Australian Government
Preventative Health Taskforce

AUSTRALIA: THE HEALTHIEST COUNTRY BY 2020

Technical Report 1

Obesity in Australia: a need for urgent action
Including addendum for October 2008 to June 2009

Prepared for the National Preventative Health Taskforce by the Obesity Working Group

Australia: the healthiest country by 2020.
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1. Executive Summary

One of the greatest public health challenges confronting Australia and many other industrialised countries is the obesity epidemic. Australia is one of the most overweight developed nations, with over 60% of adults and one in four children overweight or obese.

The prevalence of overweight and obesity has been steadily increasing over the last 30 years. Obesity is particularly prevalent among men and women in the most disadvantaged socio-economic groups, people without post-school qualifications, Indigenous Australians and among many people born overseas.

Tackling obesity is about reshaping behaviours for positive outcomes in an environment of nutritional abundance that serves aesthetic and emotional needs as well as nutritional requirements. Food and alcohol play an important part in the social fabric of life, and simply lecturing people or taking a prohibitionist approach is unlikely to be successful or appropriate.

It will be important to work together as a nation to solve this serious problem. Individuals and families, communities, health services, non government organisations, industry and governments will need to all be actively engaged and to agree on priorities for action to enable overweight and obesity to be tackled in Australia.

Obesity is a relatively new area for prevention globally. There is no simple solution or singular approach. These factors speak to a 'learning by doing' approach – that is, the staged trialling of a package of interventions accompanied by good monitoring and evaluation. Behaviour change is an essential component of any response to obesity; however, this is a complex process for individuals that extends beyond education and the provision of information.

Achieving long-term, sustainable change is difficult, resource-intensive and time-consuming. In order to halt and reverse the rise in overweight and obesity in Australia, the following initiatives are likely to be required.

Reshape the food supply towards lower risk products and encourage physical activity

- Review the taxation system to enable access to healthier foods and active recreation (for example, increase tax breaks for fitness-related products and recreational activities, and for schools and workplaces to provide healthy foods). Provide disincentives for unhealthy foods by considering increasing taxes for energy-dense foods. Taxing unhealthy foods may provide an incentive to manufacturers to change their production processes to reduce the fat, salt or sugar content in order to maintain their market share.
- Regulate the amount of trans fats, saturated fat, salt and sugar content in foods.
- Provide subsidies for the transportation of fresh foods in rural and remote areas.

Protect children and others from inappropriate marketing of unhealthy foods and beverages

- Curb inappropriate advertising and promotion including consideration of banning the advertising of energy-dense, nutrient-poor foods and beverages on free-to-air television during children's viewing hours (i.e. between the hours of 6.00am and 9.00pm), and reducing or removing such advertising in other media such as print, internet, radio, in-store and via mobile telephone.

Improve public education and information

- Develop effective, adequately funded and long-term media advertising and public education campaigns to improve eating habits and levels of physical activity, with specific media advertising and targeted public education for priority population groups.
- Enhance food labelling by introducing a national system of food labelling to support healthier choices, with simple and comprehensible information on trans fats and saturated fats as well as sugar and salt and standardised serve sizes. This would apply to food for retail sale as well as on food purchased when eating out, and be available in settings such as restaurants, food halls and takeaway shops.

Reshape urban environments towards healthy options

- Encourage school communities to support initiatives in schools that enable healthy eating and physical activity, such as healthy breakfast and lunch programs, removal of unhealthy foods from vending machines and 'walking school bus' programs.
- Implement comprehensive community-based interventions that encourage and support healthy lifestyles among all population groups, particularly in areas of disadvantage and among groups at high risk of unhealthy weight gain.
- Encourage employers and workplaces (both large and small) to develop comprehensive programs that support healthy eating and physical activity.
- Develop evidence-based guidelines to ensure policies and building design encourage healthy eating and physical activity, such as travel expenses promoting walking or cycling to work; improved stairwells to encourage use; and the provision of shower and bike parking facilities.(1)
- Introduce incentive schemes to encourage healthy behaviours and weight management including contributions to gym memberships, active travel in expense policies, and the availability and promotion of competitively priced healthy food choices on-site (including vending machines).
- Facilitate the adoption of consistent town planning and general building design that encourage greater levels of physical activity, and reorient urban obesity-promoting environments through appropriate infrastructure investments. For example, develop state and municipal plans to re-orient public transportation and increase urban density, support farmers' markets, build bicycle paths and footpaths, and protect open spaces.

Strengthen, upskill and support primary healthcare workers and the public health workforce to support people in making healthier choices

- Expand supply and support training of relevant health workers such as primary healthcare workers, health promotion workers, nutritionists and dietitians.
- Develop and disseminate evidence-based clinical guidelines and other multidisciplinary training packages for health and community workers.
- Expand community placements for the training of the primary healthcare workforce.
- Fund programs to educate patients in primary healthcare settings about nutrition, physical activity and the management of overweight and obesity.

Maternal and child health

- Have targeted programs to encourage healthy eating for pregnant women and breastfeeding for newborns.

Close the gap for disadvantaged communities

- Support ongoing research on effective strategies to address social determinants of obesity in Indigenous and low-income communities.
- Develop tailored approaches and services to reach Indigenous and low-income groups, particularly through partnerships with local governments that focus on obesity-promoting environments, and mobilise programs in schools and other community settings.

Build the evidence base, monitor and evaluate effectiveness of actions

- Develop a comprehensive national research agenda for overweight and obesity.
- Expand the national nutrition and physical activity survey to cover adults, children and the Indigenous population, and ensure the inclusion of biomedical risk factors for chronic disease. This survey needs to become a permanent national five-yearly study.

A national food strategy for Australia

Australia lacks a comprehensive national food strategy. Such a policy should be considered in the context of preventative health, and more specifically for its role in the prevention and reduction of rates of overweight and obesity in Australia. In the UK, for example, the 2008 document 'Food Matters' sets out a future strategic framework that integrates food safety, food production and agricultural policy, and addresses issues with climate change to ensure a safe and sustainable food supply. Such a strategy would be invaluable in Australia.



2. Obesity in Australia

The prevalence of overweight and obesity has been increasing significantly over the last two decades. Data from the 2004–2005 National Health Survey indicate that nearly half of all Australian adults (based on self-reported height and weight) were overweight or obese in 2004–2005: around 7.4 million adults were overweight or obese (over one-third of these were obese) and close to three in every 10 Australian children and young people were overweight or obese.(2)[1]

The most recent measured national prevalence estimates for adults are from a survey conducted in 1999–2000 among Australians aged 25 years and over:(2, 3)

- Overall, almost 60% of the participants were overweight or obese (59.6%).(4) Males (67.4%) were more likely than females (52.0%) to be overweight or obese.(2)
- The prevalence of being overweight but not obese was 39.1%: 48.2% for males and 30.2% for females.(3)
- The prevalence of obesity was 20.5%: 19.1% for males and 21.8% for females.(3)

The number of overweight and obese adults increased from 4.6 million in 1989–90 to 5.4 million in 1995, 6.6 million in 2001 and 7.4 million in 2004–05.(5) Approximately 25% of children are overweight or obese, up from an estimated 5% in the 1960s.(6, 7) The mean body mass index (BMI) at which Australians enter adulthood has been gradually increasing.(8) Over the past 20 years, the average weight of Australian adults increased by around 0.5 to 1kg per year, attributable to a mean energy imbalance of around 100 kcal per day.(148)

2.1 Health, social and economic impact of obesity

According to the Burden of Disease and Injury in Australia (BoD) study, in 2003 high body mass[2] was responsible for 7.5% of the total burden of disease and injury, ranked behind only tobacco (7.8%) and high blood pressure (7.6%).(10) High body mass caused approximately 55% of the burden associated with diabetes and 20% of cardiovascular disease.(10) Other major conditions for which obesity predicts higher mortality and/or morbidity are cardiovascular disease, some cancers and, increasingly, osteoarthritis. Obesity is also strongly associated with a wider range of conditions, including back, reproductive and mental health problems, and sleep apnoea. Overweight and obese children and adolescents face some of the same health conditions as adults, and may be particularly sensitive to the effects on their self-esteem and peer-group relationships.

Together, high body mass and physical inactivity are responsible for around 60% of the burden for type 2 diabetes.(10) Similarly, the combined effect of the cluster of associated risk factors – poor diet, physical inactivity, high body mass, high blood pressure and high cholesterol – is responsible for more than 50% of the total burden of cardiovascular disease.(10) The burden of disease attributable solely to high body mass (7.5% of total burden) is now very close to that of tobacco (7.8%). High body mass is likely to overtake tobacco as the leading modifiable cause of burden as smoking rates decline. This is already occurring for some age groups.(11, 12)

The most recent estimates of the impact of obesity in Australia[2] show that obesity causes almost one-quarter of type 2 diabetes (23.8%) and osteoarthritis (24.5%), and around one-fifth of cardiovascular disease (21.3%) and colorectal, breast, uterine and kidney cancer (20.5%).(13)

1 Height and weight data may be collected in surveys as measured (by interviewers) or self-reported data. Rates of overweight and obesity based on self-reported data are likely to be underestimates of the true rates (as people tend to overestimate their height and underestimate their weight, leading to an underestimate of BMI) and should not be directly compared with rates based on measured data.(2)

2 The standard definition of obesity is BMI≥30. The health effects of 'high body mass' in the Burden of Disease study were estimated using new methods – please see references 10 and 11 for details.



Consequently, in 2008:(13)

- 242,033 Australians had type 2 diabetes as a result of being obese
- 644,843 Australians had CVD as a result of being obese
- 422,274 Australians had osteoarthritis as a result of being obese
- 30,127 Australians had colorectal, breast, uterine or kidney cancer as a result of being obese.

Health problems related to excess weight impose substantial economic burdens on individuals, families and communities. Society as a whole bears the economic brunt. It has been estimated that the overall cost of obesity to Australian society and governments was $58.2 billion in 2008 alone.[3] (13) The total direct financial cost of obesity for the Australian community was estimated to be $8.3 billion in 2008.(13) Of these costs, the Australian Government bears over one-third (34.3% or $2.8 billion per annum), and state governments 5.1%. This estimate includes productivity costs of $3.6 billion (44%), including short- and long-term employment impacts, as well as direct financial costs to the Australian health system of $2 billion (24%) and carer costs of $1.9 billion (23%).(13) The net cost of lost wellbeing (the dollar value of the burden of disease, netting out financial costs borne by individuals) was valued at $49.9 billion.

Obesity was associated with over four million days lost from Australian workplaces in 2001.(14) Obese employees tend to be absent from work due to illness significantly more often than non-obese workers, and for a longer time, and are more likely than non-obese people to be 'not in the labour force'. As a potential indicator of productivity, absenteeism is an important factor when assessing the economic implications of an ageing Australia.(14)

2.2 Those at special risk

While overweight and obesity are widely distributed among Australian adults and children, there are some significant variations in its distribution across the Australian population. Obesity is particularly prevalent among men and women in the most disadvantaged socio-economic groups, people without post-school qualifications, Aboriginal and Torres Strait Islander peoples, and among many people born overseas, as outlined below:

- Among Aboriginal and Torres Strait Islander people, high body mass is the second highest contributor to disease burden (11.4%), after tobacco use (12.1%).(15) In comparison, among the general Australian population, high body mass is the third highest contributor to disease burden (7.5%), after tobacco use (7.8%) and high blood pressure (7.6%).(16)
- In 2004–2005, after adjusting for differences in age structure and survey non-response, approximately 60% of Indigenous Australians aged 18 years and over were overweight, of whom 31% were obese.(17)
- Indigenous Australians were:[4]
  - 1.2 times as likely as non-Indigenous Australians to be overweight
  - 1.9 times as likely to be obese
  - over three times as likely to be morbidly obese (BMI ≥40).(17)
- Across all age groups, Indigenous Australians were more likely than non-Indigenous Australians to be obese. The greatest differences in obesity rates were observed among young people aged 18–24 years (2.4 times as high as the rate for

3 This includes an estimate of $49.9 billion for the impact of obesity on quality of life. Readers of companion technical papers in this series should note that equivalent estimates are not available for the burden of diseases caused by alcohol and tobacco.

4 Based on results of the 2004-2005 National Aboriginal and Torres Strait Islander Health Survey (NATSIHS) and adjusting for differences in the age structure of the Indigenous and non-Indigenous populations and survey non-response for height and weight measurements.

non-Indigenous Australians) and among people aged 65 years and over (2.1 times as high).(17)

- There are significant differences in overweight and obesity for adults from different regions of birth and cultural backgrounds. On average, people born overseas who arrived in Australia before 1996 had a slightly lower age standardised rate of obesity (15%), while the rate was even lower (11%) for more recent arrivals (between 1996 and 2006) compared to the adult obesity rate of 18% in 2004–2005.(18) However, adults born in Southern and Eastern Europe and the Oceania region (excluding Australia) were more likely to be overweight or obese (65% and 63% respectively), while adults born in South East Asia were least likely to be classified in this way (31%).(18)
- Among school children the differences in overweight and obesity are also marked. A New South Wales study (6) found that overweight and obesity prevalence was around 50% in Year 8 boys of Middle Eastern descent, compared with 26% from English-speaking backgrounds. Prevalence in boys of European background was also high. Similarly, there is evidence that obesity is significantly more prevalent among boys and girls of all ages from Pacific Islander backgrounds. Among adolescents, those most likely to be obese (four to five times more likely) were boys and girls of Pacific Islander or Middle Eastern/Arabic background.(19)
- Populations from certain ethnic and cultural backgrounds in Australia that are disproportionately more overweight and/or obese suffer higher rates of diabetes and cardiovascular disease. For example, the prevalence of type 2 diabetes among Asian Australians (including those from the Indian subcontinent, East Asia and South East Asia) has been reported to be increasing at a disproportionately high rate compared to non-Asian Australians.(18, 20)

Data on weight status from national health surveys provide evidence of the difference in weight related to socio-economic status. In 2001 the most striking differences between the most and least disadvantaged socio-economic groups were observed in the prevalence of obesity rather than overweight.(21)

- Women in the most disadvantaged socio-economic group had nearly double the rate of obesity (22.6%) of those in the most advantaged group (12.1%).
- Men in the most disadvantaged group were also significantly more likely to be obese than those in the most advantaged group (19.5% compared with 12.7%).

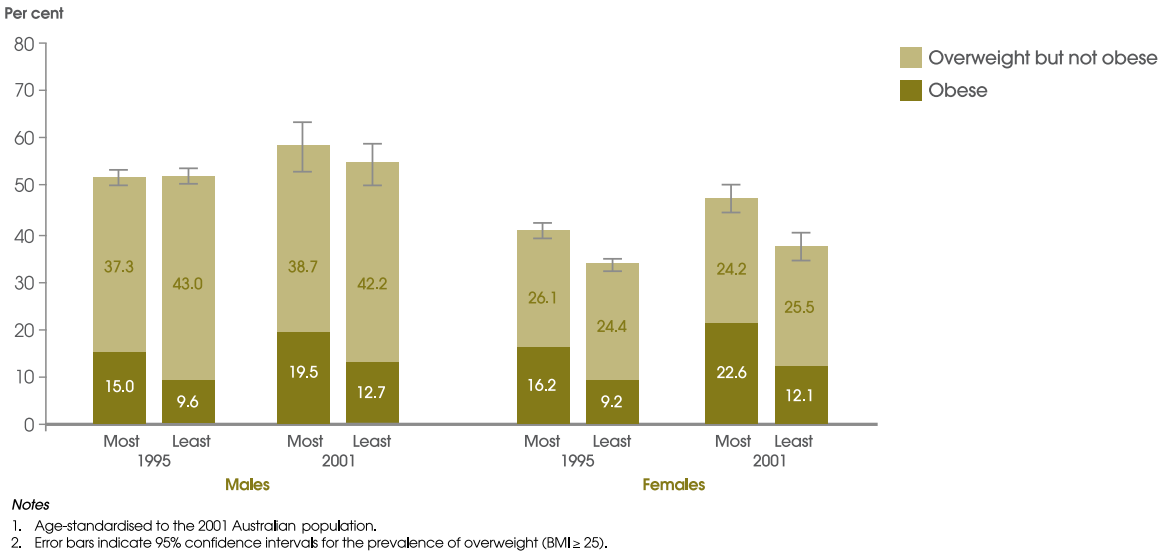

Figure 1: Prevalence of overweight and obesity among men and women aged 20 years and over in the most and least disadvantaged quintiles of socio-economic disadvantage, 1995 to 2001

Source: AIHW analysis of the 1995 and 2001 ABS National Health Surveys (AIHW 2003)(21)

Between 1995 and 2001, the gap (rate ratio) between the highest and lowest socio-economic quintiles for obesity slightly increased in conjunction with the absolute increases seen for adults of both sexes (Fig. 1).

Current research at Deakin University aims to determine at what age socio-economic influences on physical activity and eating emerge by following a cohort of children aged 5–6 and 10–12 years over a five-year period. While adults from lower socio-economic groups have lower levels of physical activity and healthy eating than those from more advantaged backgrounds, these differences are not as clear for children. Evidence seems to suggest that many problems become apparent once adolescents leave school. This may be a key point at which to target appropriate dietary and physical activity initiatives.(22)

In general, rural and remote populations have poorer health than their metropolitan counterparts with respect to several health outcomes. Increasingly higher rates of overweight and obesity are found between major cities, inner regional areas and outer regional and remote areas for both men and women (Fig. 2).

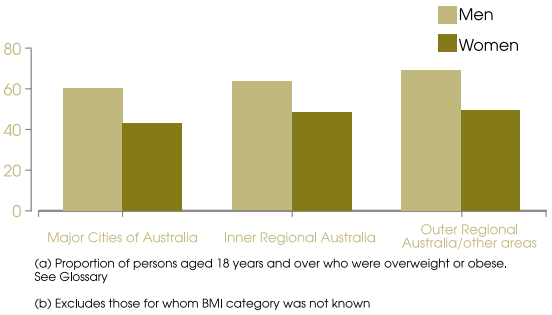

Figure 2: Overweight and obesity by geographical areas[a, b]

Source: ABS 2008(5)

2.3 Trends and scale of the problem

Based on current trends there is an urgent and immediate need to address the growing prevalence of obesity and overweight in Australia. The most recent projections from Access Economics, assuming a constant increase in obesity prevalence over the next 20 years in line with current trends, estimate that there will be 6.9 million obese Australians by 2025 (Fig. 3). Even more conservative estimates, which assume no further change in age-gender prevalence rates, such that all further increases are due to demographic ageing alone, indicate that 4.6 million Australians (18.3% of the population) will be obese by 2025.(13)

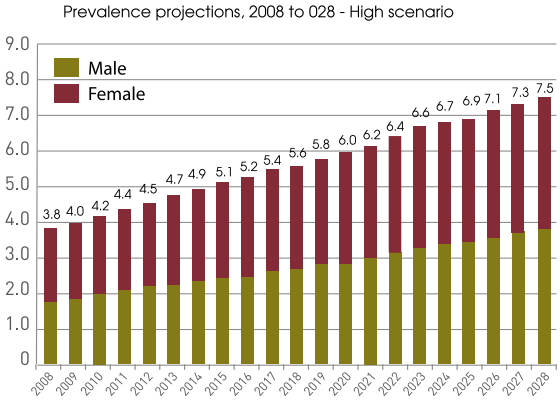

Figure 3: Population obesity prevalence projections, Australia, 2008-2028 (assuming current trends continue)

Source: Access Economics 2008(13)

Predictions of health loss (loss of healthy life) to the year 2023 conducted for the Burden of Disease study indicate the largest projected increases will be for neurological disorders and diabetes, with a lesser increase for musculoskeletal disease. In comparison, for conditions such as cardiovascular disease, cancer, injuries and chronic respiratory conditions, rates of health loss are expected to decline.(10) Significantly, the projected increase in rates of loss of healthy life associated with diabetes is due mainly to expected increases in body mass.

Diabetes prevalence is projected to increase two- to threefold over the next 25 years, due to expected increases in the prevalence of obesity, along with demographic changes.

