Families

Within the family setting, barriers to eating more fruits and vegetables need to be addressed. Barriers identified include perceived cost, the planning ahead required, poor knowledge of proper storage of fresh produce, lack of knowledge regarding available produce and methods of preparation, lack of time to prepare home-cooked meals, and children often being left in charge of meal preparation.^{ii, iii}

Family-based obesity treatment programmes require more resources to help enhance parenting skills.

WHOLE OF SOCIETY INTERVENTIONS

No single entity can 'fix' the problems of obesity and type 2 diabetes. It is not just a health sector problem. To achieve the outcome of reducing or eliminating obesity and type 2 diabetes will require a range of interventions from all sectors and communities of interest in society will need to work together. Such interventions could include the following.

- Central government. E.g. Strengthening the Tripartite agreement (Health, Education and Sparc) to have National Administrative Goals and National Education Goals set and implemented to successfully address the nutrition environment in schools to eliminate high energy food and beverages.
- Local government. E.g. action to design and build safe walkable communities with features such as adequate street lighting and smooth footpaths.
- Non governmental sector. E.g. action from sports and recreation trusts to encourage physical activity and provide accessible and affordable facilities.
- Local Communities. E.g. action from groups such as churches to encourage healthy food choices and exercise.
- Commercial sector. E.g. innovation through the development and reformulation of food stuffs to reduce fat, sugar and energy density.

Central government needs to take a lead role in mandating and coordinating a whole of society intervention to ensure that the goal of reducing obesity and type 2 diabetes is achieved. Central government also has an additional role as a 'cheerleader' for local government, NGOs, community groups and the commercial sector by providing praise and support (e.g. seed funding for community initiatives and awards to celebrate food industry success) to encourage their whole hearted and enthusiastic participation in society's efforts to defeat obesity and type 2 diabetes.

Delivering the societal outcome of reduced obesity and type 2 diabetes is also likely to help deliver other beneficial outcomes such as reduced air pollution, reduced traffic congestion, a reduction or delay of investments in roading as many of the factors contributing to obesity and type 2 diabetes are also factors in other issues facing New Zealand.

HEALTH SECTOR INTERVENTION

Primary Health Care

Improved emphasis on and diagnosis of overweight patients in primary care so that progression to obesity is avoided

Such a preventive approach is in accord with the WHO International Task Force which concluded that "the prevention of weight gain is easier, less expensive, and potentially more effective than treating obesity after it has fully developed".^{iv} Research has shown that people see their general practitioner as a highly credible source of dietary information and a key influencer in terms of creating awareness of the likelihood and dangers of obesity.^v It is also established that patients would like to receive nutrition advice in the general practice setting.^{vi} However, although GPs themselves have been shown to realise the importance of providing such information, they have reported considerable barriers to action including lack of nutrition training, lack of time, lack of patient motivation or compliance, inadequate materials and financial obstacles.^{vii} Practice nurses, who could be involved in giving advice, lack the confidence, time and skills to do so.

Computer tailored nutrition messages appear to offer better prospects for effective intervention than generic nutrition information. Proposed mechanisms for this effect are personalisation, less superfluous information and greater personal relevance of the messages leading to more intensive cognitive processing.^{viii} ARPHS has developed an electronic nutrition message library which is based on an individual's dietary habits and level of motivation. The questionnaire can be quickly administered and personalised information, or messages, are generated from the library. A pilot study, conducted mainly with Maori and Pacific participants, supported its potential to favourably influence the participants' eating habits with 60% reporting changes made.

Primary Health Organisations need health promotion plans that target childhood overweight and obesity prevention. In addition, primary health care needs more obesity treatment resources, in particular more Community Dieticians.

CONSUMER EDUCATION

Healthy Workplaces

Implement one or more of the actions listed here in order to make the food and drink environment of workplaces less obesogenic and more health-promoting. To this end, a workplace nutrition policy could be implemented across all workplaces in the Food Industry Accord (and in workplaces in the wider state sector).

Promote other environmental and lifestyle changes, for example, stairs instead of elevators for staff use when possible (or slow the rate of elevators to encourage stair use); flexible working hours where possible to encourage participation in physical activity through gyms, family activity, sport clubs, volunteer work on school sports teams etc; lifestyle goals being included in employees Key Performance Indicators etc.

Important Public Education Messages

Promote the following important public education messages, possibly by participating in a health-sector led campaign on healthy eating and drinking e.g. through messages on product packaging, advertising etc:

- Drink water, low-fat milk and diet drinks.
- Eat a healthy breakfast at home before going to school. Provide examples.
- Bring a healthy lunch from home or buy from school tuck shops which have a good school food policy. Provide examples.
- Get active. Encourage parents/families to place limits on children's sedentary activities in the home; and encourage children and families to look for physical activity opportunities at home, school and in the community.

This list should be developed in concert with the other initiatives and also promote other aspects of a healthy lifestyle.

Loss of Cooking Skills

The increasing availability of take away meals and ready meals coupled with the increasing time pressures on many in the community has led to a reduction in the numbers of people who regularly cook. Over time this has led a reduction in cooking skills and many people are now unfamiliar with how to prepare healthy food. The place of cooking in the school curriculum needs to be protected and effort expended to increase cooking skills in the wider community so that healthier choices can be implemented. Increased cooking skills will also help ensure that there is no increase in foodborne illness caused by culinary ineptitude.

State Sector Leading by Example

The Service recommends that the wider State Sector leads by example in its own operations and through its control over community assets and infrastructure by such actions¹⁶ as:

State Sector Facilities, including State Owned Enterprises;

- Reduce the availability of high energy food and drink types from vending machines and other catering facilities on all state sector facilities.

State Sector Support for Other Organisations; by way of grant, lease of facilities, loan / financial guarantee or support policies;

- Impose similar public health requirements as a condition of receiving State Sector support.

Partnerships with the Private Sector;

- Impose similar public health requirements as a condition involvement with the State Sector.

Use of State Sector facilities;

- Impose similar public health requirements as a condition of hiring or holding events on State Sector facilities (both built and open space).

RESEARCH AND EVALUATION

Research

NZ obesity prevention research is needed that examines the association between environmental factors and individual behaviours affecting energy balance, addresses various methodological constraints, and identifies appropriate Body Mass Index standards according to ethnicity. Research, possibly in collaboration with the food industry, is needed to determine what drives food choices.

Government-supported surveillance and research is needed to evaluate the effect of policy and macro-environmental changes on nutrition, physical activity, body weight, and health outcomes.

¹⁶ The Service accepts that some changes could only be made as pre-existing arrangements expire and come up for renewal.

Evaluation of interventions

The impact of the interventions (including those to date by the Food Industry) on sales and consumer demographics e.g. changes in the sales of water and diet drinks as a proportion of the total; changes in the age, sex and ethnicity of the consumers; and the uptake of the 'diet drinks by default' option in fast-food outlets should be monitored. Health partners need to have access to these results.

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