Diabetes is also expected to cause the largest growth in disability in the elderly.(12)

A modelled case study prepared for the United Nations estimated that Australia's total health expenditure will increase in real terms by 127% over the period 2002 to 2032, and that health expenditure would increase as a percentage of GDP from 9.4% to 10.8%. (12) A study in the US found that, as for Australia, if trends continue, disability rates will increase across all age groups, offsetting past reductions in disability(23) – it was estimated that if this continued in the US, one-fifth of US healthcare expenditure would be needed for treating the consequences of obesity by 2020.(24)

Recent conservative estimates based on Australian data indicate that life expectancy at age 20 is about one year less among overweight Australian adults compared with Australians within the healthy weight range, while life expectancy is reduced by an average of around four years for obese Australian adults. For Australian children, it has been estimated that if current obesity trends continue, the life expectancy for children alive now will fall two years by the time they are 20 years old. This would represent a loss of five to 10 years in life expectancy gains and a return to life expectancy values seen in 2001 for males and in 1997 for females. These estimates, particularly those for children's life expectancy, are likely to be conservative and are particularly compelling given that life expectancy is otherwise increasing for healthy Australians.(25)

Recent analyses estimated the current and future prevalence of overweight and obesity in Australian children and adults based on measured height and weight data from national and state population surveys.(26) The results predict a continued rise in BMI for both males and females and across the age span. Based on past trends, and assuming no effective interventions are in place, 16.9 million Australians will be overweight or obese by 2025.

2.4 Trends in weight gain by age

Some age groups have gained weight at a faster rate than others, showing a trend towards earlier weight gain at younger ages. Between 1995 and 2004–2005, the greatest increase in the prevalence of obesity was observed for:

- Adults 25–44 (up 6.1%)
- Adults 45–64 (up 6.1%) (Fig. 4).

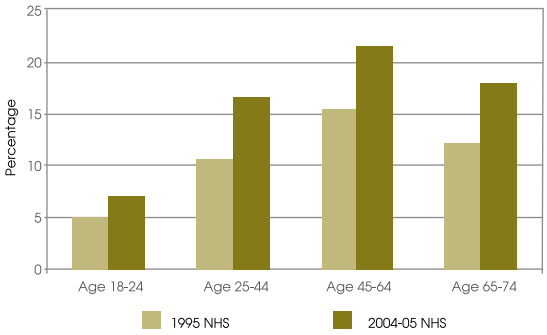

Figure 4: Percentage of obese persons by age group: 1995 vs 2004–2005[5]

Source: Unpublished DoHA analysis (2008) of 1995 and 2004–2005 National Health Survey data

As illustrated in Figure 5A & B (over), the mean BMI of young adults is increasing compared with previous generations.(27, 28) In addition, younger generations are gaining weight faster than previous generations. On current trends, Generation X males – those born from the mid-1960s to late 1970s – will have the highest mean BMI of any generation (Fig. 5A). Similarly, while baby-boomer generation women (Fig. 5B) are predicted to have the highest average BMI in 2010, younger women (Generation X) are gaining weight faster than other generations of women.

Overweight Generation Xers are now the parents of young children, placing these children also at risk. With the rapid increase in BMI in younger women (Generation X and Generation Y), there is mounting concern about the impact of an unhealthy body weight on pregnancy outcomes. Excessive weight gain during pregnancy is directly associated with having an overweight child, and with gestational diabetes, and may lead to weight gain and diabetes in later life in the mother.

5 The increase observed in 25–44-year-olds may be partly explained by the fact that, between 1989–1990 and 2001, despite relatively low absolute levels of obesity, obesity prevalence in 20–24-year-olds more than doubled from 4.4% to 9.5% (AIHW 2003).

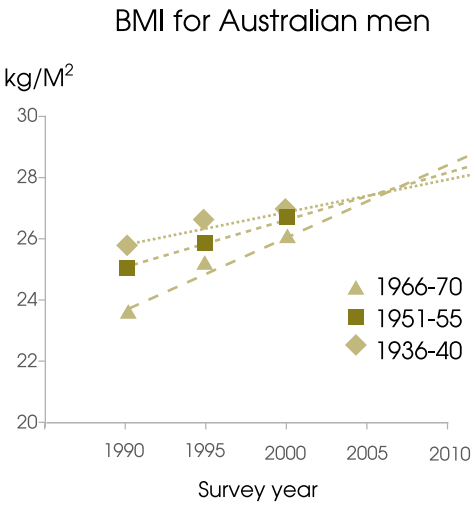

Figure 5A

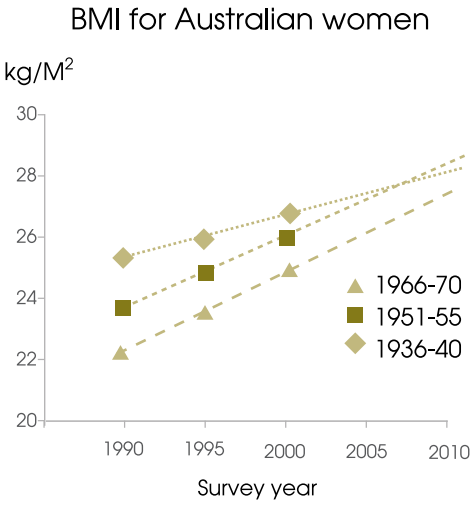

Figure 5B

Figure 5A and B: Mean BMI by birth cohort for men and women in Australia 1990–2000 and 2010 projections

Source: Allman-Farinelli et al 2006 (27, 28)

2.5 Middle-aged and older Australians

Another major contributor to the rise in mean BMI in Australia has been that the heaviest groups within the population have put on disproportionately more weight (around 7 BMI units) than lighter groups.(149) This suggests the need for specific targeting of those already at higher levels of BMI. These are predominantly people in middle age. There has been a steady and substantial increase in the number of older Australians who are obese, from 310,000 in 1980 to 940,000 in 2000.(9) This represents an increase from 11% to 23% of older Australians who are obese. About one-third of the increase in number has been as a result of the ageing of the population and two-thirds as a result of the increased obesity rates.

Older Australians are about 6–7kg heavier on average than their counterparts were 20 years ago. Australians in their 50s and 60s are now also gaining weight as they gain years, at least into their mid-70s. The number of older Australians aged 55 years or older is increasing, as is their representation in the total population. Their number is projected to increase from 4.2 million in 2001 to 7.2 million in 2021, which is an increase from 22% to 31% of the population. The combined trend of population ageing and the obesity epidemic is likely to result in continuing increases in the number of older, obese Australians.(149)

Many of the middle-aged overweight and obese population already have co-morbidities. In the National Health Surveys, the proportion of those reporting no long-term conditions is consistently significantly lower for obese people of both sexes. Among adults aged 20 years and over, obese men were more likely than healthy weight men to have five or more long-term conditions in 2001 (26.1% compared with 19%). Similarly, proportionately more obese women reported five or more long-term conditions than women of healthy weight (36.6% compared with 23.1%). The results for overweight but not obese men and women were similar to the results for obesity, although the differences from those of healthy weight were not as marked.(150)



3. Obesity prevention

The World Health Organization defines prevention as 'approaches and activities aimed at reducing the likelihood that a disease or disorder will affect an individual, interrupting or slowing the progress of the disorder or reducing disability'.

Primary prevention is targeted at reducing the likelihood of the development of a disease or disorder. Secondary prevention aims to interrupt, prevent or minimise the progress of a disease or disorder at an early stage, while tertiary prevention focuses on halting the progression of damage already done.(29)

The main focus of this paper is on the primary prevention of obesity in Australians. Overall, the evidence suggests that the prevention of obesity is the most realistic, efficient and cost-effective approach for dealing with childhood and adult obesity. This is due to the relative lack of success of treating obesity once it has become established, particularly long-term,(30, 31) and because the health consequences of obesity are cumulative and possibly not reversed completely with weight loss.(32)

However, while prevention may represent the most effective strategy to manage obesity, there remains a need to deal with the immediate weight and health problems of people who are currently overweight and obese. There are already significant numbers of obese people requiring treatment, and the numbers will rise regardless of any short-term measures.(33) Many of these people will have co-morbidities and will be at risk of further weight gain over time.

Given the existing magnitude of the problem in Australia (around one in five Australian adults is obese), the *prevention of unhealthy weight gain* is a more appropriate target. As this encompasses both secondary and tertiary prevention, it allows the scope of initiatives to become broader and cover a spectrum of activity in the prevention of weight gain, including obesity prevention, weight loss and maintenance, and the management of weight-related risk factors.(34)

3.1 What could be achieved in obesity control

It is difficult to set targets for obesity prevalence, as no country has been successful in reversing the trend of rising levels of overweight and obesity, and few jurisdictions have set targets for specific reductions in the prevalence of obesity. Importantly, it is not only reductions in the prevalence and incidence of overweight and obesity that should be the target of health reforms. Population health measures such as obesity prevalence are affected by many factors, and it takes many years to have an impact on personal behaviours and health outcomes. In the short term, therefore, policy reforms should at least aim to reduce the rate of increase in obesity. Over a five-year period, for example, the best that might be seen in changes in prevalence of overweight and obesity at the population level would be a gradual slowing of the rate of increase. In the UK, for example, the comprehensive cross-government obesity strategy 'Healthy Weight, Healthy Lives' aims to reduce childhood overweight and obesity to 2000 levels by 2020.(35)

Policy reforms in the first instance should also target the disproportionate distribution of obesity in Australian society, and focus on reducing the inequity in prevalence between population sectors; for example, obesity is particularly prevalent among men and women in the most disadvantaged socio-economic group, people without post-school qualifications, those with the lowest equivalent income, Aboriginal and Torres Strait Islander peoples, and among many of those born overseas.(5, 36)

Some international studies have modelled the impact of various scenarios targeting chronic conditions on population health outcomes. For example, a Dutch study modelled a national approach to obesity control. In an attempt to develop a basis for policy targets for a potential national action plan on overweight and physical inactivity, researchers simulated the cost-effectiveness of a population-level community-based intervention to 13.3 million people over five years. The results suggested that if an intervention consisting of social marketing and mass media strategies, self-help support groups, risk factor screening and/or counselling in various settings was offered to 90% of the population, and an intensive lifestyle or multi-component weight loss program was offered to 10% of overweight adults, the prevalence rate of moderate overweight (currently 36.1%) could be reduced by 1.6 percentage points and obesity (currently 11%) by 1.2 percentage points. The prevalence rate of physical inactivity (currently 11%) could be decreased by 2 percentage points. The cost of the intervention, based on two existing Dutch projects, would be 470 million (AUD$731.2 million) or 7 (AUD$11) per adult per year. At this level of funding, using a conservative methodology, the study found that costs per quality adjusted life year (QALY) gained were far below those reported for intensive glycaemic control and a reduction in serum cholesterol levels in diabetics.(37)

The US Centers for Disease Control and Prevention (CDC) commissioned a dynamic simulation model of diabetes prevalence and complications, for use in designing and evaluating intervention strategies.(38) As part of the study, the impact of three scenarios on diabetes rates to 2050 were modelled. The three scenarios were:

- enhanced clinical management
- increased management of pre-diabetes
- reduced obesity prevalence (primary prevention).

As illustrated in Figure 6 below, the first scenario was shown to lead to slightly higher prevalence than baseline due to a reduction in deaths. Under the second scenario, diabetes prevalence rises by 17% (compared with 23.5% under the baseline scenario), while under the third scenario, prevalence rises to only 5.5%. This is because the pre-diabetes scenario does nothing to reduce the onset of pre-diabetes in the first place. This leads to a 'backing up' of people in the pre-diabetes category, and a proportion of cases of diabetes are merely delayed rather than prevented. It is only the obesity reduction scenario that 'turns off the tap'.

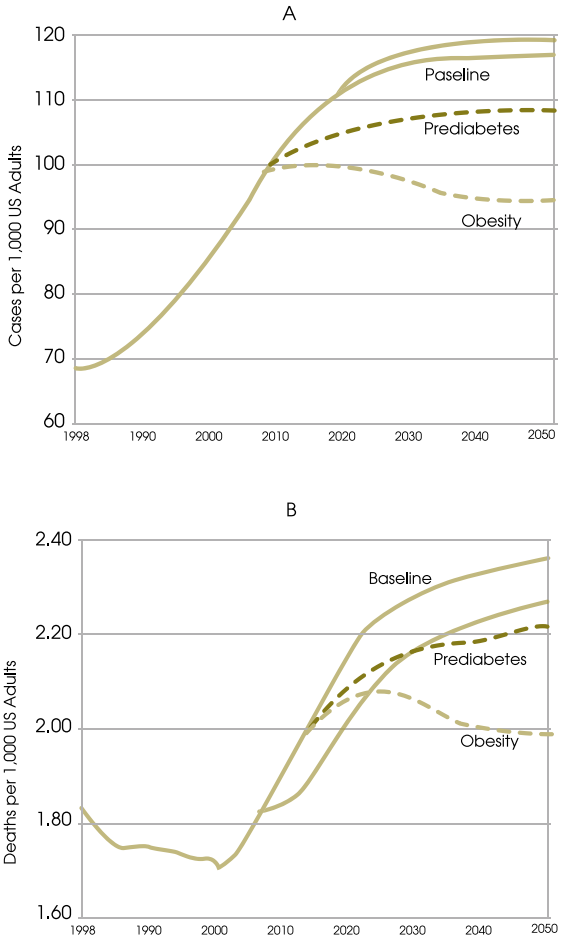

Figure 6: Model output for 3 intervention scenarios compared with the baseline scenario for diabetes prevalence (a) and complication-related deaths (b)

Source: Jones et al. 2006(39)

3.2 What is required to address the problem

The magnitude of the obesity problem (in Australia and internationally), the number of decades over which it has emerged, and the complexity and multitude of its health, social, economic, cultural and environmental determinants and consequences demand a long-term, comprehensive and well-funded response. Addressing obesity requires much greater change than has been attempted or achieved to date, and at multiple levels. Significant individual, family, community, organisational and environmental changes are required in order for Australians to achieve and maintain a healthy weight and to prevent obesity. It is not something that governments can do alone. This is recognised in the UK cross-government strategy, for instance, which involves working in partnership with communities, businesses, third sector organisations and individuals in a national 'Coalition for Better Health'.(40)

3.2.1 Prompt action

Given the size of the current and projected obese and overweight population, there is a need to act promptly. While Australia's mortality rates for coronary heart disease, stroke, lung cancer and transport accidents have improved significantly in terms of our ranking with other Organisation for Economic Co-operation and Development (OECD) member countries, this is not the case for our ranking for obesity.(4) Australia's adult obesity rate is the fifth highest among OECD countries, behind the US, Mexico, the UK and Greece.(41)

3.2.2 Multifaceted, multi-sectoral response

Multiple social, economic, technological, environmental and political factors interact to influence trends in population obesity and overweight. The majority of these are outside the control of individuals and families. Effective action must therefore address obesity at a structural level, as an environmental, political and cultural problem. This requires strong political leadership and the coordination, cooperation and partnership of the public and private sector over the long term, including national, state and local governments, the non-government sector, the media, industry, private interests and local communities.(42)

3.2.3 Leadership and coordination

Obesity arguably poses a greater challenge to national public health management than either tobacco or alcohol. Effective action on overweight and obesity at a population level demands strong leadership and intelligent coordination of a staged approach that will sustain action in the long term. Partnerships and cooperation across the public and private policy spheres are required, and must involve all aspects of national, state and local governments, the non-government sector, industry, business, private interests and local communities, and occur across all levels of government and within and across sectors. The health system, despite the need for wider engagement, has a key leadership role in mediating among different interests, ensuring citizen engagement and advocating for policy directions that support better health.

It is clear that all members of society have a crucial role to play in tackling Australia's obesity crisis. This is reflected in data from a national survey commissioned by the Heart Foundation in 2006, which asked a large representative sample of Australians who should play a major role in addressing Australia's weight problem. Australian adults believe that there are many parties who should be involved: the greatest proportions felt that parents of overweight children (94%) and adults who are themselves overweight (80%) should play a major role. Health professionals (74%), media (65%), companies that make/market food products (65%) and governments (52%) were also perceived to play a major role. The vast majority of Australians felt that all these groups should play either a major or minor role in addressing the nation's weight problem (87% or higher for each sector).(43)

3.2.4 Role of individuals

All Australians share responsibility for individual and population health, and the success of the health system.(44)

- As individuals, each Australian makes choices about personal lifestyle and behaviours. These are shaped by physical and social circumstances, life opportunities and environment.
- The health system is funded by the community, and, as patients, community members make decisions about how to use the health system.
- The health system has an important role to play in helping people to become more self-reliant and better able to make the best choices to manage their own healthcare needs. This includes helping people, both as individuals and as a community, to make informed decisions on issues such as smoking, alcohol consumption, a healthy diet and adequate physical activity.

With the increasing prevalence of overweight and obesity nationwide, it appears that Australians may perceive being overweight as 'normal' and hence many overweight people may not consider that they have a problem. For example, only around one-third of Australian adults in the 2004–2005 National Health Survey considered themselves to be overweight (32% of males and 37% of females).(45) This was substantially lower than the actual rates based on BMI calculated from self-reported height and weight: 62% of males and 45% of females in the survey were classified as overweight or obese. In addition, trends suggest that overweight or obese adults are increasingly likely to see themselves as having an acceptable weight. The proportion of overweight or obese Australians who perceived themselves as having an acceptable weight increased from 37% in 1995 to 41% in 2001 and 44% in 2004–2005.(5)

3.2.5 Role of governments

Governments have a responsibility to coordinate preventative health reform, to deliver preventative programs and to make sure adequate supports are put in place to enable individuals, families and communities and the health system to make useful contributions. It is the role of government to enable and support individuals, families and communities to take responsibility for health (*'making healthy choices easier for everyone, everywhere and every day'*).

3.2.6 Role of healthcare systems

Healthcare systems need greater emphasis on helping people to stay healthy through stronger investment in prevention, early detection and appropriate interventions to keep people in the best possible health. There is a need to ensure that, as well as diagnosis and treatment, actions and incentives are available to keep people well, create supportive environments and policies, protect the health of all Australians, and prevent disease and injury (adapted from NHHRC 2008).(44)

The direction of prevention within the health system and the provision of health services should be shaped around the health needs of individuals, their families and communities. Responsiveness to individual differences, stage of life, cultural diversity and preferences through choice in health care is important (adapted from NHHRC 2008).(44)

3.2.7 Social determinants of health

Healthcare systems should be designed to ensure equitable, universal coverage and access, with adequate human resources. Health systems need to combine locally organised action on the social determinants of health with strengthened primary care. It is important that there is adequate funding for prevention and health promotion as well as treatment. Progress towards health equity requires addressing economic inequality. Policy coherence and inter-sectoral action for health – 'health in all policies' – are essential, and renewed government leadership is urgently needed to balance public and private sector interests.(46)

3.2.8 The environment

The environment plays an important role in our health and in helping to make sensible decisions about health. The environment is taken to include the global climate, the physical and built environment (for example, the workplace, air quality, planning decisions that affect our health), the socio-economic environment (including the working environment) and external influences such as the promotion of healthy or unhealthy behaviours.

The health system needs to work at all these levels to promote health in many and varied partnerships and across agencies, Partnerships outside the health system should include those with all levels of government, planning, infrastructure and transport departments, police and the courts, local councils, employers, businesses, early-learning centres, schools and universities (adapted from NHHRC 2008).(44)

3.2.9 Working with industry

The contribution of Australian industry is a crucial component of the multi-sectoral response that is needed to tackle the obesity problem. The development of a comprehensive national obesity prevention strategy represents a unique opportunity to engage with the diverse areas of industry that need to be part of the solution.

Industry sectors have already demonstrated their willingness and ability to work in partnership with others to develop strategies and products that enhance the health of Australians. Industry can make an important contribution to population health through:

- The provision of information (for example, product and menu labelling and responsible marketing; the placement of healthy products in more prominent positions in supermarkets).
- Improving the food supply (for example, making healthier and affordable food products available).
- Developing a more environmentally sustainable food chain. The following examples demonstrate some of the ways industry can play an influential role in shaping the population's health.

FOOD INDUSTRY

Some members of the food industry are willing to cooperate with strategies aimed at achieving a healthier, affordable food supply, and have indicated this through, for example, new product development and reformulation of existing recipes (such as reductions in salt or using healthier oils for cooking). Other areas have been more contentious. The food industry has opposed regulation in the past, for example, in relation to food marketing to children. A set of seven principles (the 'Sydney Principles') was developed by an International Obesity Taskforce (IOTF) Working Group in 2006 to guide action on changing food and beverage marketing practices that target children. Each of the principles was supported by a wide group of stakeholders, including the food and advertising industries, but there was industry opposition to the third principle which called for a statutory approach.

This principle is based on the premise that industry self-regulation is not designed to ensure a high level of protection for children from targeted marketing and the negative impact that this has on their diets, and that only legally enforceable regulations have sufficient authority to achieve this goal.(47)

RESTAURANT AND CATERING INDUSTRY

Restaurant associations are often opposed to regulatory measures that introduce point of sale menu labelling (i.e. where menu boards contain nutritional and energy content information). Reasons include the cost burden associated with nutritional analysis and updating menu boards, as well as concerns about loss of revenue if menu labelling curbs ordering. While it has been suggested that revenue shifting within and between restaurants is more likely to occur if menu labelling works as intended, there is currently a lack of evidence on this point.(48)

WEIGHT LOSS INDUSTRY

The weight loss industry in Australia is worth millions each year (for example, in 2002 young women aged 18–32 years were estimated to have spent almost $414 million per annum to manage their weight).(49) There are a wide range of weight loss programs available, including commercial weight loss programs (such as pharmacy-based programs), internet-based programs, weight loss products (such as meal replacements) and community-based weight management or exercise groups. While these programs are popular, there is limited data on their effectiveness. To ensure that industry practices are safe and effective, there is a need to review weight loss industry programs and to develop a common code of practice for the industry, covering issues such as costs, counsellor training, and the marketing and promotion of services.

3.2.10 Population-wide focus

There is a clear need to balance policy directions that focus on individual and personal responsibility with a population-wide focus on policies that support and facilitate healthy eating and physical activity. Evidence indicates there is a wide range of forces, most of which are outside the control of individuals and families, that interact to shape patterns of overweight and obesity, and the high rates of overweight and obesity in the community warrant a population-level response. According to the World Health Organization.

> 'A life-course perspective is essential for the prevention and control of non-communicable diseases. This approach starts with maternal health and prenatal nutrition, pregnancy outcomes, exclusive breastfeeding for six months, and child and adolescent health; reaches children at schools, adults at worksites and other settings, and the elderly; and encourages a healthy diet and regular physical activity from youth into old age.'(50)

3.2.11 High-risk groups

A focus on the population as a whole will need to be complemented by targeted approaches for groups with disproportionately high rates of overweight and obesity, including Aboriginal and Torres Strait Islander people; people of different cultural backgrounds, particularly from Asia (India and China), Pacific Islands and the Middle East; and people of lower socio-economic status. In addition, interventions aimed at children and pregnant women may have a significantly higher impact.

3.2.12 Costs

Given the magnitude of the obesity problem in Australia, the cost of a comprehensive strategy to address it could be substantial. For example, costs for a comprehensive population-level strategy targeting obesity may be considered in the context of the UK Government's strategy 'Healthy Weight, Healthy Lives', aimed at reversing the rise in obesity prevalence in the UK. This strategy comprises funding of £372 million for the period 2008–2011, on top of additional investment of £1.3 billion in school food, sport and play initiatives, and £140 million pounds for Cycling England for the same time period.(35) However, costs for prevention and management need to be considered in light of the estimated economic cost to the nation, and balanced with the gains to be made for effective strategies that will also ultimately address the comorbidities associated with excess weight. For example, evidence suggests that as BMI increases, so do length of hospital stay, medical consultations and use of medication.(32)

3.2.13 Research, monitoring and evaluation

It will be important to continue developing the evidence base through research, evaluation, monitoring and surveillance, but this should not be a cause for delayed action. Australia can build a strong evidence base through research, evaluation, monitoring and surveillance. This should include a much higher investment in research and evaluation of weight reduction interventions, as well as improving our understanding of its causes. In terms of research, a specific research agenda needs to be developed with appropriate levels of public and private funding. This will need to be supported by improved monitoring and harmonisation of surveillance systems across Australia.



4. Potential initiatives

While behaviour change is an important component of any response to obesity, it is a complex process for individuals that extends beyond education and the provision of information. Achieving long-term, sustainable change is difficult, resource-intensive and time-consuming. To achieve substantive change in Australia's obesity problem, the following proposals require the engagement of both community and government.

4.1 Reshaping the food supply towards lower risk products and pricing

Pricing is a crucial issue to consider in shifting consumer demand. Food prices have risen significantly in Australia recently, including large increases in the price of many fresh products.(52) The majority of Australians regularly obtain their grocery requirements from supermarkets. Around 12–14% of the average Australian household post-tax income is spent on standard groceries. In 2008 the Australian Competition and Consumer Commission (ACCC) examined whether increased grocery prices were related to the level or lack of competition between major supermarket chains and other retailers such as independent supermarkets, bakeries and greengrocers. Around half of all fresh product sales (such as meat, fruit and vegetables) are sold through Australia's two largest supermarket chains, Coles and Woolworths (compared with around 70% of packaged groceries). No evidence was found to suggest that there had been broad, fresh produce price increases at the retail level by a greater margin than rises in prices at the farm gate. The ACCC found that food price rises could not be attributed solely to the market or bargaining power of the largest retailers, but were associated with a myriad of national and international factors.(52)

These include the drought, adverse weather conditions, increasing costs of raw materials and other products crucial to farm production such as petrol and fertiliser, as well as rising international food commodity prices. The ACCC recommended that mandatory unit pricing be introduced nationally (in-store and in print advertising) for all large supermarket chains and independents, to assist consumers to more readily compare product prices between different sizes, brands and stores. The ACCC considered that six to 12 months would be an appropriate timeline for implementation, and recommended an accompanying public education campaign to enhance impact and consumer understanding.

Since August 2008 the results of independent monthly surveys of typical grocery basket prices across Australia (involving around 500 products from 600 supermarkets) have been available through a dedicated website, allowing consumers to assess their cheapest locally available groceries (www.grocerychoice.gov.au).

ENSURING ACCESS TO HEALTHY FOOD

There is evidence that economic factors may pose a barrier to the adoption of healthier diets and so limit the impact of dietary guidance.(53) Low-income Australians report lower levels of consumption of fruits and vegetables, often related to difficulties in accessing, purchasing and storing these foods.(54) People on lower incomes spend a higher proportion of their income on food,(55) and are less likely to meet dietary guideline recommendations for levels of fruit and vegetable consumption than higher income consumers.(56) They are more likely to consume energy-dense foods (high in fat and sugar) and lower amounts of plant-based foods (fruits and vegetables and wholegrain bread). Energy-dense foods are often perceived as being more affordable, more filling, more acceptable to family members and more readily available in disadvantaged areas.(57)

The introduction of policy-related economic instruments, especially in the form of taxes and price policies, may reduce food consumption, including high saturated fat and other energy-dense foods, and increase the purchasing of healthy products.(58)

A tax on unhealthy foods may encourage food manufacturers to produce healthier foods by reformulating existing products or developing new ones to maintain market share.(59) In addition, as consumers are responsive to price, taxes on unhealthy foods that increase the effective price to consumers may be effective in discouraging and lowering their consumption.(60)

For example, UK research modelled the effects of several options for taxing unhealthy foods to estimate the likely impact of price rises on demand for a range of foods. Under one model, a wide range of food products would be taxed to reduce fat, salt and sugar intake to maximise health outcomes. This was estimated to prevent up to 3200 deaths from heart disease and stroke annually, and to increase food expenditure by 4.6%.(61) Further evidence on the demonstrated rather than predicted outcomes of economic policies like targeted food taxes is required, such as whether consumers' buying habits would actually change and the magnitude of resulting health gains.(58, 60, 61)

In addition, targeted taxation on unhealthy foods is considered to be regressive as it would impact disproportionately on people and families on lower incomes who spend a larger proportion of their income on food than higher-income earners.(60, 86)

Subsidising healthy foods has an advantage in comparison with the potentially regressive impact of policies (such as taxes added to unhealthy food that are aimed at increasing prices) in that the greatest benefit would go to the most disadvantaged consumers: those with lowest incomes.(53) In addition, research supports interventions encouraging a greater intake of healthy foods rather than policies encouraging a decreased intake of unhealthy foods, as there may be more benefit in terms of weight loss in increasing the intake of healthy foods than in decreasing the consumption of unhealthy foods.(53)

Potential health benefits (reduced stroke and coronary heart disease) associated with subsidising healthy foods have been estimated by modelling consumption changes related to a hypothetical government subsidy on fruit and vegetables in the US:(60)

- Policies that lead to an ongoing reduction in the market price of all fruits and vegetables would result in a substantial decrease in the number of cases of stroke and heart disease
- A 1% retail price subsidy on all fruits and vegetables would result in an average saving of US$1.29 million per statistical life saved
- The most cost-effective policy would involve subsidies for both fruits and vegetables together.(60)

Recent reports suggested that the French Government was considering an increase in tax on unhealthy food items by increasing the existing 5.5% value-added tax to up to 19.6%, based on recommendations by the French tax and social affairs inspectorates. Items under consideration included extra-fatty, salty or sugary products such as pizzas, hamburgers and soft drinks, and possibly alcohol. Revenue was to go in part towards a large deficit in the state healthcare system.(62) However, subsequent reports have indicated that this plan has not been adopted by the Budget Minister, due to the current economic climate, including increases in the cost of living.(63)

PROMOTING ACTIVE LIVING

While evidence of the effectiveness of subsidies for active living initiatives is still being developed, there are examples of new policies introduced in other jurisdictions that Australians can draw on in formulating policy. Since 2005, the government in Nova Scotia, Canada, has allowed a 'Healthy Living Tax Credit' to help with the cost of registering children and youth in eligible sport or recreation activities that offer health benefits.(59) This credit, based on a maximum annual spending of $150 per child when introduced, was raised to an annual maximum of $500 in January 2006. It is estimated that the tax credit costs the Nova Scotia Government $2.2 million annually.

In its 2006 Budget, the Canadian federal government introduced a similar economic incentive: the Children's Fitness Tax Credit. Under this tax credit, starting in the 2007 taxation year, parents are allowed to claim a non-refundable tax credit of up to $500 in eligible fees for the enrolment of a child under the age of 16 in an eligible program of physical activity. It is estimated that the federal tax credit will cost approximately $160 million per year. Once sufficient data are available, evaluation of the effectiveness of such credits on physical activity and obesity will be possible.(59)

Australian research that examined modes of transport to work in New South Wales in 2003 found that the majority of people drove cars (69%), while less than one-quarter used public transport, walked or cycled. People who drove were significantly less likely to undertake recommended levels of physical activity than non-car users, and driving to work was associated with being overweight or obese.(64)

Proposals to encourage the use of active transport in Australia include encouraging workplaces to replace subsidies that promote private and company motor vehicle use (such as subsidised car parking and novated leases) with inducements that encourage employees to walk, cycle or take public transport to work (including fare rebates, shower and safe bicycle parking facilities, bicycle maintenance vouchers and bonuses for use of alternative forms of transport).

Under the current fringe benefits tax (FBT) system in Australia, private transport is encouraged, as cars of higher-income workers are subsidised. As the taxable value of the car and therefore the FBT payable is reduced with the number of kilometres travelled each year, there is incentive for people using the scheme to maximise car use during the FBT year in order to qualify for the greatest FBT benefit. Numerous groups and several parliamentary inquiries have called for this tax concession to be repealed.(65) There are no comparable financial incentives for people to use active transport modes such as public transport, walking and cycling. The introduction of similar tax advantages would encourage and support increased physical activity among Australian workers and is likely to have a subsequent beneficial environmental impact through a reduction in greenhouse gas emissions and urban traffic congestion.[6]

6 The fringe benefits tax will be raised by the Taskforce with Dr. Ken Henry, chair of the Australian Government's review of the taxation system (*Australia's Future Tax System*) announced in May 2008 and due in December 2009.

Reshape the food supply towards lower risk products and encourage physical activity:

- Review the taxation system to enable access to healthier foods and active recreation (for example, increase tax breaks for fitness-related products and recreational activities, and for schools and workplaces to provide healthy foods).
- Provide disincentives for unhealthy foods by considering increasing taxes for energy-dense foods, as taxing unhealthy foods may provide an incentive to manufacturers to change their production processes to reduce the fat, salt or sugar content in order to maintain their market share.

4.2 Food composition

The development and reformulation of existing products is one way to increase the availability and accessibility of healthy food options and help create a supportive environment for behaviour change.(66) For example, an estimated 75% of salt intake comes from foods people purchase; clearly, product reformulation by industry has a key role to play in improving health outcomes.

There are policy examples for voluntary targets for salt reduction in food associated with reductions in population salt intake. In an initiative to reduce population salt intake, the UK Food Standards Agency (FSA) set voluntary targets for the level of salt in 85 categories of food in March 2006, involving around 70 firms and trade associations, and a broad range of products. The FSA is currently reviewing the targets and considering further reductions to maintain progress towards the daily average intake target of 6g of salt.(67) Existing initiatives in Australia involve the food industry reformulating food products with lower salt options through the Heart Foundation 'Tick' program and the Australian Division of World Action on Salt and Health (AWASH) 'Drop the Salt!' Campaign.

The UK Government is using the achievements in salt intake reduction by FSA and sectors of the food industry as a model for achieving reductions in levels of saturated fat and sugar in food.(35) The Code is intended to be voluntary; however, 'the Government will clearly continue to examine the case for a mandatory approach where this might produce greater benefits'.(35)

Interventions to reduce population-wide salt intake have been shown to be highly cost-effective.(68) The most recent survey evidence (July 2008) indicates the UK's average daily salt consumption has fallen from 9.5g to 8.6g since 2000.(69)

The North Karelia Heart Health Program in Finland is an example of the successful use of an integrated food policy approach in significantly improving population health. (151-157) The program was a comprehensive population intervention that led to significant improvements in risk factors and lifestyles, and favourable changes in chronic disease rates and population health. It involved a large-scale community-based intervention that began in the early 1970s to address regionally high rates of coronary mortality by targeting critical causal risk factors and their relationships with community lifestyles. While strategies were focused on tobacco use and the typical dietary habits of the population (high saturated fat and salt intake, low vegetable and fruit consumption), physical activity, weight, diabetes, alcohol consumption and psychosocial factors were also taken into account. The program incorporated an integrated food policy approach and combined general health education (through media, campaigns and meetings), local health service measures and training of personnel with environmental changes (smoking restrictions, collaboration with food manufacturers and retailers, and promotion of vegetable growing).

Crucial components of the intervention included expert advice, evaluation, coordination of activity and media information. Interventions included:

- Health information and nutrition counselling for the regional population
- Health agencies working nationally with the food industry to reformulate food, leading to low-fat dairy and meat products, and the reduction of salt in a range of food items
- Close collaboration with national vegetable oil product manufacturers to produce healthier spreads.

The regional success of the project led to nationwide nutrition education to target the rest of the country, leading to significant changes in the North Karelian and Finnish diet such as:

- Increased consumption of fish, vegetable, fruit and berry consumption over 20 years
- Increase in proportion of people using mainly vegetable oil for cooking between 1972 and 1997
- Decreased consumption of salt and energy from saturated fats between 1972 and 1997, with an associated drop in cholesterol levels by 18% over 25 years.

Changes were substantial. Notable health impacts included a decrease in heart disease rates nationally by 65% between 1971 and 1995. Trends in stroke and cancer mortality also showed a downward turn, with impacts on life expectancy and diminished mortality. Evidence suggests that most of the decrease in coronary heart disease mortality can be explained by changes in the target risk factors, and that the reduction in serum cholesterol level has been the strongest contributor.

Regulate the amount of trans fats, saturated fat, salt and sugar content in foods.

4.3 Food subsidies

THE COST OF FOOD

There is increasing evidence that food is more costly in rural areas compared to metropolitan areas across Australia.(70-72) There is also increasing evidence that the availability, accessibility and costs of nutritious food influence consumers who are socially or geographically disadvantaged and their ability to consume healthy food.(73) In the 1995 and 2001 NHS surveys, around 5% of adults reported that there had been times in the previous year when they had run out of food and could not afford to buy more. Australians at particular risk of food insecurity include older people, those living in rural and remote areas, and those with a disability.(2) In 2006 a healthy food basket cost on average 29% more (ranging from 24% to 56%) in remote areas of the Northern Territory compared with Darwin.(74)

The 2006 Queensland Healthy Food Access Basket Survey compared food price movements at 47 stores throughout the state between 2000 and 2006 for a standard basket of food containing such items as bread, cereals, fruit and vegetables, milk, steak, chicken, rice and pasta. Results revealed regional price differences:(72) in Brisbane, the price of a fortnight's groceries increased between 2000 and 2006 from $299 to $443 (48%); in regional Queensland, prices increased by 54% in Cairns, Townsville, Bowen, Emerald and Goondiwindi. The same basket of food cost up to $113 more in very remote areas of Queensland than in Brisbane. Price increases have been attributed to the drought, increasing costs of production and rising fuel prices.

A study in a remote Northern Territory Aboriginal community found that food in general cost 50% more than in Darwin, and that families spent an average of 38% of their income on food and non-alcoholic beverages, compared with 14% for the average Australian household and 30% for low-income non-remote Australian households.(74)

At least 44% of household income and significant changes in purchasing patterns would be required to achieve dietary recommendations. While community members reported a preference for fresh produce, more than half the average energy intake in the community came from white bread and flour, sugar and milk powder, products that provide most calories for least cost, store well and divert hunger. However, when factors including store management and leadership, workforce development and improved infrastructure were addressed through a whole-of-store approach, sales of fruit and fresh vegetables increased. Thus, while still facing significant economic barriers, people in the community purchased more fruit and vegetables when given the opportunity.

IMPROVING ACCESS TO HEALTHY FOODS IN REMOTE AREAS

Strategies that have been suggested to improve access to healthy foods among rural and remote Indigenous Australians include.

- The provision of vouchers to buy a weekly basket of nutritious foods.
- The examination of patterns of transport and marketing to reduce barriers to the trade of fresh local foods.
- The support of economic development opportunities such as agriculture and horticulture, and the development of traditional food resources.
- The provision of adequate remote food storage infrastructure.
- The development of the Indigenous workforce in remote and rural stores.(74)

Evidence suggests that subsidising the transportation of healthy foods in remote regions is an effective means of promoting healthy eating; for example, an evaluation of the Canadian Food Mail Program, which subsidises the cost of transporting nutritious perishable foods to isolated communities, found that increasing the freight subsidy from 30 to 80 cents per kilogram for healthy products like fruits, vegetables and dairy as part of a pilot project in three communities resulted in a significant increase in the purchase of these products.(59)

While there is a need to ensure access to fresh produce in remote areas, it should be noted that the availability of healthy frozen and canned foods (such as 'low salt' or 'no added salt' varieties of canned goods) is also important. These can provide convenient and economical access to fruit and vegetables for consumers. These foods can be as nutritious as fresh forms: frozen vegetables picked and frozen within hours of harvest, for example, may actually retain more nutrients than the unprocessed form.(75) There is also a need to ensure that key messages around dietary guidelines (eg. the consumption of two servings of fruit and five servings of vegetables a day) include information about the range of ways in which these intake levels can be met, such as through the intake of canned or frozen foods.

However, frozen vegetables require freezer transport, which is likely to be more expensive than chilled freight for fresh fruit and vegetables and unchilled freight for canned goods/non perishables. In addition, remote community household infrastructure may not support measures to improve access to healthier food, be it fresh or frozen. For example, evidence indicates that in the Northern Territory less than half of houses surveyed in remote communities had a functioning fridge,(76) while only 6% of 4343 houses in Aboriginal communities across Australia assessed between 1999 and 2006 had functional nutritional hardware (storage space for food, preparation, functional stove and sink).(77)

To address this lack of basic amenities, other initiatives may be appropriate and more urgent, such as subsidies for refrigerators or other infrastructure in remote communities for better storage of fruit and vegetables; or schemes to improve household infrastructure for the preparation and storage of food at home (such as hardware rental programs). It is critical to ensure the implementation and maintenance of relevant recommendations from the National Indigenous Health Equality Summit,[7] such as the target that healthy living practices like the ability to store, prepare and cook food are available in three-quarters of all houses by 2013.(171) Poor quality diet in the Indigenous population is a significant risk factor for three of the major causes of death (cardiovascular disease, cancer and type 2 diabetes).(78) Poor nutrition among many Indigenous people is associated with disadvantaged socio-economic circumstances. In order to improve nutrition in Indigenous communities, it is necessary to acknowledge and address the role of poverty.

Provide subsidies for rural and remote area transport of fresh foods.

4.4 Protect children and others from inappropriate advertising of unhealthy foods and beverages

Television advertising has significant reach, and has been shown to independently influence children's food preferences and purchasing requests.(79, 80) Food advertising to children affects food choices and influences dietary habits.(79) A ban on advertising unhealthy foods to children during peak viewing periods would help to reinforce and normalise healthy eating for Australian children, and enable them to make healthier food choices.

THE AUSTRALIAN EXPERIENCE

Australian children's exposure to television food advertising is amongst the highest in the world,(81) and a high proportion of these advertisements are for non-core or extra (energy-dense, nutrient-poor) foods.(83, 158, 159) Australian children watching 20 hours of television or more per week (two hours and 51 minutes per day) are twice as likely to be overweight or obese as children who watch less television.(82) Evidence indicates higher rates of high-fat/high-sugar food advertisements on Australian television during children's compared with adults' viewing hours; and during popular children's programs.(83)

Australian research that models television food advertising under different regulatory scenarios suggests that simple regulatory restrictions such as restricting content and timing of advertisements would reduce children's exposure to advertisements for non-core foods.(84)

The new draft of the Children's Television Standards was released by the Australian Communications and Media Authority (ACMA) in August 2008 for public and industry comment.[8] General restrictions on food and beverage advertising were not proposed.

7 On 18–20 March 2008, the National Indigenous Health Equality Summit was held in Canberra. The outcome was a statement of intent and a report detailing a series of targets aimed at achieving health status and life expectancy equality between Indigenous and non-Indigenous Australians by 2030. In December 2007 the Council of Australian Governments (COAG) agreed to a partnership between all levels of government to 'close the gap' on Indigenous disadvantage; notably, to close the 17-year gap in life expectancy within a generation and to halve the mortality rate of Indigenous children within 10 years. The report is available at www.hreoc.gov.au/social_Justice/health/targets/index.html

8 See www.acma.gov.au/WEB/STANDARD/pc=PC_310262

ACMA cited limited evidence on the benefits of banning food advertising and questioned the body of research linking weight and television advertising. It considered that restricting food advertising without a tool to identify foods high in fat, salt and sugar (HFSS) would be a blunt form of regulatory intervention. ACMA indicated it would consider reviewing its position should a stronger association between food advertising and obesity be found or when there is a more established body of research illustrating the benefits of banning food and beverage advertising; and when an Australian-appropriate food identification standard is successfully introduced.

As part of the review, ACMA assessed the economic impact of restrictions on television food and beverage advertising. It should be noted that ACMA based its cost-benefits analysis on figures from the 2006 Access Economics report on the cost of obesity in Australia.(86) Since ACMA released its draft standard, these estimates have been revised by Access Economics.(13) As the more recent report estimated significantly higher costs to the Australian community of obesity, this would significantly alter the cost-benefit outcomes calculated for the ACMA review. The Taskforce believes that further research needs to be undertaken utilising the most recent Access Economics data to help us understand the association between advertising and children's weight.

International recommendations conclude that restrictions on food and beverage marketing directed to children should form part of a comprehensive and multifaceted strategy to address the growing problem of childhood obesity. The World Health Organization has recognised that food marketing to children, particularly television advertising, is an important area for action to prevent obesity(51) and has called upon governments to implement policies and strategies that reduce the impact of foods high in fat, sugar and salt and promote the responsible marketing of foods and beverages to children.(87)

There is growing international consensus that food advertising works by influencing children's food preferences, diet and health, and that this influence is harmful to children's health, as most advertising to children is for products high in salt, sugar and fat.(85) International reviews have concluded that heavy marketing of fast-food outlets and energy-dense micronutrient-poor foods and beverages is likely to be causative in weight gain or obesity.(51) Statistical evidence indicates that exposure to television advertising is associated with adiposity or body fatness in children aged 2–11 years and young people aged 12–18 years.(80) While current evidence is not sufficient to conclude a causal relationship between television advertising and adiposity, even a small association would have significant impact across the entire population of children and young people.(80)

Following the release of the new standards by ACMA, the South Australia and Queensland governments announced consultations into television food and drink advertising for children to consider bans or regulations on marketing of unhealthy food and beverages. In South Australia, the government has indicated a preference for voluntary restrictions from the advertising and food industries, as well as a preference for national action. However, the South Australian Government will consider the introduction of state-based restrictions if national agreement is not reached. In addition, at the national level, the Senate has recently referred the `Protecting Children from Junk Food Advertising (Broadcasting Amendment) Bill 2008' to the Community Affairs Committee for inquiry and report by 25 November 2008.

Among other effects, it has been suggested that regulation may lead to lower levels of funding for children's programs. While the evidence remains limited on the effects of advertising bans, impacts need to be assessed in practice and over a significant time period. However, there is some evidence from international jurisdictions where advertising restrictions have been enacted.

THE INTERNATIONAL EXPERIENCE

There are extensive legislative prohibitions on advertising to children in Sweden and Norway, and the Canadian province of Quebec. In Sweden and Norway, commercial advertising directed to children on television is prohibited, while in Quebec the commercial advertising (of all products and services, not just food) targeted at children via any medium is prohibited. It has been argued that childhood obesity rates increased in Sweden and Quebec following the introduction of advertising restrictions to children, and that this provides evidence that food advertising is not a contributor to the obesity epidemic, and that the regulation of food advertising would not be effective in reducing obesity. These claims have been refuted for a range of reasons:(88)

- The argument fails to take into account the fact that there are multiple factors that contribute to the obesity crisis, and that restricting advertising targeted at children is proposed as only one of a large range of measures required to address obesity. It is not expected that the introduction of advertising bans alone would lead to significant reductions in obesity prevalence among children.
- There are several limitations to the advertising restrictions in these jurisdictions, including:[9]
  - Restrictions do not apply to broadcasters and advertisers outside the jurisdiction. As a consequence, significant levels of food advertising to children remain on Swedish television, since two of the three commercial television stations received in Sweden are broadcast from the UK. A similar situation occurs in Quebec.
  - The bans apply to advertisements that are *directed at children* in Sweden, or *designed to attract the attention of children* in Quebec. These stipulations allow advertisements with any component deemed to be 'adult' or in any way not designed for children to be considered exempt from the bans.
  - Lack of resources for the monitoring and enforcement of bans.
- It is not known what childhood obesity rates would have been in these jurisdictions if advertising bans had not been introduced: prevalence may have increased at an even greater rate.
- There is evidence that French-speaking children in Quebec have lower rates of obesity than English-speaking children, who can watch commercial television broadcast from outside the province.

THE UK EXPERIENCE

In the UK, Ofcom has introduced restrictions on broadcast food and drink advertising to children. These apply to the advertising of food products high in fat, salt and sugar within programming aimed at children aged under 16 years. The first review of these restrictions commenced in July 2008 and will be based on six months of data. Industry has also introduced new content rules for all food and drink advertising to children in non-broadcast media, with fruit and vegetable promotion excepted, under the Advertising Standards Authority (ASA). ASA is reviewing its advertising codes and will put out revised codes for public consultation later in 2008. The Institute of Standards in British Advertising (ISBA) has published best practice principles for advertiser-owned websites for marketing to children.(35)

9 Goldberg (1990) and Caron (1994), cited in Ofcom: Childhood Obesity – Food Advertising in Context, 22 July 2004, www.ofcom.org.uk/research/tv/reports/food_ads/report.pdf.

THE US EXPERIENCE

In the US, the Federal Trade Commission was asked by Congress to undertake a study of food and beverage marketing to children and adolescents in response to marked increases in childhood obesity.(89) The research examined expenditures and activities in 2006 across traditional media such as radio, television and print, as well as activities on the internet and in previously unmeasured marketing arenas such as packaging, in-store, event sponsorship and school promotions.

The 44 companies surveyed were the primary marketers to youth (2–17 years old) in categories including beverage manufacturers and bottlers; packaged/processed food producers; dairy marketers; fruit and vegetable growers; and quick-service restaurants. The survey found that food and beverage companies spent US$1.6 billion in 2006 on marketing their products to children; advertising to 2–17-year-olds made up 17% of their total 2006 marketing budgets. The majority (63%) of the total spent on advertising to youth was for soft drinks, breakfast cereals and restaurant foods. Television advertising was the dominant marketing technique used to promote foods and beverages to youth, comprising 46% of all reported youth marketing expenditures. Over half of this television advertising was targeted at children under 12; this was mostly advertising for breakfast cereals and restaurant food.(89)

While just over half of the spending was on traditional media forms of print, radio and television (53%), the remainder was concentrated in areas such as internet and digital promotions, expenditure on speciality items and prizes for children and adolescents (excluding toys distributed with children's meals at quick service restaurants), packaging and in-store display materials, and other media such as event sponsorships; celebrity endorsement fees; cinema, video and video game advertisements; and product placements in films, television and video games.

Spending on cross-promotions comprised 13% of all reported youth marketing – this included the use of licensed characters and associations with television programs, movies, toys or other entertainment events. For some food categories, such as restaurant food and fruits and vegetables, cross-promotions represented almost half of spending targeted at children.(89)

This report and evidence from the UK highlights the increasing importance of non-traditional media and promotional activities in the marketing of food and beverage products to children and adolescents, including the use of the internet (for example, company-sponsored websites), digital promotions (for example, email and text messaging) and word-of-mouth/viral marketing. For example, large food companies in the UK are using social networking sites and text messaging competitions to market unhealthy food to children. A recent report by the Consumer group 'Which?' found that some companies that had pledged to stop marketing unhealthy food to children under 12 years have not done so, but have continued to use cartoon characters, film tie-ins, celebrity endorsements and free offers to target children aged under 12 years.(90)

Curb inappropriate advertising and promotion, including consideration of banning advertising of energy-dense, nutrient-poor foods on free-to-air television during children's viewing hours (i.e. between the hours of 6.00am and 9.00pm), and reducing or removing such advertising in other media such as print, internet, radio, in-store and via mobile telephone.

4.5 Improve public education and information

4.5.1 Social marketing

An effective and coordinated long-term public education campaign is needed to increase physical activity levels and improve eating habits. The campaign should include evidence-based media advertising and targeted education for priority population groups. National campaign messages and resources should be integrated with advice on healthy weight, healthy eating and physical activity within the community setting, in order to establish healthy social norms.

The best evidence on the effectiveness of mass media campaigns, such as that derived from tobacco control, indicates that long-term, well-funded, sustained, hard-hitting campaigns are necessary to achieve behaviour change. For example, a recent study found a significant reduction in smoking prevalence associated with a televised antismoking advertising campaign.(91)

It should be noted that, unlike campaigns to stimulate smoking cessation behaviour that are implemented in an environment in which tobacco advertising had been banned, healthy eating campaigns will need to compete and achieve cut-through (i.e. awareness and exposure) in an environment that is dominated by food advertising.

Considered in a social marketing framework, advertising for energy-dense, nutrient-poor products generally promotes behaviours that compete with public health recommendations and services, and strengthens potentially negative or challenging behaviours.(92, 93) The advertising supports behaviours that are typically more appealing to the target audience than the behaviour that is the focus of the intervention (in this case, increased intake of fresh fruit and vegetables, and decreased consumption of unhealthy food options).

Potential competing factors therefore need to be considered in the development of interventions, and sustained strategies to recognise and remove or minimise the potential impact of such competition must be incorporated into the program design.(94, 95)

THE EFFECTIVENESS OF SOCIAL MARKETING IN IMPROVING HEALTH BEHAVIOURS

There is increasing evidence that social marketing can substantially enhance the impact and effectiveness of public health and health promotion interventions.(92-94, 160, 161) A study examining 17 European health campaigns concluded that the campaign effects, while small, were positive.(92) A meta-analysis examining 48 health promotion campaigns in the US estimated there was an average 9% level of behaviour change associated with the campaigns.(96) Even small estimates of behavioural change associated with health programs can translate into significant impacts at the population level.(92) It is important to note that funding for these health campaigns was very limited and this probably explains the limited campaign outcomes.

A recent report on a series of three systematic reviews selected only interventions that applied six key social marketing features in their design.(95) All interventions were aimed at improving healthy eating behaviour, increasing physical activity or targeting substance abuse. The review concluded that social marketing interventions can be effective in these three areas: in nutrition and substance use the evidence was reasonably strong, while in physical activity the results were more mixed. In addition, the interventions were successful among different target groups and in diverse settings, from family- and community-based settings to clinical practice and the workplace.

Evidence from other health-related campaigns indicates that appropriately targeted investment in social marketing can provide health and economic gains; compelling evidence is available from areas including tobacco control, drink-driving/road safety, immunisation, sun protection and HIV/AIDS, as well as the commercial sector.(162-165) Lessons from these areas are transferable to obesity management and prevention.

Tailoring key campaign messages and interventions to specific target audiences will enhance campaign effectiveness.(92-95, 160) Key elements of social marketing include:

- Identifying the target audience and tailoring interventions and key messages accordingly
- Using market research to identify and segment target audiences, to develop effective messages (including comprehensive pilot-testing) and determine dissemination channels.

THE NEED FOR A CAMPAIGN IN AUSTRALIA

Social marketing campaigns involving public education and the engagement of healthcare professionals can help to raise community awareness about relatively fundamental issues, such as what constitutes healthy weight for adults and for children, as well as providing information and resources about healthy eating and activity. This is important in addressing misperceptions about healthy levels of weight in the Australian population. For example, with the increasing prevalence of overweight and obesity nationwide, it appears that Australians may perceive being overweight as 'normal' and hence many overweight people may not consider that they have a problem. Only around one-third of Australian adults in the 2004–2005 National Health Survey considered themselves to be overweight (32% of males and 37% of females).(45)

This was substantially lower than the actual rates based on BMI calculated from self-reported height and weight: 62% of males and 45% of females in the survey were classified as overweight or obese. Trends also suggest that this is becoming increasingly likely: the proportion of overweight or obese Australians who perceived themselves as having an acceptable weight increased from 37% in 1995 to 41% in 2001 and 44% in 2004–2005.(5)

INTERNATIONAL INITIATIVES

Initiatives can be simple and cost-effective. For example, French schemes to tackle obesity have included posters suggesting that metro train passengers use stairs instead of escalators, and advisories prominently displayed on advertisements for fast foods telling people to eat at least five fruits and vegetables a day.(62)

The UK 'Healthy Weight, Healthy Lives' strategy seeks to reverse the increasing rates of obesity and overweight in the population through 'enabling everyone to achieve and maintain a healthy weight'.(40) This is reflected in the strategy's approach to a social marketing campaign that aims to 'recruit' people to change the lives of themselves, their children and their families. It is based on research that indicated that people want help to live healthier lives and want to be broadly supported to do this, including by government and commercial organisations.

The social marketing aim is therefore 'to act as a catalyst for a societal shift in English lifestyles, helping bring about fundamental changes in those behaviours that lead to people becoming overweight and obese'. Rather than merely telling people what to do through an education campaign, the strategy aims to motivate them to participate in a supportive social movement designed to make lives healthier. The aim is to engage stakeholders from the public and commercial sectors, and create a practical healthy living campaign driven by ordinary people.(40)

Several international models of community engagement are using large-scale sporting events in specific cities to create a focus for improving community health. In Canada, the province of British Columbia is hosting the 2010 Olympic and Paralympic Winter Games and is using the preparation in promoting their aim to be the healthiest region ever to host these events. Similarly, in the UK, the upcoming 2012 Olympic Games and Paralympic Games in London are being used as an opportunity (via the national strategy to tackle obesity) to develop a range of physical activity initiatives inspiring people to be more active in the lead-up to the games and beyond.(35)

Develop effective, adequately funded and long-term media advertising and public education campaigns to improve eating habits and levels of physical activity, with specific media advertising and targeted public education for priority population groups.

4.5.2 Food Labelling

A food labelling scheme that is clear and comprehensible can be effective in enabling consumers to make informed purchasing decisions and influence consumer behaviour, as well as providing incentives for food companies to improve the nutritional composition of products. In order to be effective, a food labelling system needs to guide people to healthier food and drink choices rather than further confuse them or provide insufficient information on important nutritional messages.

Presenting nutrient information on menu boards at the point of purchase also provides incentives for the food industry to reformulate healthier products and provides significant benefits to consumers.

For example, most people substantially underestimate the energy content of restaurant food, including professionals such as dietitians. Including energy content information on menu items for which people tend to underestimate energy levels has been demonstrated to reduce the likelihood of product purchase and to lead to more negative attitudes towards the product.(48)

INTERNATIONAL EVIDENCE

Consultations conducted in the development of UK policy suggest that front-of-pack labelling `is influencing consumer shopping patterns and helping to accelerate the reformulation of foods by the industry' moving the retail market towards foods that are lower in fat, salt and added sugar.(67) In conjunction with salt reduction targets, the salt content of products in the UK is now flagged more prominently through the current voluntary front-of-pack nutritional labelling scheme. This may strengthen incentives for the food industry to reformulate their products, as there is evidence that an increasing number of consumers are looking at this information.(67) For example, the number of people looking at labels for salt content in the UK rose by 48% between 2004 and 2007. (67, 97, 98)

THE ROLE OF THE FOOD INDUSTRY

To achieve a change in the food supply there is a need to work with the food industry. The World Health Organization sees interaction with food manufactures as fundamental to the success of strategies aimed at reducing, for example, the level of salt in food products.(68) Current UK polices involving the industry include working with food manufacturers to expand the range of products that count towards the daily fruit and vegetable intake requirements;(67) work with industry to reduce saturated fat and added sugar levels in foods and reduce portion sizes where appropriate;(35) and work in partnership with the convenience stores sector to increase the availability of healthier food, particularly fruit and vegetables in retail outlets in deprived areas.(40)

The work to reduce levels of saturated fat and sugar in food is initially via a voluntary Code of Good Practice. However, the UK Government has indicated that it will 'continue to examine the case for a mandatory approach where this might produce greater benefits'.(35)

TRANS FATS AND LABELLING: INTERNATIONAL REGULATIONS

Internationally there are some examples of legislation introduced to mandate menu labelling and to ban trans fat use. For example, in two US jurisdictions, New York City (NYC) and King County, Washington, regulations have recently been introduced requiring chain restaurants with 10–15 or more outlets nationally to display calorie counts on their menus. The NYC Health Department estimates that this regulation could reduce the number of people who suffer from obesity by 150,000 over the next five years and prevent over 30,000 cases of diabetes.(99) King County requires restaurants to list calories, carbohydrates, saturated fat and sodium on printed menus. As in a growing number of other US cities and counties, these jurisdictions have also banned the use of artificial trans fats in restaurant meals. Many other US states are now considering legislating to ban the use of trans fats in food service establishments and to introduce restaurant menu labelling.(100)

Evidence suggests that displaying information about restaurant menu items at point of sale or on menus is more effective than making this information available to the public via other means such as on the internet, and may be associated with lower calorie purchases by consumers who see the information. For example, a study in NYC before menu labelling regulations were introduced surveyed patrons of 11 fast-food chains that provided calorie information publicly, either on site or on the internet. Customers of the only chain that voluntarily displayed calorie information at point of purchase reported seeing calorie information significantly more often than other customers. Over one-third of these customers reported that this information influenced their purchase. Customers of this chain who observed the calorie information purchased significantly fewer calories than other patrons of the same venue.(101)

Enhance food labelling by introducing a national system of food labelling to support healthier choices, with simple and comprehensible information on trans fat and saturated fat as well as sugar and salt and standardised serve size. This would apply to food for retail sale as well as on food purchased when eating out, and be available in settings such as restaurants, food halls and takeaway shops.

4.6 Reshape urban environments towards healthy options: A 'settings' approach

Interventions to counter obesity are premised on the need for simultaneous action at the structural environment – through legislation and regulation – and at the local community and individual level. The notion of a 'settings' approach becomes particularly important. The 'setting' has long been seen as a way of reaching a captive audience, providing entry points and access to specific populations as well as channels for delivering health promotion programmes. Settings are also understood as 'creating supportive environments' to 'make healthy choices easy choices'. A setting is a context – and a complex set of relationships and structures – within which people live, work, trade and socialise.(102) Consequently, settings may also exert direct and indirect effects on health, and acting on community-level influences may need to parallel interventions with individuals.(166-168)

For these reasons, it will be important to undertake a combination of interventions in schools and workplaces, as well as in local government areas to make local environments healthy and active. Local governments are in a position to shape the local natural and built environment and integrate efforts in different sectors. The linking of the work within these settings at the local level may particularly benefit disadvantaged communities.

4.6.1 The school setting

Schools are able to influence the nutrition and physical activity environment, and to educate children, families and the broader community about healthy lifestyles. Promotion of healthy eating in schools may be weakened by a high level of unhealthy foods and beverages available in school canteens, and the presence of soft drink and confectionery vending machines.(103) Recent Australian data indicate that children purchasing foods from school canteens had a higher energy intake from energy-dense foods than those who did not use the canteen.(103)

Evidence-based guidelines recommend ensuring that all school policies and the school environment help children and young people to maintain a healthy weight, eat a healthy diet and be physically active. This includes policies relating to building layout and recreational spaces, catering (including vending machines) and the food and drink children bring into school, the curriculum (including physical education) and school travel plans (including provision for cycling).(1) The UK has recently announced that it will implement a ban on fizzy drink and junk food in school vending machines.(104) France banned vending machines in schools in 2005.(62)

The European Commission recently announced a European Union-wide scheme to provide free fruit and vegetables to school children from 2009, with funds of 90 million annually for the purchase and distribution of fresh fruit and vegetables to schools.(105)

This would be matched by national funds in Member States choosing to participate. The scheme is based on the analysis of existing national policies and expert consultations that demonstrated that the benefits of such a scheme can be enhanced if the provision of fruit is accompanied by awareness-raising and educational measures. It also requires participating states to set up national strategies in conjunction with public health and education authorities, and to involve industry and interest groups. The proposal will now go before the Council and European Parliament.

School communities support initiatives in schools that enable healthy eating and physical activity, such as healthy breakfast and lunch programs, removal of unhealthy foods from vending machines and walking school bus programs.

4.6.2 The community setting

There is a range of community-wide interventions under way in Australia and Pacific countries that aim to control childhood obesity. One of the controlled intervention demonstration projects, 'Eat Well Be Active', recently published results following several years of community implementation in Colac, in regional Victoria.(106) The program was designed to build the community's capacity to address childhood obesity through the promotion of healthy eating, physical activity and healthy weight in 4–12-year-olds and their families.

The action plan was designed and implemented by local organisations, including schools and parents, and local health, housing and government services. The program used nutrition strategies such as support from school-appointed dietitians, canteen menu changes, training for canteen staff and healthy breakfast days, while physical activity strategies included walking to school programs, sporting club equipment and coach training.

Project objectives included reducing television viewing, sugary drinks and energy-dense snacks, and increasing water and fruit intake, active play out of school and active transport to school.

While overweight and obesity levels in children from both the campaign and the nearby comparison areas did not differ significantly and increased over time, children in the project area gained less weight and had smaller waist circumference measures (about 3cm) after several years of the project. Project results were also promising in reducing obesity-related health inequalities: in Colac, changes in weight and other measures were not related to children's socio-economic status, while in the comparison group the more disadvantaged children experienced greater unhealthy weight gain.(106)

INTERNATIONAL EXPERIENCE

Ensemble prévenons l'obésité des enfants (EPODE) ('together, let's prevent obesity in children') is a community-based, family-oriented nutrition and lifestyle education program in France. The initiative involves local physical activity and healthy eating initiatives aimed at parents and children, with engagement of influential community groups and individuals, including education and health professionals, retailers and the media. The program was launched in 2004 and involves over 110 French towns in 10 pilot communities, and is now being extended into Belgium and Spain.(35)

The program was launched following the success of a similar campaign in two French towns between 1992 and 1997, which involved a nutritional program intended to change children's eating habits; 80% of the population participated. The program included a school breakfast program and curriculum changes, and was supported by local doctors and dietitians, including lectures for parents on healthy eating.

The results indicated significant modification of eating habits (for example, the number of families eating chips weekly fell from 56% to 39%), while childhood obesity did not increase between 1992 and 2000. In comparison, in the rest of the region where childhood obesity doubled. Mothers in the participating towns also gained less weight than those in other towns.(107)

The program is led by an expert committee with the support of the Ministry for Health and Family, with private sector partners (including food and insurance companies) that have committed human and technical resources as well as US$1 million.(107) In the current program, height and weight is monitored in the target group (5–12-year-olds), with feedback provided to parents. Overweight/at-risk children are encouraged to see a doctor, while each town receives suggestions for activities, diets and community initiatives such as safe routes for walking to school, learning about vegetables at school, inviting food professionals to talk in schools and organised games at playtime.(107) While results from the 10 pilot towns will be published in 2009, initial results appear promising; for example, in one town, the prevalence of overweight children decreased markedly between 2004 and 2005 (from 19% to 13.5%).(35)

The North Karelia project is another excellent example of a community-based intervention. (See section 4.2 in this paper).

Implement comprehensive community-based interventions that encourage and support healthy lifestyles among all population groups, particularly in areas of disadvantage and among groups at high risk of unhealthy weight gain.

4.6.3 The workplace setting

As a setting of particular importance in obesity prevention, the workplace represents an arena for social leadership and peer support in tackling behavioural change, while work and employment policies and practices can enable or inhibit positive change.

A recent review of the effectiveness of workplace weight loss programs concluded that outcomes show modest short-term improvements in body weight, but that there is a paucity of long-term health and economic data.(108) Common factors of worksite health promotion programs with successful outcomes (such as small decreases in BMI) include regular participation, intervention intensity, the inclusion of dietary advice, supervised physical activity, support for physical activity outside the workplace, counselling and plant reorganisation.(109)

A review of workplace-based interventions targeting dietary behaviours through various education and environmental initiatives that were focused around the work canteen found positive but modest changes in diet and food purchases or no impact.(110)

Reviews of workplace initiatives promoting physical activity (interventions included health checks, motivational prompts and physical activity programs) have found inconsistent or inconclusive evidence,(111, 112) with some strong evidence for increased physical activity behaviour but inconsistent or no evidence for improvements in cardiovascular outcomes, body weight or general health.(112) More comprehensive interventions, incorporating individual approaches and changes in workplace culture and organisational structure, were more successful.(111)

'WorkHealth' is an initiative of the Victorian Government which began in July 2008.[10] It is a five-year, $218 million program aimed at improving the health and wellbeing of Victorian workers through workplace-based health checks and providing access to advice and education programs to help workers reduce their risk of chronic disease. The aims are to reduce absenteeism, improve productivity, reduce injuries and reduce the burden of chronic disease on the Victorian health system. The voluntary initiative uses the workplace as an opportunity for health promotion and disease prevention; partnerships between government, employers and workers to develop effective health solutions; and links to existing health initiatives and services. Through the initiative, every Victorian workplace (involving up to 2.6 million workers across the state) will be given the opportunity to participate in staff health programs. All workers will be provided with information on how to improve their health and will initially be offered two types of free on-site screening tests. These include a self-assessment chronic disease test to identify physiological and lifestyle issues contributing to their level of risk of developing a chronic disease; and the collection of physical and biomedical measurements, such as height, weight, cholesterol, blood pressure and blood sugar. The health provider will assess the information collected, provide the worker with individualised information and advice, and, where appropriate, provide the worker with recommendations for a general practitioner (GP) follow-up. The initiative also involves co-contribution grants for larger workplaces for screening, and for the expansion of existing or new health and wellbeing programs.

10 See www.workhealth.vic.gov.au/wps/wcm/connect/WorkHealth/Home

These programs will provide information and advice, and facilitate free on-site screening services for chronic disease. A chronic diseases prevention program will also be developed through the initiative; those workers identified as most at risk and those newly diagnosed with chronic diseases such as type 2 diabetes will be provided with access to services such as a free lifestyle change program to help them adopt healthier eating and physical activity behaviours, and information and education programs.

These kinds of programs and opportunities could be provided to Australian employees more broadly as a standard condition of employment. For example, workplaces could offer risk assessment and risk modification programs, nutritional education for workers and families, and physical activity embedded in or in association with regular daily work practice. In addition, incentives could be provided to employers to reduce the chronic disease risk profile of their employees.

SEDENTARY BEHAVIOUR IN THE WORKPLACE

The workplace represents an ideal opportunity to reduce sedentary behaviour among the population. Prolonged inactivity such as sitting is now common during working, domestic and recreational time, and typically comprises over half of waking time activity.(113, 114) Over one-quarter of Australians (26%) report sitting for eight or more hours during a typical day.(43)

Recent Australian research has demonstrated the benefits of avoiding prolonged uninterrupted periods of sedentary (mainly sitting) time,(114) interspersing periods of inactivity with breaks, and substituting (at minimum) light-intensity activity for sedentary time.(113, 114) These benefits include improved weight and metabolic outcomes. For example, the amount of sedentary time, time spent in light-intensity physical activity and time spent in mean activity intensity were found to be significantly associated with waist circumference and metabolic risk factors, independent of time spent in moderate-to-vigorous-intensity activity. On average, each 10% increase in sedentary time was associated with a 3.1cm larger waist circumference.(113) Evidence also indicated that people who took more breaks in sedentary time had significantly lower measures of obesity (waist circumference and BMI), and improved blood triglyceride and glucose levels, regardless of total sedentary time and moderate-vigorous physical activity. Those in the group who had the most breaks had a waist circumference on average 5.95cm smaller than those in the group who took the least breaks.(114)

While it is important to continue to promote the significant health benefits of regular moderate-vigorous physical activity, this research indicates that extended periods of sedentary time (as are common among office workers) may undo the benefits of such activity. The results suggest that simple interventions that can be implemented in the workplace and domestically to decrease passive sitting time and increase the number of breaks can also lead to substantial health improvements. The evidence highlights behaviours that may be more appealing and feasible for some people to undertake, which can still result in improved weight and metabolic effects; for example, the importance of lower-intensity activity throughout the day (including incidental activity such as standing) rather than a focus on more purposeful moderate- to vigorous-activity such as going to the gym or jogging. Simple and sustainable strategies include:

- Standing up while on the telephone or watching television
- Using a telephone headset at the office to keep moving during phone calls
- Holding walking or standing meetings when appropriate
- Arranging regular (for example, half-hourly) short breaks during sit-down meetings.

Employers and workplaces (both large and small) develop comprehensive programs that support healthy eating and physical activity. Evidence-based guidelines recommend ensuring policies and building design encourage healthy eating and physical activity, such as travel expenses promoting walking or cycling to work; improved stairwells to encourage use; and the provision of shower and bike parking facilities.(1) Incentive schemes to encourage healthy behaviours and weight management include contributions to gym memberships, including active travel in expense policies, and the availability and promotion of competitively priced healthy food choices on-site (including vending machines).

4.6.4 Town planning and building design

While interventions based on improved nutrition and increased physical activity can be effective in addressing overweight and obesity in individuals, shifting the population distribution of obesity requires interventions that target elements of the environment that promote or support weight gain. Solutions to address the obesity-promoting environment such as changes in transport infrastructure and urban design can be more difficult and expensive than interventions targeting groups, families or individuals. However, these kinds of strategies are more likely to support and encourage healthy eating choices and physical activity among the greatest number of people in the population in the long term.(33)

Urban planning approaches influence community levels of physical activity and driving behaviours, and are also associated with health outcomes.(115)

Meta-analyses have quantified the effects of environment on physical activity.(116) For example:

- Good community-scale urban design and land use policies and practices in promoting physical activity are associated with higher levels of physical activity (for example, proximity of residents to shops and schools, connectivity of streets, population density, green spaces).
- Good urban design and land use at a street level increase physical activity levels by 35% (improved lighting, ease and safety of street crossings, pathway continuity, presence of traffic calming structures, aesthetic enhancements).
- Having access to places for physical activity increases physical activity by 48.4% (trails, facilities, parks, safety, affordability).

The urban environment also has significant association with some health outcomes. For example, a large US study across more than 400 counties found that people living in more sprawling counties (i.e. a widely dispersed population in low-density residential developments; the rigid separation of homes, shops and workplaces; a lack of thriving distinct activity hubs such as town centres; and a network of roads with large blocks and poor access between places) were less likely to walk during leisure time, weighed more and had a greater prevalence of hypertension, after demographic and behavioural covariates were taken into account.(115)

In Australia, a national planning guide is being developed that addresses the relationship between people's health and the built environment. The planning group includes the Australian Local Government Association, the National Heart Foundation of Australia and the Planning Institute of Australia.[11]

11 See www.healthyactive.gov.au/internet/healthyactive/publishing.nsf/Content/healthy-spaces-index

The 'Healthy Spaces and Places Project', with funding assistance from the Department of Health and Ageing, aims to promote ongoing development and improvement of built environments to facilitate lifelong active living and promote good health outcomes for Australians. Long-term planning, policy and infrastructure measures are required to address the urban obesity-promoting environment. This requires reorientation of transport policy to prioritise and enable walking, cycling and public transport options, and the development of policies to support increased urban density. At a neighbourhood level there is a need to build new, and redevelop existing neighbourhoods to provide infrastructure and services for recreational physical activity, including accessibility for pedestrians and cyclists to shops, workplaces, public transport and services. It is also important that there are high-quality and usable public open spaces that cater for different target groups such as children, adolescents, adults and older Australians. These spaces should enable walking as well as active recreation and sport.

A number of reviews have shown that access to neighbourhoods characterised by higher density, mixed-use zoning, interconnected streets and access to public transport increases walking.(169, 170) There is also reasonably strong evidence of an association between parks and open spaces and walking. While having access to public open spaces is associated with walking as a form of transportation and achieving recommended levels of walking, it also appears necessary to have good communication and promotion of available facilities; access alone does not guarantee improved outcomes.(117, 118) Young people who live in more walkable, pedestrian-friendly neighbourhoods, with reduced exposure to traffic, are also more likely to walk.(119)

Evidence-based recommendations on how to improve the physical environment to encourage and support physical activity, based on effectiveness and cost-effectiveness studies, are available from the UK National Institute for Health and Clinical Excellence (2008).(120)

Facilitate the adoption of consistent town planning and general building design that encourage greater levels of physical activity, and reorient urban obesity-promoting environments through appropriate infrastructure investments. For example, develop state and municipal plans to re-orient public transportation and increase urban density, support farmers' markets, build bicycle paths and footpaths, and protect open spaces.

4.6.5 Active environments

Community and neighbourhood environments influence walking, cycling and public transport use, as well as recreational physical activity. There are some good policy precedents and some encouraging research findings on the links between environment and physical activity.(121, 122) People who have access to safe places to be active and neighbourhoods that are walkable are likely to be more active.(123) Creating more 'liveable' neighbourhoods has the potential to produce significant sustainability benefits by reducing car use, improving access to local services and through more efficient land use.(124)

Approaches involving multiple settings and multilevel strategies appear to have the greatest effect on physical activity behavioural change. A greater focus on active transport to and from work is a potential strategy that could increase opportunities for physical activity among working populations.(125) This is reflected in the UK Healthy Weight Healthy Lives 'Walking into Health' initiative.(35) Results from the pilot of an existing UK program, 'Sustainable Travel Towns', in three towns suggest walking has increased by around 20% and cycling by almost 50% in two years, accompanied by reductions in car and public transport use.(35)

Research has examined the community design correlates of obesity.(126) For example:

- Time spent in a car as passenger or driver: every additional 60 minutes per day spent in a car increased the odds of being obese by 6%
- Walk distance: each kilometre walked reduced the odds of being obese by 4.8%
- Land use: each quartile increase in land use mix (i.e. mixing residential with other uses such as retail, workplaces etc) associated with 12.2% reduced odds of being obese.

Development in countries such as the US has traditionally been based on the assumption of long-distance, private car trips and thus long-term planning is required to modify current practices and infrastructure to facilitate the widespread community adoption of active and public transport. In addition, barriers to the implementation and adoption of active transport must be considered: these include poor health, weather, time of travel and access to showers.(127)

ACTIVE LIVING, CLIMATE CHANGE AND ENVIRONMENTAL SUSTAINABILITY

There are many areas in which improving health is entirely compatible with increasing environmental sustainability, such as walking and cycling for transport. Both obesity prevention and climate change require societal change with cross-governmental action and long-term commitment, as well as partnership between government, science, business and the community/individuals.(33) It is clear that measures to design sustainable communities, reduce traffic congestion and increase active transport such as walking and cycling are all initiatives that would address both problems; addressing them together would enhance the effectiveness of action.

While we must wait for hard evidence to emerge from future initiatives, research has already begun to consider the association between environmental sustainability objectives and the promotion of active living.

For example, a US study calculated the travel distances equated with recommended daily walking and cycling levels, and modelled the effects of this type of active transport on weight loss, oil consumption and carbon emissions. (127) Results indicated that if all Americans aged 10–74 years met daily recommended physical activity targets through one hour of walking (5km) or cycling (20km), replacing car travel over the same distances, oil consumption in the US could be reduced by up to 38%; the average individual would expend around 12.2kg of fat annually for walking and 26.0kg of fat for cycling; and carbon dioxide emissions would be significantly reduced. The potential level of weight loss was concluded to be sufficient to eliminate obese and overweight conditions in a few years for all but extreme cases without reducing food intake. The subsequent financial savings were estimated to be substantial, based on reductions in healthcare expenditure and productivity losses related to ill health. While based on simplified calculations, the results nonetheless illustrate the great potential of active transport to reduce energy demand and carbon emissions, as well as to provide extensive health benefits to individuals and society.

In recent years the community has embraced a range of activities addressing climate change, such as reduction in water and energy use; installation of home rainwater tanks; the use of low-energy light bulbs and green products in the home; increased recycling; greater awareness of food supply concepts such as `food miles'; and limiting detrimental environmental impacts associated with agricultural methods, food transport and packaging processes by purchasing local produce. Sustainability initiatives could be used to harness community support to address the obesity crisis; for example, the promotion of physical activity with the message that people can save petrol money, help the environment and incidentally get healthier through the adoption of exercise-based transport (cycling and walking) and public transport use to reach schools, workplaces, shops, community centres, and by shopping locally at fresh produce markets.

4.7 Strengthen, upskill and support primary health care and public health workforce to support people in making healthy choices

4.7.1 Health workforce

The public and primary health workforce is an essential component of any public health program to reduce obesity and promote health. While not the frontline in tackling obesity-promoting environments, the primary healthcare setting is the frontline for dealing with many individuals and represents a valuable opportunity to intervene in the prevention of unhealthy weight gain across a broad spectrum of the Australian community.

Around 85% of Australians visit a doctor at least once a year.(2) However, there is currently no systematic screening for metabolic risks in primary care. There is also a lack of funded referral pathways to allied health professionals, as well as a lack of primary care engagement with the range of risk modification and healthy living programs provided by, for example, non-government organisations, the fitness industry and the commercial weight loss sector. In order to enable these systems and networks to operate in coordinated and effective partnerships, there is a need to develop standards, accreditation requirements and directories, and to provide appropriate education and training to primary and public healthcare professionals.

Having an appropriate level of public and primary health workforce is important to support population and community-based activities, such as working with local schools to assist them in implementing school canteen guidelines; working with local governments to assist in making their local plans supportive of health; and working with community groups to promote activities such as walking groups. The public and primary healthcare workforce is also crucial to the success of any comprehensive social marketing campaign, by helping to direct messages to identified target groups and providing additional knowledge and support in the community. The workforce would consist of a range of health professionals, including public health nutritionists based in regional centres, health promotion officers specialising in physical activity, based in regional centres, and generalist health promotion workers in towns and rural centres. These officers could be employed in a range of settings including local governments, state/territory governments and non-government organisations. This level of capacity is currently lacking in most jurisdictions in Australia.

There is a range of Health Equality Targets from the 'Close the Gap' report that aim to provide an adequate workforce to meet Aboriginal and Torres Strait Islander health needs. We need to ensure the implementation of these targets in order to increase the recruitment, retention, effectiveness and training of health practitioners working within Aboriginal and Torres Strait Islander health settings, and to build the capacity of the health workforce. This includes establishing programs that increase the availability of a multidisciplinary workforce in Aboriginal and Torres Strait Islander health at the local level.(171)

Further research on the role of multidisciplinary teams in the treatment of overweight and obesity is needed. There is evidence that programs delivered by multidisciplinary teams may be more effective at maintaining weight loss(129) when typically there is a high degree of relapse in weight loss for overweight and obese people.(128, 130) There are clear benefits of team care in improving chronic disease management,(131, 132) and sub-optimal management of chronic disease in general practice has been attributed to the absence of multidisciplinary teams within many general practices.(133)

Multidisciplinary patient care teams may include health professionals from a range of areas, such as a physician, dietitian, exercise expert, nurse and behavioural therapist/psychologist.(132) Such teams are proposed

in the Australian Government's Super Clinics policy with GPs and allied health professionals providing lifestyle modification advice and promoting better multidisciplinary care, located in one facility. Similarly, the New South Wales state government recently announced a $36 million state-wide strategy to address obesity, which includes the establishment of nine specialised Medical and Surgical Clinics across the state to provide multidisciplinary medical programs and bariatric surgery for those who are morbidly obese. Staff will include specialist physicians, diabetes nurses, psychologists and physiotherapists. Bariatric surgery will be considered for patients who fit certain criteria if all medical treatment options have been tried unsuccessfully.

The New South Wales strategy also includes a state-wide social marketing campaign promoting healthy eating and physical activity; a healthy advice telephone line providing information and coaching including follow-up calls and tailored counselling, based on the Quitline model, to be staffed by trained health professionals such as dietitians, nurses and exercise scientists; a parenting program to support parents of overweight and obese children; and the establishment of an Obesity Prevention Research Centre.(134)

Research among GPs has found that the impact of existing incentives to encourage a multidisciplinary approach to patient care (i.e. the Enhanced Primary Care (EPC) Chronic Disease Management (CDM) Medicare items) is restricted by:

- A lack of available community allied health services.
- Limited funding and eligibility of services under Medicare.
- Waiting times for state allied health services (as these services are now increasingly concentrated on recently hospitalised patients).(133)

GPs also perceive significant barriers to the implementation of the EPC: administrative requirements; the complexity of incentives and initiatives; being too limited to significantly change GP practice for as complex a problem as obesity (i.e. only five sessions per year from any of the range of allied health practitioners covered).

Expand the supply and support training of relevant health workers such as primary healthcare workers, health promotion workers, nutritionists and dietitians.

4.7.2 Guidelines and training

The NHMRC 'Clinical Practice Guidelines for the Management of Overweight and Obesity in Adults' and 'Clinical Practice Guidelines for the Management of Overweight and Obesity in Children and Adolescents' have not been updated since 2003. Limited training and a lack of appropriate knowledge and skills among family doctors and other primary healthcare professionals are common barriers to providing care to overweight and obese individuals. (32, 135, 172, 173)

Research has identified a range of areas in which health professionals working with overweight and obese patients could benefit from training in evidence-based approaches to the management of overweight and obesity in clinical practice. Professional education should reflect the rise in prevalence of obesity in Australia.(135) A recent study of Australian university medical, dietetic and nursing curricula found that, among the limited number of courses surveyed, while most of the undergraduate courses appeared to provide a reasonable number of hours related to training on obesity, professional training by the specialist medical colleges was less comprehensive and not specific to obesity.(135)

A Cochrane systematic review examined studies of providers' management of obesity or the organisation of care to improve provider practice or patient outcomes.(136) Reminder systems, brief training interventions, shared care, in-patient care and dietitian-led treatments may all be worth further investigation to improve obesity management.

Develop and disseminate evidence-based clinical guidelines and other multidisciplinary training packages for health and community workers.

Expand community placements for training of primary healthcare workforce.

4.7.3 Primary healthcare settings

In tackling obesity, it is crucial to target patients in primary care settings, at all levels of prevention: that is, to reduce the chance that excess weight will affect a patient, to interrupt, prevent or minimise the progress of unhealthy weight gain at an early stage, and to attempt to halt and reduce existing disability and damage associated with unhealthy weight gain. Given the prevalence of overweight and obesity in the community, adults, adolescents and children who are overweight or obese need to be offered services and support to ensure that they at least do not continue to gain weight and ideally to ensure that they lose weight. The Taskforce has considered policy initiatives in primary healthcare settings such as the implementation and monitoring of brief interventions about nutrition, physical activity and management of overweight and obesity, including an expansion of the 'Lifescripts' (lifestyle prescription) program in primary care.

The importance of access to culturally appropriate primary healthcare services (both mainstream and Aboriginal and Torres Strait Islander services) at a level commensurate with need is highlighted in the National Indigenous Health Equality Targets in the 'Close the Gap' report, and these must be implemented.(171)

Brief GP interventions incorporating verbal advice and written materials can lead to short-term modification of physical activity behaviours.(111) Common factors in improved, more consistent changes in physical activity behaviours include:

- GPs and other health professionals working together
- Patients receiving counselling outside usual GP appointments.

GPs want to see their role supported through community education campaigns, so that people expect them to provide advice as part of routine medical care.(137) A key component of an effective and comprehensive social marketing campaign is linkage with community agencies such as health professionals to support and reinforce key messages (such as through the provision of campaign information and resources). GPs also want clear referral pathways to dietitians and physical activity providers, with simple systems for people to be reimbursed for weight management referrals.(137)

The 'Lifescripts' program is a national, evidence-based initiative that promotes risk factor management in GP and primary healthcare services. Lifescripts resources provide GPs with a framework for:

- raising and discussing lifestyle risk factors with patients
- advice in the form of a written script and associated patient education
- referral to other providers to support healthy lifestyles.

This comprehensive approach to encourage achievable health behaviour change is needed for sustainable population health behaviour change. Behavioural changes need to be easy to make; for example, following the health promotion message of making healthy choices, easier choices.(117, 124, 129, 169, 174, 175) 'Lifescripts' requires additional funding to expand the program, provide linkages to local services and to integrate it with national campaigns. As a widely adopted, dedicated general practice-based lifestyle program, 'Lifescripts' would have the potential to improve the identification and management of people who are or are at risk of being obese or overweight and thus reduce associated healthcare costs.

Fund programs to educate patients in primary healthcare settings about nutrition, physical activity and management of overweight and obesity.

4.8 Maternal and child health

PREGNANT WOMEN

There are serious adverse effects of overweight during pregnancy, with the risk of complications increased for both mother and baby.(138) Obstetric risk increases with BMI among overweight and obese women.(139) Programs targeting pregnant women in healthy eating, activity and weight could enhance obstetric outcomes and reduce healthcare costs of obesity-related increases in maternal and neonatal morbidity. Initiatives such as the UK Child Health Promotion Programme aim to identify families most at risk due to child weight issues through a series of health reviews, including assessments in the early stages of pregnancy, allowing health professionals to identify and provide mothers who are already obese or overweight with advice on healthy weight gain in pregnancy.(35)

BREASTFEEDING

In addition to the protective role breastfeeding may have in several chronic diseases, breastfeeding (including delaying weaning until babies are six months old) plays an important role in helping to prevent obesity in children.(2) This has been attributed to physiological factors in human milk as well as feeding and parenting patterns associated with breastfeeding. While the proportion of Australian infants ever breastfed was around 86–88% between 1995 and 2005, in 2001 less than half (48%) of all infants were receiving any breast milk at the age of six months, and none were being exclusively breastfed.(2) The proportion of children receiving any breast milk declines steadily with age.(140)

Australian recommendations for breastfeeding reflect the international recommendations of exclusive breastfeeding for the first six months of life, with the introduction of complementary foods and continued breastfeeding from six months of age.(2)

In 2001, the proportion of Australian children receiving breast milk was higher among more highly educated and older mothers (aged over 30 years).(140) Indigenous mothers in non-remote areas appear to be less likely to initiate and continue breastfeeding than other Australian mothers.(2) These data suggest the need for targeted interventions among urban Indigenous mothers, as well as younger and less educated mothers to increase levels and duration of breastfeeding.

The Australian Government has announced funding to upgrade the existing breastfeeding helpline to a national 24-hour toll-free helpline, and to provide training for health professionals and research to support breastfeeding, including barriers and enablers to breastfeeding, indicators of breastfeeding rates and the development of dietary guidelines for pregnant and breastfeeding women.[12]

12 http://www.health.gov.au/internet/ministers/publishing.nsf/Content/mr-yr08-nr-nr105.htm?OpenDocument&yr=2008&mth=7

New UK strategies to enhance breastfeeding behaviours include: promotion of breastfeeding as the norm for mothers (as part of a comprehensive healthy development marketing program); the implementation of the UNICEF 'Baby-Friendly Initiative' in hospitals and communities with low breastfeeding rates; a code of best practice for employers and businesses on how to support and facilitate employees and customers who breastfeed; guidance for relevant professionals to encourage breastfeeding; and establishing parental support groups.(35)

Due to the susceptibility of Indigenous women to obesity compared with non-Indigenous women, it is crucial that relevant National Indigenous Health Equality Targets from the 'Close the Gap' report are met,(171) such that all Indigenous women and children have access to appropriate mother and baby programs within 5–10 years; 75% of all Indigenous pregnant women present for first antenatal assessment within the first trimester; and there is national coverage of maternal and child health services for Aboriginal and Torres Strait Islander people.

Develop targeted programs to encourage healthy eating for pregnant women and breastfeeding for newborns.

4.9 Close the gap for disadvantaged communities: Indigenous and low-income Australians

In developed countries, the prevalence of obesity is higher among people of lower socio-economic status.(32) This differential is observed in the Australian population: in 2004-05, Australians aged 18+ years in the most socio-economically disadvantaged fifth of the population had the highest rates of overweight and obesity (50%, compared with 45% of adults in the least disadvantaged fifth of the population).(2) Similarly, Indigenous Australians are almost twice as likely as other Australians to be obese (after adjusting for differences in population age structures), with these differences greatest among women. In the 2004-2005 National Health Survey, Indigenous females were around one and a half times as likely to be overweight or obese as non-Indigenous females, whereas the rates were similar among Indigenous and non-Indigenous males.(2)

These striking differences demand strategies to address the underlying social determinants. For example, the physical activity and eating behaviours of low-income people may be more dependent on the default choice (often the unhealthy choice in an obesity-promoting environment).(32)

There are several National Indigenous Health Equality Targets from the 'Close the Gap' report, which, if achieved, would help address Indigenous disadvantage; for example, access to healthy, affordable food choices for over 90% of Aboriginal and Torres Strait Islander families by 2018.(171) An existing initiative supporting this target is the Remote Indigenous Stores and Takeaway (RIST) project, which aims to improve access to healthy food in remote Indigenous community stores and takeaways through the development, implementation and evaluation of a common set of guidelines and resources promoting access to healthy foods; discourage the promotion of energy-dense, nutrient-poor food and drinks; and endorse guidelines and resources by key stakeholders to influence their uptake. Currently, each state and territory has their own implementation strategy; Queensland Health, for example, is funding the state-wide implementation and evaluation of the resources. Project resources include guidelines, marketing ideas and optimal storage tips for healthy food in remote

community stores, and a toolkit to improve the freight transport of healthy foods to remote stores. The 'Buyer's Guide 2008 for managers of remote Indigenous stores and takeaways' developed by the Heart Foundation identifies specific brands of foods and beverages that remote stores and takeaways are encouraged to stock in order to improve the available range of healthier items.(141) The 'Close the Gap' report recommends this resource to community stores in their commitment to healthy nutrition and financial goals and targets.(171)

While it is too early to assess the uptake and use of the resources nationally, results are available from a six-month pilot of a selection of the RIST resources in 2007 in seven remote communities across Australia. The best outcomes (such as substantial increases in sales of fruit and vegetables between 2006 and 2007) were observed in communities where strategies consistent with those recommended in the RIST resources were implemented within a supportive environment.(142) The results illustrate the need for community-based initiatives to involve far more than the provision of resources, including broad community engagement and consultation, and relevant infrastructure and funding.

In the participating Kururrungku community in the east Kimberley region of Western Australia, for example, increased sales of fruit, seafood, lean meat and recommended fats and oils were observed, in conjunction with the community participating as a COAG Trial site for a nutrition program supporting major changes being made to the community store. (143) These included structural changes, such as the provision of a nutritionist in the community, the establishment of a weekly freight delivery of perishable items to the store and the provision of 12 commercial display fridges.

Support ongoing research on effective strategies to address social determinants of obesity in Indigenous and low-income communities.

Develop tailored approaches and services to reach Indigenous and low-income groups, particularly through partnerships with local governments that focus on obesity-promoting environments and mobilise programs in schools and other community settings.

4.10 Build the evidence base, monitor and evaluate effectiveness of actions

There is a clear need to increase the evidence base regarding obesity prevention and management through research, evaluation, monitoring and surveillance. This requires a much higher investment in the research and evaluation of weight reduction interventions and the causes of obesity. There is a need to develop a comprehensive national research agenda for obesity. It is also vital to develop an agreed national assessment tool and reporting levels for overweight and obesity, particularly as they relate to children, young people and minority groups. A specific research agenda needs to be developed with appropriate levels of public and private funding, which must be supported by improved monitoring and harmonisation of surveillance systems across Australia. Existing and future interventions require well-designed, rigorous evaluation (including economic analysis such as the assessment of cost-effectiveness) if the relative lack of evidence on obesity prevention and management is to be addressed.

The Taskforce has identified the need to establish a comprehensive national surveillance system focused on the behavioural, environmental and biomedical risk factors for chronic disease (including factors such as food availability and food composition) to track and report on performance and outcomes, including the impact on health inequalities. Expanding the national nutrition and physical activity survey program through the inclusion of biomedical data would be an important input to such a system.

Develop a comprehensive national research agenda for overweight and obesity.

Expand the national nutrition and physical activity survey to cover adults, children and the Indigenous population, and ensure the inclusion of biomedical risk factors for chronic disease. This survey needs to become a permanent national five-yearly study.

NATIONAL DATA COLLECTION – ADULTS

Australia's major investment in monitoring the nutrition, physical activity and weight patterns of the Australian population is currently undertaken through the now triennial National Health Survey (NHS), conducted by the Australian Bureau of Statistics (ABS). The last three surveys were conducted in 1995, 2001 and 2004–2005. Data is collected through personal interviews with all respondents, except for children (parents/carers are interviewed on the child's behalf). Among a range of health data, the NHS collects information on nutrition (fruit and vegetable intake), leisure time physical activity, and height and weight (self-reported).

The most recent National Health Survey (the 2007–2008 survey, for which data collection was completed in July 2008) collected both self-reported and measured height and weight information from all participants aged over five years, as well as measured waist and hip data. Results from this survey are expected to be released in March 2009.

Measured height and weight from a sample representative of the population and for which data is currently available was last collected in 1999–2000 (the Australian Diabetes, Obesity and Lifestyle study, AusDiab). This is a longitudinal population-based study that was repeated in 2004–2005. There are plans for a 10-year follow-up to the initial survey in 2009–2010, inviting all previous participants to take part once again, as well as recruiting another cohort of new respondents from the general population.

Prior to this, the 1995 National Nutrition Survey was the largest and most comprehensive Australian survey of food and nutrient intake, dietary habits and body measurements (height, weight, waist and hip circumference, and blood pressure). It was conducted by the ABS in 1995–1996 among around 13,800 respondents from across Australia. Information on food and beverage intake, the usual frequency of intake, food-related habits and attitudes, and physical measurements were collected from people aged two years or more.

The difference between measured and self-reported height and weight is important, as measured data are likely to be more accurate and self-report data will likely underestimate true BMI.(2)

NATIONAL DATA COLLECTION – CHILDREN

The latest national-level data collected on children's weight occurred through the Kids Eat, Kids Play survey, the first national survey of Australian children's nutrient intake since 1995 and the first national children's physical activity survey since 1985. The survey involves 4000 children aged 2–16 years. Field work was completed in September 2007. Food, beverage and dietary supplement intake information were collected to calculate nutrient intake, while activity patterns and physical measurements (weight, height and waist circumference) were also recorded. Results were released in October 2008.

NATIONAL DATA COLLECTION – ADOLESCENTS

An ongoing national survey to commence in 2009 (funded by state Cancer Councils, the Cancer Council Australia and the National Heart Foundation of Australia) aims to monitor overweight/obesity prevalence, diet and activity among a nationally representative sample of around 20,000 secondary school students from year levels 8 to 11. Measured height, weight and waist circumference, food intake, dietary habits, physical activity, sedentary behaviour, barriers and enablers of physical activity and data on the school food and activity environment will be collected.



5. Conclusion

Although obesity is a relatively new area for prevention globally, there is evidence about interventions to improve diet and physical activity, and there are also lessons from other areas of successful health promotion action, such as tobacco, HIV/AIDS and road trauma reduction, which are transferable to obesity. While many pieces of this jigsaw are known, community readiness for a set of hard-hitting, multifaceted interventions on obesity may at this stage be similar to that in the early days of the tobacco control effort. Furthermore, as Australia is one of an early group of countries internationally to commit to a concerted effort, there is much evidence about the effectiveness of interventions that is yet to be gathered. These factors speak to a 'learning by doing' approach – that is, the staged trialling of a package of interventions accompanied by good monitoring and evaluation. This involves drawing upon available evidence from current initiatives addressing obesity; other public health areas in which comprehensive approaches have been taken, such as chronic disease at the population level; and the experience and evidence-based strategies and policies of other jurisdictions.

Despite the evolving nature of the evidence base for combating obesity, the advice from the World Health Organization is several-fold: legislate to support the healthier composition of food products; limit the marketing of food and beverages to children; enact fiscal policies to encourage the consumption of healthier food products and promote access to recreational physical activity; change physical environments to support active commuting and create space for recreational activity; create healthy school and workplace environments; undertake mass media, education and information campaigns to promote healthy diets and physical activity; and offer health advice and preventative services in primary healthcare settings.(87)

In addition to the specific evidence related to interventions for obesity, public health principles as applied to other successful areas of health promotion suggest the need for a combination of strategies that are applied at multiple levels and are targeted at the general population as well as the high-risk groups.

Evidence about chronic disease causation points to the need to adopt a life-course approach, with an emphasis on child and maternal health, due to the importance of the intra-uterine environment.(144) As obesity prevalence is highest in low-income populations, intensive efforts will be required in disadvantaged communities. Excellent coordination is also required across governments, as well as partnerships with communities, the private sector and the healthcare system.

While no country has been successful in reversing the trend of rising levels of overweight and obesity, in the short term policy reforms should, at least, aim to reduce the rate of increase in obesity. For example, the UK cross-government strategy has an initial focus on children and aims to reduce childhood overweight and obesity to 2000 levels by 2020.

In the first instance, a combination of regulation, social marketing and community-based programs will be necessary. The Australian Better Health Initiative (ABHI) is laying the groundwork for interventions through social marketing and community-based interventions in school and primary care settings. There is an opportunity to build and learn from these efforts, to scale up in a significant way, and to complement these initial efforts with further interventions in other settings (such as workplaces) and with environmental interventions, including legislation and regulation.(145)

Benefits for Australia in meeting the challenge of obesity

Reductions in the prevalence and incidence of overweight and obesity would lead to significant improvements in the health and wellbeing of individuals and families, and substantial savings to the healthcare system and to overall workplace productivity. Weight loss in people who are overweight and obese improves physical, metabolic, endocrinological and psychological complications.(109) Obesity-related mortality can be reduced through intentional weight loss: even a modest loss of 5–10% of body weight can lead to significant health benefits.(109)

Improvements in dietary behaviours and physical activity levels would lead to significant social and economic benefits; for example, it has been estimated that 70,000 premature deaths could be averted in the UK annually if the population's food intake met the dietary guidelines.(67) If more people were physically active for 30 minutes a day, estimates suggest the Australian healthcare system could save $1.5 billion annually.(146) This amount is the gross cost and refers to direct health expenditure, in the public and private sectors, for the prevention, diagnosis and treatment of medical conditions attributable to physical inactivity. In comparison, direct health costs of sports injuries and the cost of participating in fitness-related activities was estimated to be $831.4 million. These figures clearly demonstrate that the cost of physical inactivity far outweighs the cost of participating in fitness activities and the cost of healthcare for sports injuries.

Other estimates indicate that $8 million per year could be saved for every 1% increase in the proportion of the adult population that is sufficiently active.(147) Physical inactivity costs at least $400 million annually in direct healthcare costs. This amount would be more than doubled if indirect costs, such as time off work and the social costs of inactivity, were included.(147)

Research has similarly shown that increasing fruit and vegetable consumption in Australia by just one serve a day would save between $8.6 million and $24.4 million in healthcare costs relating to various types of cancer. In addition, over $150 million would be saved in costs related to cardiovascular disease. These estimates would be far greater if savings in indirect costs such as absenteeism and the social costs of poor nutrition were also taken into account.(147)

A national food strategy for Australia

Australia lacks a comprehensive national food strategy. Such a policy should be considered in the context of preventative health, and more specifically for its role in the prevention and reduction of rates of overweight and obesity in Australia. In the UK, for example, the 2008 document 'Food Matters', commissioned by the Prime Minister from the Cabinet Office Strategy Unit, sets out a future strategic framework for food policy and practical measures for addressing issues around food and health, food and the environment, and other concerns. (67) The document presents a series of actions for government to address the challenges presented by the health and environmental impacts of food production and consumption in an integrated way. This includes working with the agriculture sector to look at ways to mitigate and adapt to climate change, working with the food supply chain to reduce food and packaging waste, and engaging with all stakeholders in the food system – primary producers, processors, food manufacturers, retailers, individuals in the transport, storage and retail sectors, and consumers – to develop a vision for the future of food.

There are therefore important gains to be made from implementing a comprehensive approach to obesity prevention. Australia is in a position to provide leadership internationally and to make a significant contribution to the growing evidence base on effective obesity prevention strategies and programs.



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Addendum for October 2008 to June 2009

Contents

In October 2008, the National Preventative Health Taskforce released its Discussion Paper,(1) with three accompanying technical papers on obesity,(2) tobacco(3) and alcohol.(4) Since then, a range of key reports, research and policy documents have been released which are relevant to policies proposed in the Taskforce's reports.

This addendum summarises the major studies and developments since October 2008 considered relevant to the Taskforce's work on obesity, and includes updates and additional evidence on potential initiatives. For example, additional evidence is provided on the link between sedentary behaviour and chronic disease, and the need to ensure strategies to reduce sedentary behaviour are part of an obesity prevention approach.

Major developments in Australia have included the release of the House of Representative's Inquiry into Obesity. Their report, 'Weighing it Up', released in May 2009, complements the National Preventative Health Taskforce process. The report has made general recommendations on the role of governments, industry, individuals and the community, and has provided a platform for the sharing of ideas, views and stories from a wide range of stakeholders. Their recommendations are consistent with the strategic actions outlined in the Taskforce's National Preventative Health Strategy.(5)

The Senate Standing Committee on Community Affairs released its report on the Protecting Children from Junk Food Advertising (Broadcast Amendment) Bill 2008 in December 2008. The Committee stated that they considered it was premature to bring forward legislative changes to food and beverage advertising whilst the National Preventative Health Taskforce was developing a national strategy and before the industry's voluntary initiatives had been assessed. They also referred their report and the information received by the Committee to the Taskforce.(6)

Internationally, a number of countries and jurisdictions are recognising the urgency of the obesity situation and moving to address the causes of overweight and obesity. The California Department of Health Services (CDHS), for example, released its Obesity Prevention Plan in 2006, detailing strategies for action and outlining responsibilities for state and local government, employers, healthcare insurers and providers, families, schools, the food and beverage industry, and entertainment and professional sports. The development of the strategic plan to guide a statewide response to the obesity crisis was mandated by legislation, under the 2005 Budget Act. The plan's strategic actions are organised under four goals:

- Ensure state-level leadership and coordination that reaches into communities across the state.
- Create a statewide public education campaign that frames healthy eating and active living as California living.
- Support local assistance grants and implement multi-sectoral policy strategies to create healthy eating and active living community environments.
- Create and implement a statewide tracking and evaluation system.(7)

Another report recently released in the United States was 'Reversing Obesity in New York City: An action plan for reducing the promotion and accessibility of unhealthy food'. This report was prepared by the City University of New York Campaign Against Diabetes and the Public Health Association of New York, and is a document intended to educate and to spark debate on food policy issues in New York.(8)

Authorities in the United Kingdom continued to release reports on their comprehensive approach to obesity prevention and control, and updates on these initiatives are reported later in this addendum.



1. New evidence on global perspectives on obesity

Being overweight or obese is one of the most common risk factors associated with increased mortality and morbidity globally. Other common preventable risks include poor infant feeding practices, low birthweight, childhood and maternal under-nutrition, unsafe sex, use of tobacco, harmful use of alcohol, unsafe water and lack of sanitation. Worldwide, these preventable risks contribute each year to over 40% of the 58 million deaths and one-third of the loss of healthy life-years.(9)

Recent data from the Organisation for Economic Co-operation and Development (OECD) indicate that the most marked shifts in body mass index (BMI) distributions over the past two decades in a range of OECD countries have occurred in Australia, England and the United States.

Based on past trends, the prevalence of obesity and overweight in Australia is predicted to increase significantly over the next decade across all age groups to around two-thirds of the population.(10) The report examined past and projected future trends in adult overweight and obesity in 11 OECD countries. The authors found a projected continued increase in obesity prevalence for all countries. While there were differences between countries, trends suggested greater levelling-off or even decreases in rates of overweight alone. They considered the results to suggest that diverging forces are pushing overweight and obesity prevalence in opposite directions: it appears that the strong effects of obesity-promoting environments (that is, aspects of physical, social and economic environments promoting the development of obesity) have been consolidating over the course of the past two to three decades.

In addition, they postulate that successive generations have become increasingly aware of the health risks associated with lifestyle choices, and in some cases are more capable of dealing with environmental pressures due to the long-term effects of changing education and socioeconomic conditions.

The authors found that the distribution of overweight and obesity in these countries showed consistent and pronounced disparities by education and socioeconomic condition in women, with higher levels of education and socioeconomic status (SES) associated with significantly lower prevalence, while mixed patterns were found for men. The analysis also found that inequalities in obesity related to education levels in women seemed to increase in Australia. The findings also emphasised the spread of overweight and obesity within households, which was concluded to suggest that health-related behaviours, especially those concerning diet and physical activity, are likely to play a larger role than genetic factors in determining the convergence of BMI levels within households.(10)

The authors highlighted the implications of the gender difference in socioeconomic gradients. These included the higher prevalence of obesity in women in disadvantaged socioeconomic groups, meaning that children of women in these groups are more likely to be overweight or obese, which will be likely to perpetuate the link between obesity and socioeconomic disadvantage as these children will most likely experience fewer opportunities of attaining higher SES.(10)

A report released in December 2008 on the 2005–2006 National Health and Nutrition Examination Survey (NHANES) reveals a disturbing trend in the United States: based on measured height and weight, an estimated 32.7% of US adults 20 years and older were classified as overweight, 34.3% as obese and 5.9% as extremely obese (BMI of 40 and above). Compared with US health survey data collected since 1988, the 2005–06 survey was the first in which the prevalence of adult obesity exceeded the level of adult overweight. While the prevalence of obesity in the United States has more than doubled since 1980 (although the increase between 2003–04 of 32.2%, and 2005–06 of 34.3%, was not statistically significant), the prevalence of overweight has remained stable over the same time period.(11)

2. New evidence on obesity in Australia

Trends and scale of the problem

The results of two recent national surveys involving measured height and weight data were released in 2009. Results of both surveys indicate rises in obesity and overweight among male and female adults and children compared with comparable earlier data.(12)

Prevalence of overweight and obesity in adults

The height and weight of adults and children was measured in the 2007–08 National Health Survey for the first time since 1995. Preliminary results suggest that overweight and obesity prevalence in adults has continued to increase. Data from the 2004–05 health survey indicated that 62% of men and 45% of women were overweight or obese,(13) continuing to rise from 2001 levels when 58% of men and 42% of women were overweight or obese (both surveys were based on self-reported height and weight).(14) Results from the 2004–05 survey showed that, for men, those in the 45–54-year age group had the highest rates of obesity (23.2%), while those in the 55–64-year age group had the highest rates of overweight (45.9%). For women, those in the 55–64-year age group had the highest rates of obesity (21.7%), while overweight was highest among those aged 65–74 years (30.8%).(13)

Prevalence of overweight and obesity in children

Of particular concern is the increasing prevalence of overweight and obesity in children. Results from the National Children's Nutrition and Physical Activity Survey (conducted February–August 2007) based on measured height and weight found that 23% of 2–16-year-old children were classified as overweight or obese (6% as obese and 17% as overweight), while 72% of 2–16-year-olds were classified as normal weight.(15)

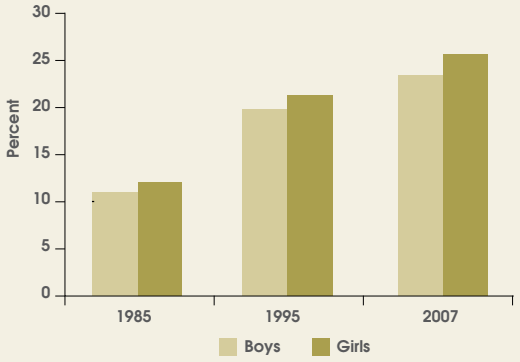
Recent trend data

Comparison of the National Children's Nutrition and Physical Activity Survey data with data from previous studies shows a clear and disturbing upward trend in overweight and obesity rates in children over the last 20 years. Analysis of overweight and obesity levels among young Australians from comparable age groups at three time points over more than 20 years, using the same internationally accepted definitions of childhood overweight and obesity, is presented in Figure 1. These data indicate the change in overweight and obesity levels among 7–15-year-old Australian children between 1985, 1995 and 2007.

As illustrated, the prevalence of overweight and obesity in boys aged 7–15 years has risen from 11.0% (95% CI 10.99–11.01) in 1985 to 20.0% (95% CI 19.97–20.03) in 1995, and 23.7% (95% CI 23.68–23.72) in 2007. In 7–15-year-old girls, the prevalence of overweight and obesity has increased from 12.2% (95% CI 12.19–12.21) in 1985 to 21.5% (95% CI 21.47–21.53) in 1995, and 25.8% (95% CI 25.78–25.82) in 2007.(16) While further data from a greater number of points in time are required to identify national trends more comprehensively, this analysis clearly indicates a rising trend in overweight and obesity for 7–15-year-old boys and girls between 1985, 1995 and 2007.

Figure 1:

Prevalence of overweight and obesity in Australian children aged 7–15 years, 1985–2007.(16)



* Data weighted for age, gender and region.

Children at special risk

In the Technical Report we described some significant differences which have been observed in overweight and obesity prevalence for children from different cultural backgrounds. For example, among adolescents, those most likely to be obese (four to five times more likely) were boys and girls of Pacific Islander or Middle Eastern/Arabic background.(17)

There is also evidence that obesity and overweight is also an issue for Indigenous children.(18, 19) For example, the school-based study conducted by O'Dea in 2006 among 7889 6–11-year-old children across Australia found that obesity rates were higher for Indigenous boys than Anglo/Caucasian boys.(20) Indigenous children and adolescents aged 6–11 years were 1.4 times more likely to be obese than non-Indigenous Australians of the same age group.(20)

Data from 2004–05 for 15–19-year-olds indicate that Indigenous teenagers were more than twice as likely (2.6 times) to be obese as non-Indigenous teenagers. Similar proportions of Indigenous and non-Indigenous teenagers were overweight but not obese.(20)

This study conducted by O'Dea also found that students in the most disadvantaged schools had higher rates of overweight and obesity than students in the least disadvantaged schools. The social gradient was greater for obese children than for overweight (excluding obese) children.(20)

There is some evidence that children from South East Asian backgrounds may have a significantly higher risk of high systolic blood pressure (SBP) with increases in obesity indices compared to those of Australian origin. A study examining the relationship between obesity and blood pressure in school-aged children from South East Asian backgrounds in Sydney found that in nine-year-old children, SBP increased 1.51 mm Hg for each of BMI increase for South East Asian children compared to 1.05 mm Hg for Australian children.(21)

Children's nutrition and physical activity levels

The National Children's Nutrition and Physical Activity Survey was the first national survey of Australian children's nutrient intake since 1995 and the first national children's physical activity survey since 1985.(15) Food, beverage, dietary supplement intake, activity patterns and physical measurements (weight, height and waist circumference) were recorded in 4487 children aged 2–16 years. Key findings included:(15)

- Only 22% of 4–8-year-olds, 14% of 9–13-year-olds and 5% of 14–16-year-olds met the dietary guidelines for vegetable intake.
- A large proportion of children did not meet the recommendations for fruit intake: 61% of 4–8-year-old boys and girls and 51% of 9–13-year-olds met the requirements, compared with only 1% of 14–16-year-olds.
- The majority of children in each age group met the estimated average requirements for all of the assessed nutrients (for example, calcium, protein and iron) except for calcium. The majority (82–89%) of 12–16-year-old girls did not meet the estimated average requirement for calcium.

- The consumption of sodium in all age groups exceeded the recommended upper level of intake.
- Few 9–16-year-olds met the guidelines for electronic media use (around one-fifth). Girls met the guidelines more often than boys, and younger children more often than older children.
- Most 9–16-year-olds met the guidelines for moderate-vigorous physical activity every day. Girls met the guidelines less often than boys and there was a drop-off with age, extremely marked in older girls (13% of 14–16-year-old girls compared with 33% of 9–13-year-olds met the guidelines using the 'all days' method.)

Whether or not children met the guidelines for moderate-vigorous physical activity was assessed in four different ways in this survey. Using the most stringent method (a child meets the guidelines if he or she accumulates at least 60 minutes of moderate-vigorous physical activity on each of the four days sampled), fewer than one-third (32%) of all children (38% of 9–16-year-old boys and 25% of 9–16-year-old girls) met the guidelines. Using other estimates, 58% overall complied (using the proportion who met guidelines on most days) or there was 82% compliance (if children averaged 60 minutes a day over four days).(15)

For free play, sport and active transport, girls reported lower levels of moderate-vigorous physical activity than boys. The results showed that the overall amount of moderate-vigorous physical activity decreased by about 10 minutes per day with each year of age.(15)

Few of the 9–16-year-olds met the guidelines for electronic media use (no more than two hours a day for entertainment). Only 19% or almost one-fifth met the guidelines using the most days method. Girls met the guidelines more often than boys, and younger children more often than older children. The proportion of children who met the guidelines every day out of four days of surveying was only 7%: 4% of 9–16-year-old boys and 9% of 9–16-year-old girls.(15)

3. New studies on the impact of obesity

There is some evidence that more recently born generations are at greater risk of becoming overweight and obese. A study on the 'Age, period and birth cohort effects on prevalence of overweight and obesity in Australian adults from 1990 to 2000' examined the effects of age (20 to 74 years and over), survey period (1990, 1995 and 2000) and birth cohort (in five-year periods from 1915 and earlier to 1976–80) on the prevalence of self-reported overweight and obesity in Australian adults between 1990 and 2000.The prevalence of combined overweight/obesity increased with age, recency of survey period and with cohorts born since 1960. While most of the findings were demonstrated for both men and women, for overweight/obesity combined the overall effect of birth cohort was significant among women but not men.(22)

There is increasing evidence of comorbidities associated with overweight and obesity. A recent study found that both overweight and obesity are associated with the incidence of multiple comorbidities, including type II diabetes, cancer and cardiovascular diseases. Maintenance of a healthy weight could be important in the prevention of the large disease burden in the future.(23)

A review of recent data on the prevalence, severity and racial/ethnic differences in childhood obesity found obesity to be associated with significant health problems in the paediatric age group and to be an important early risk factor for much of adult morbidity and mortality. The authors noted that many obese children and adolescents already manifest some metabolic complications, and that these children are at high risk for the development of early morbidity.(24)

Obesity and life expectancy

A range of studies indicate a link between life expectancy and overweight and obesity prevalence. For example, estimates based on Australian data indicate that life expectancy at age 20 is about one year less among overweight Australian adults compared with Australians within the healthy weight range, and an average of around four years lower for obese Australian adults. The largest ever investigation of how obesity affects mortality analysed the link between weight and longevity in nearly 900,000 people internationally, and found that moderately obese people (BMI of between 30 and 35) died 2–4 years earlier than those with an ideal weight. A BMI of 40–45 reduced life expectancy by 8–10 years, comparable with the effects of lifelong smoking.(25) Similarly, other research estimating the impact of obesity on life (from age 40) found a mean loss of seven years associated with obesity – similar to the life expectancy loss from smoking.(26)

Recent work commissioned by the Taskforce indicates that if current trends in overweight and obesity continue, there will be approximately 1.75 million deaths at ages 20+ years and 10.3 million premature years of life lost (PYLL)[1] at ages 20–74 years caused by overweight/obesity in Australia in 2011 to 2050.(27) Each Australian aged 20–74 years who dies from overweight/obesity in 2011 to 2050 will lose, on average, 12 years of life before the age of 75 years.

Stopping the increase would save half a million lives: if current trends are halted and overweight/obesity levels are stabilised at 2005 levels, there will be around 1.25 million deaths

1 The person-years of life lost as a result of exposure of the population to a particular condition, in this case overweight/obesity.

at ages 20+ years. For each additional 1% proportional reduction in overweight/obesity that can be achieved beyond a stabilisation at 2005 prevalences, around an additional 10,000 deaths and 60,000 PYLL will be prevented.(27)

Obesity and diabetes

Obesity has been disproportionately prevalent among women and minorities, accompanied by an increased risk for diabetes mellitus (DM). Women have experienced an increased risk for metabolic syndrome, DM and cardiovascular disease after onset of menopause. Maternal obesity has been a risk factor for gestational diabetes mellitus (GDM). Obesity and DM represent crises for the healthcare system and the health of the public, incurring costs and disease burden for adults and children, with increasing costs and prevalence expected unless more coordinated efforts to address the causes of these conditions at the national level are implemented. An investment in infrastructure to promote increased physical activity and reward weight management may be budget neutral in the long term by reducing the costs of morbidity and mortality. About two-thirds of the costs from DM complications could be averted with appropriate primary care.(28)

Obesity and cancer risk

In November 2007, the 'Second Expert Report on Food, Nutrition, Physical Activity and the Prevention of Cancer: A global perspective' was launched. This is the most current and comprehensive analysis of the literature on diet, physical activity and cancer, building on the foundation established by the World Cancer Research Fund International (WCRF) in the 1980s to analyse, interpret and make public the available scientific evidence to help individuals reduce their risk of developing cancer. The Second Expert Report was commissioned and funded by the WCRF and the American Institute for Cancer Research (AICR), with the content driven by an independent panel of 21 world-renowned scientists.(29)

The main focus of the Second Expert Report is on nutritional and other biological and associated factors that modify the risk of cancer. However, it was recognised that the risk of cancer and other diseases is also modified by social, cultural, economic and ecological factors. That is, the food and drink that people consume are not purely because of personal choice, and similarly opportunities for physical activity can be constrained.

For this reason, a companion report, 'Policy and Action for Cancer Prevention', was published in February 2009,(30) which identifies a wider range of policy recommendations and options. This report provides advice and guidance on what can be done to influence and change the lifestyle choices that people make, as they relate to their risk of cancer. The report sets out changes that can be made at all levels of society to reduce the number of cancer cases.

The Expert Report concludes that there is convincing evidence that excess body fat increases risk of cancers of the bowel, oesophagus, pancreas, kidney, endometrium and breast (in postmenopausal women). Being overweight also probably increases the risk of gallbladder cancer. The report recommends being as lean as possible within the normal range of body weight across the life course, and cites maintenance of a healthy weight throughout life as possibly one of the most important ways to protect against cancer. Being physically active as part of everyday life is recommended, as all forms of physical activity protect against some cancers, as well as against weight gain, overweight and obesity. Correspondingly, sedentary ways of life are a cause of these cancers and of weight gain, overweight and obesity. Weight gain, overweight and obesity are also causes of some cancers independently of the level of physical activity.

The Expert Report(29) recommends limiting the consumption of energy-dense foods and avoiding sugary drinks, with the main purpose of the recommendation to prevent and to control weight gain, overweight and obesity.

The evidence shows that it is not specific dietary constituents that are problematic, so much as the contribution these make to the energy density of diets. The report also recommends eating mostly foods of plant origin, and that these probably protect against weight gain as they are typically low in energy density. Other recommendations include limiting intake of red meat and salt, and avoiding processed meat.

The recommendations contained in the companion report(30) included the following statements:

Action is needed:

> ***'Incidence and trends of cancer, and of obesity – a cause of a number of cancers – now amount to a global public health crisis. While there is more to be learned about the causes of cancer and of obesity, enough is known to justify policies and actions at all levels from international to personal.'***

The public health approach:

> ***'Public health is a public good, requiring protection that needs leadership and concerted and determined action across many sectors taken at all levels. Citizens have a right to expect that decisions determining availability of foods and drinks and opportunities for physical activity in any societal sector are taken with public health as a top priority.'***

Women and weight gain

Women aged 25–45 years represent a high risk group for weight gain, and those with children are at increased risk because of weight gain associated with pregnancy and subsequent lifestyle change. An Australian study investigated the baseline weight-related behaviours and feasibility of recruiting and delivering a low-intensity self-management lifestyle intervention to community-based women with children in order to prevent weight gain, compared to standard education.

The recruitment and delivery of the cluster-randomised controlled intervention was in conjunction with 12 primary (elementary) schools. Nearly all women (90%) reported being dissatisfied with their weight and 72% attempted to self-manage their weight. The women were more confident of changing their diet (mean score 3.2) than physical activity (mean score 2.7). This population perceived they were engaging in prevention behaviours, with 71% reporting actively trying to prevent weight gain, yet they consumed a mean of 68g fat per day (SD30g) and 27g saturated fat per day (SD12g), representing 32% and 13% of energy respectively. The women had a high rate of dyslipidemia (33%) and engaged in an average of 9187 steps per day (SD 3671).

The study concluded that delivery of a low-intensity intervention to a broad cross-section of community-based women with children is feasible. Women with children are engaging in lifestyle behaviours which do not confer adequate health benefits. They appear to be motivated to attend prevention programs by their interest in weight management. Interventions are required to strengthen and sustain current attempts at achieving healthy lifestyle behaviours in women to prevent weight gain.(31)

While physical activity is important for the health of all individuals, the determinants of physical activity behaviour for women who are overweight remain largely unexplored. A preliminary analysis of barriers, intentions and attitudes towards moderate physical activity in a small group of overweight women explored a range of factors influencing participation in physical activity for the women.(32) The 30 participants were aged 25–71 years, with a mean age of 46.8 years and an average BMI of 31.2 (+5.6). Self-reported level of physical activity, perceived barriers and facilitators of physical activity, attitudes, intentions and perceived behavioural control to physical activity were measured.

Seventeen participants were generally active, with self-reported moderate physical activity of 218.53 minutes in the last seven days, whereas 13 participants reported being less active (43.46 minutes). Active participants were more likely to identify social reasons for participating in physical activity, while inactive participants perceived that their laziness prevented them from being physically active. There were no significant differences between active and inactive overweight women in attitude, intention or subjective norm for moderate-intensity physical activity. There was a significant difference between these women in perceived behavioural control for moderate-intensity physical activity: women who felt more in control of their physical activity behaviour were more likely to engage in physical activity than inactive women.

The authors concluded that future research should investigate interventions to increase behavioural control of moderate-intensity physical activity in women who are overweight.(32)

4. New initiatives for obesity prevention and control

UK experience: Change4Life and other initiatives

While small changes may lead to a significant public health impact across the whole population, the community still requires assistance from government and industry to make healthier choices.

The United Kingdom's Change4Life initiative, which commenced in January 2009, is a multi-pronged approach to encourage behaviour change within the entire population, with strategies including an advertising campaign, website, resources and partnership opportunities where healthy messages and the Change4Life brand are promoted to encourage people to eat well, move more and live longer[2]. The campaign also includes a children's health survey.

With the focus on long-term prevention, the initiative aims to target the issue of obesity by highlighting to parents the links between poor diet and sedentary lifestyles and preventable illnesses, as well as their responsibility to ensure their children eat better and are physically active regularly. The initial target is families with young children (aged 0–11). The initiative will establish national, regional and local partners with healthcare professionals, teachers, charities, government agencies, the media, big businesses and community organisations. It supports the United Kingdom's overall obesity strategy *Healthy Weight, Healthy Lives* and links into the National Child Measurement Programme. The campaign is expected to cost £75 million over three years.(33)

Financial incentives to help individuals

Financial incentives (including payments and vouchers) for individuals to achieve sustained weight loss and adopt healthy eating and physical activity behaviours are included in the United Kingdom's cross-government strategy *Healthy Weight Healthy Lives*. For example, the *Well @ Work* program (led by the British Heart Foundation with funding from Active England and the Department of Health) is a £1.5 million, two-year program to pilot ways to make England's workplaces healthier.[3] The program has included weight loss competitions offered to employees with rewards of fruit baskets and trophies to teams and store gift vouchers to individuals.

Another scheme aimed at overweight people is being trialled in the United Kingdom by a private health firm for 400 people, with National Health Service backing and funding. Under the scheme, overweight people would sign up to a 13-month slimming program and be paid only if they completed it. They would have seven months to get down to their target weight and would have their weight checked monthly at their GP's surgery or health clinic. Six months later, they would have to show that they had not put on weight. Payments would increase with the amount of weight lost: a loss of 23kg would be rewarded with the maximum amount of £425 ($865); 13.5kg weight loss would be rewarded with £160, and 7kg with £70[4].

2 See www.dh.gov.uk/en/News/Currentcampaigns/Change4Life/DH_092080.

3 See www.bhf.org.uk/thinkfit/index.asp?SecID=1590&secondlevel=1593.

4 See www.smh.com.au/world/rolls-of-fat-can-lead-to-rolling-in-the-money-20090413-a4t7.html.

In a range of UK cities, the Department of Health has been funding subsidised gym memberships since April 2009 for 16–22-year-olds who regularly go to the gym over a 12-month period. The pilot will look at the effect that a financial incentive has in recruiting, retaining and affecting behaviour change in young people who are at risk of inactive lifestyles. The Department of Health is commissioning a national evaluation of such incentive schemes (of which there is a range being introduced in the United Kingdom).(34)

US initiative: a partnership to tackle childhood obesity

In February 2009, the US Alliance for a Healthier Generation, a joint initiative of the American Heart Association and the William J. Clinton Foundation, announced the formation of the Alliance Healthcare Initiative, a collaborative effort with national medical associations, leading insurers and employers to offer comprehensive health benefits to children and families for the prevention, assessment and treatment of childhood obesity.

The goal of the initiative is to reimburse health professionals for the provision of obesity-related care and nutrition counselling, and to provide parents with educational and nutritional information for fighting childhood obesity.

Through the program, visits to doctors and registered dietitians will be provided to children as part of their health insurance benefits. The Alliance Healthcare Initiative will also educate parents about childhood obesity and the expanded services available to children as part of the initiative. Doctors will be reimbursed for bringing children back for follow-up visits and for working with them on the adoption of healthy behaviours, while registered dietitians will be reimbursed for providing in-depth nutrition counselling over multiple visits to those children referred by their doctors.

Participating companies will have access to materials and resources developed by the Alliance to inform parents about childhood obesity prevention and treatment. Several health insurance organisations and major corporations are participants, while the American Academy of Pediatrics and the American Dietetic Association will assist clinicians provide education, improve care coordination, offer resources to eligible families, and help with recruitment of medical professionals. The initiative represents the first time a group of organisations such as this has worked together to provide children with insurance coverage to address obesity, as well as the first time outcomes will be monitored to ensure the benefits are being used.(35)

Improving diets and changing the food supply

There are numerous potential dietary health benefits in reducing salt, saturated fat and sugar consumption, including a reduction in mortality and morbidity linked to high consumption of these nutrients. Analyses conducted in the United Kingdom by the Food Standards Agency (FSA) and the Department of Health have estimated cancer risk reductions through increased fruit consumption in childhood, as well as the number of deaths that could be prevented annually by a unit reduction in salt, saturated fat and sugar. A change in children's diets extrapolated into adulthood could prevent over 50,000 deaths annually in the United Kingdom (or around 5000 deaths annually if the policy were 10% successful).(36)

- An increase of 100g in the childhood daily intake of fruit equates to an annual prevention of 31,050 adult deaths due to cancer.
- An approximate 6.25% reduction in food energy intake for non-milk extrinsic sugars (NMES) would save 12,500 lives.
- An average daily reduction of 0.9g in a child's salt intake extrapolated to the adult population would equate to an annual prevention of 6050 deaths.
- 1550 lives would be saved from a 1% reduction in saturated fat.

Table 1 Illustration of the numbers of deaths which could be prevented by a reduction in salt, saturated fat and sugar and through increased fruit intake (36)

	Deaths prevented for 100% policy success	Deaths prevented for 10% policy success
Reduction of 0.9g of salt	6,050	605
Reduction of 1% in saturated fat	1,550	155
Reduction of 1% for NMES	12,500	1,250
Increase of 100g of fruit	31,050	3,105
Total deaths prevented	**51,150**	**5,115**

The benefits to the public health of the United Kingdom of achieving recommended levels of consumption of fruit and vegetables, saturated fat, salt and added sugar are potentially as great as £20 billion a year in terms of quality-adjusted life-years.(37) Almost 70,000 premature deaths could potentially be prevented each year if UK diets matched nutritional guidelines, more than 10% of current annual mortality. For example, reaching the target for everyone to consume five portions of fruit and vegetables per day could see 42,000 premature deaths a year avoided (compared to 20,200 for salt and 3500 for saturated fat targets).(37)

Update on the UK Food Standards Agency initiative to reduce population salt intake

As described in the Technical Report, the UK FSA set voluntary targets for the level of salt in 85 categories of food in March 2006, involving around 70 firms and trade associations, and a broad range of products. The Agency made a commitment to review the targets in 2008 to formally assess progress and to establish what further reductions were necessary to maintain progress towards the 6g daily intake target.

In May 2009 the UK FSA published revised salt reduction targets for 2012, for 80 categories of foods. These are more challenging than the previous targets for 2010.(38)

Outcomes of meetings held in early 2008 (at which industry was asked to report on progress towards achieving the targets, any significant challenges experienced and what further levels of salt reduction might be achieved) were used to help the FSA develop proposals for revised targets, together with data on the levels of salt in food on the market in 2007 and current intakes, expert advice on technical and safety issues, and ongoing research.(38)

The revised targets have been set at challenging levels that will have a real impact on consumers' intakes, while taking into account the reductions that have already been achieved by the industry and technical and safety issues. Targets were set considering and reflecting reductions that had already been achieved by industry. These include:(38)

- The average amount of salt found in branded pre-packed, sliced bread has been reduced by around one-third.
- Reductions in salt of about 44% have been achieved in branded breakfast cereals.
- Reductions of between 16% and 50% have been achieved in some top-selling cakes and biscuits between 2006 and 2007.
- Reductions in the snack sector; for example, 13% reduction of salt in standard crisps in 2007.
- Reductions in processed cheese products of 21–50%.
- Reductions among a wide range of own-brand products for the United Kingdom's major retailers: some have met the 2010 targets ahead of time in most or all of their products, and one retailer is using the original 2010 targets as maximum salt levels for all relevant products.

The FSA has stated that developments in food technology – including alternatives to salt and other sodium-based ingredients, manufacturing and distribution chain processes, and acceptable food safety testing – will all be necessary to ensure further progress, as will rebalancing product

flavours to maintain consumer acceptability. The FSA has acknowledged that the current economic climate may make it more difficult for companies to fund this kind of work. It has reiterated its commitment to working in partnership with stakeholders to review barriers and solutions to achieving the targets and the timescales proposed, including providing ongoing support through research and dissemination of the results of research.(38)

The Agency plans to next review progress towards the end of 2010, and then every two years. Monitoring of salt intakes in the United Kingdom will continue and will be carried out through urinary sodium surveys undertaken as part of the new rolling program of the National Diet and Nutrition Survey, which began fieldwork in April 2008. The method used for collecting and analysing the samples will be comparable with previous surveys. The first set of results will be available at the same time as the results of the next review of industry progress.(38)

Soft drinks and obesity

At the same time as obesity rates have increased, a steep increase in consumption of soft drinks has been seen. In the United States, soft drink consumption has tripled in recent decades, paralleling the dramatic increases in obesity prevalence.

Several countries have targeted taxation policies on widely available popular foods and beverages such as soft drinks, which are inherently high in energy and empty of any important nutrients. Results of a meta-analysis found that the intake of sugared beverages displaces the consumption of healthier beverages, and is associated with higher body weight and poor nutrition.(39) In addition, the risk of obesity and diabetes increases with rising intake. Drinks such as soft drinks that are rich in sugars (both added and natural) have also been shown to reduce appetite control, leading to increases in weight gain and increased risk of obesity.(40) Increased liquid carbohydrate consumption is not accompanied by a reduction in solid food consumption;(40) in fact, soft drink intake has been identified in a range of research as a key contributor to increasing levels of overweight and obesity,(39) as well as increased rates of dental decay.(41)

A clinical review by Wolff and Dansinger published in 2008 evaluated the extent to which current scientific evidence supports a causal link between sugar-sweetened soft drink (SSD) consumption and weight gain. (42) Six of 15 cross-sectional and six of 10 prospective cohort studies identified statistically significant associations between soft drink consumption and increased body weight. There were five clinical trials; the two that involved adolescents indicated that efforts to reduce SSD consumption slowed weight gain. In adults, three small experimental studies suggested that consumption of SSD caused weight gain; however, no trial in adults was longer than 10 weeks or included more than 41 participants. The authors concluded that observational studies support the hypothesis that SSD consumption causes weight gain; they also called for more clinical trials to clarify the specific effects of SSD on body weight and other cardiovascular risk factors.(42)

Gibson completed a systematic review re-examining the evidence on SSD and obesity from epidemiological studies and interventions up to July 2008.(43) Forty-four original studies (23 cross-sectional, 17 prospective and four interventions) in adults and children, as well as six reviews, were identified. These were critically examined for methodology, results and interpretation. Approximately half the cross-sectional and prospective studies found a statistically significant association between SSD consumption and BMI, weight, adiposity or weight gain in at least one subgroup. The majority of evidence was dominated by American studies in which SSD consumption tends to be higher and formulations different. Most studies suggest that the effect of SSD is small except in susceptible individuals or at high levels of intake. Methodological weaknesses meant that many studies could not detect whether soft drinks or other aspects of diet and lifestyle have contributed to excess body weight.

The authors concluded that progress in reaching a definitive conclusion on the role of SSD in obesity is hampered by the paucity of good-quality interventions which reliably monitor diet and lifestyle and adequately report effect sizes. Of the three long-term (>6 months) interventions, one reported a decrease in obesity prevalence
but no change in mean BMI, while two found a significant impact only among children already overweight at baseline. Of the six reviews, two concluded that the evidence was strong, one that an association was probable, while three described it as inconclusive, equivocal or near zero.(43)

A literature review on associations between intake of calorically sweetened beverages and obesity relative to adjustment for energy intake found that the majority of the prospective studies found positive associations between intake of calorically sweetened beverages and obesity. The authors concluded that a high intake of calorically sweetened beverages can be regarded as a determinant for obesity.(44)

Removing soft drinks from schools

In 2006, former President Bill Clinton and the American Heart Association (through a partnership launched in 2005, the Alliance for a Healthier Generation) brokered a deal with the beverage industry in the United States, removing most soft drinks from almost every US primary and secondary school by the 2009–10 school year.[5] Following the introduction of the agreement, the level of calories due to beverages delivered to schools in the 2007–08 school year decreased by 58%.(45) Under further agreements with the Alliance involving more than 30 companies and trade associations in the beverage, food and dairy industries, there has been a 41% decrease in calories shipped to school vending machines.[6]

Pricing and taxation policies

Pricing policies are a potential policy instrument to address the increasing prevalence of obesity. A recent comprehensive review of evidence on the effects of food prices on weight outcomes examined whether altering the cost of unhealthy, energy-dense foods compared with healthy, less-dense foods through the use of fiscal pricing (tax or subsidy) policy instruments would, in fact, change food consumption patterns and overall diet enough to significantly reduce individuals' weight outcomes.(46)

The review examined empirical evidence regarding the food and restaurant price sensitivity of weight outcomes in peer-reviewed English-language articles published between 1990 and 2008. When statistically significant associations were found between food and restaurant prices (taxes) and weight outcomes, the effects were generally small in magnitude, although in some cases they were larger for low SES populations and for those at risk for overweight or obesity. The authors found the evidence supported a multi-pronged approach to changing prices – that is, taxing unhealthy foods and subsidising healthier products.

The review concluded that fiscal policies could be used to improve weight outcomes, noting that substantial price changes are required to ensure significant improvements. Small taxes on unhealthy foods or small subsidies applied to healthy food products were unlikely to be associated with substantial reductions in BMI or obesity rates. Importantly, these effects were particularly likely to be observed among populations of low SES, those most at risk for overweight, and children and adolescents. The authors also concluded that, while price interventions might only affect individual behaviour to a small degree, if applied broadly these policies had a potentially large population-level impact.(46)

5 See www.parentsjury.org.au/tpj_browse.asp?ContainerID=soft_drink_ban_in_us_schools.

6 See www.clintonfoundation.org/what-we-do/alliance-for-a-healthier-generation/what-we-ve-accomplished.

In the United States, soft drink taxes have been introduced by individual states to reduce consumption, raise revenue and improve public health (as the taxes have been extremely low, impacts on health would not be expected to be large). During the 1990s, around half of all states taxed soft drinks and 20 states changed their soft drink tax rate. An evaluation of the impact of changes in state soft drink taxes on BMI indicated that soft drink taxes modestly reduced BMI. The impact varied across demographic groups. The results were extrapolated to conclude that if the soft drink tax was as high as cigarette tax, the proportion of obese adults would decrease by nearly 1 percentage point.(39) Using taxation revenue from a tax on sugared beverages to subsidise healthy foods has been described as the most 'defensible' approach, countering any regressive effect of the tax and demonstrating to consumers the association between tax and benefit.(47)

In Denmark, it has been estimated that the population's diet would be consistent with national guidelines if tax exemptions for 'healthy' products such as fruit, vegetables, rice, pasta and fish products were combined with a 30% tax increase on 'unhealthy' products.(48) In February 2009, the Danish Government announced extensive restructuring of its income tax system. While the reform will result in a deficit in the short term in order to stimulate the economy, the government plans to generate additional revenues through increasing taxation on unhealthy lifestyles. Under the government's proposals, pollution, cigarettes and unhealthy food (foods and drinks with a high sugar and fat content) will be subject to higher taxation. Ice cream, candy and chocolate will see a duty increase of 25%, while saturated fats in dairy products and oils will be levied at 20 kroner per kilo.[7]

Forty states in the United States have small taxes on sugared beverages and snack foods.(47) Large taxes on sugared beverages have been proposed in Maine and New York (NY) State; in New York, for instance, an 18% tax on non-diet soft drinks has been proposed for implementation in June 2009. While the tax is part of the state's strategy to tackle childhood obesity, it has also been cited as one component of a raft of measures to address the state's projected budget shortfall of US$14 billion.(49) It has been estimated that a tax of a penny per ounce could reduce consumption by more than 10% and raise US$1.2 billion a year in New York State alone.(47) There is significant community support for the introduction of a tax (52%) among New Yorkers, rising to 72% if taxation revenue were to be used for obesity prevention.(47)

To counter the inequitable impact of taxes on unhealthy foods, it has been proposed that any such taxes be introduced in combination with subsidies or tax reductions for healthier options,(49) particularly if it was possible to target these to low-income households.(46) For example, Denmark is considering the exemption of healthier food products from a national value added tax of 25% on all foods.(49) The US Department of Agriculture Economic Research Service has estimated that providing a price discount on fruit and vegetables for low-income Americans would have a small but statistically significant positive effect on consumption. The study concluded that a 10% subsidy would increase low income earners' fruit intake by 2.1–5.2% and vegetable intake by 2.1–4.9%. The study also concluded that these increases would not result in low income earners meeting recommended levels of consumption for fruit and vegetable, however.(50)

7 Seewww.cphpost.dk/culture/denmark-through-the-looking-glass/44873.html?task=view;www.forbes.com/feeds/reuters/2009/03/01/2009-03-01T182848Z_01_L1437267_RTRIDST_0_DENMARK-TAXES.html; www.lawandtax-news.com/asp/story.asp?storyname=35321.

Food subsidies

International examples of food subsidy programs and equitable access to healthy foods

Local community-based initiatives can promote equitable access to healthy food. In Thailand, the major food and small goods market in the city of Sam Chuk was restored with the help of local intersectoral action including community architects, supporting local traders and tourism.(51) The London Development Agency plans to establish a sustainable food distribution hub to supply independent food retailers, restaurants and city-based institutions.(51)

US food subsidies for low income earners

Low-income individuals and families in the United States can access subsidised food through several programs, including the federal *Food Stamp Program (Supplemental Nutrition Assistance Program* or SNAP, run by the Department of Agriculture); the *Women, Infants and Children (WIC) Supplemental Nutrition Program*; the *Child and Adult Care Food Program*; and the *National School Lunch and Breakfast Programs*.(46)[8]

Funding of US$20 million has been provided through the 2008 Farm Bill for a project to examine point-of-purchase incentives for healthy foods through SNAP.[9] In addition, under recently introduced legislation in California, a *Healthy Purchase* pilot program will target SNAP subsidies: for each dollar of food stamps spent on fresh produce, participants will be subsidised a portion of the cost.(46)

The Farmers' Market Nutrition Program (FMNP),[10] associated with the WIC, was established by Congress in 1992 to provide fresh, unprepared, locally grown fruits and vegetables to WIC participants, and to expand the awareness, use of and sales at farmers' markets. FMNP is administered through a federal/state partnership in which the Food and Nutrition Service (FNS) provides cash grants to state agencies including agriculture or health departments. WIC participants are issued FMNP coupons in addition to their regular WIC food instruments. These coupons can be used to buy fresh, unprepared fruits, vegetables and herbs from state agency-approved farmers, farmers' markets or roadside stands, and farmers then submit coupons for reimbursement.[11]

Nutrition education is provided through both the SNAP and WIC programs. There are some restrictions on the types of foods and products which may be purchased through the SNAP (for example, alcohol, tobacco and pet food are excluded). Federal regulations specify minimum nutritional requirements for WIC-eligible foods, which include juice, iron-fortified cereal, eggs, cheese, milk, peanut butter, dried beans or peas, iron-fortified infant formula, tuna and carrots. Foods in the program are high in one or more of the nutrients shown to be lacking in the diets of the population WIC serves.

UK food voucher system

The Healthy Start program in the United Kingdom[12] provides eligible low-income pregnant women and parents/carers of children under the age of four with vouchers to exchange for fresh fruit and other products.(52)

Food marketing to children

As discussed in the Technical Report, the most authoritative and comprehensive reviews of studies on the nature and extent of food marketing to children have been conducted in the United Kingdom, initially in 2003,(53) updated in 2006(54) and in 2008 (unpublished).(55) This work reviewed studies on the extent and nature of food marketing to children from over 25 countries. These reviews and updates indicate that children are exposed to high

8 See www.fns.usda.gov/fsp/.

9 See www.fns.usda.gov/fsp/rules/Legislation/about.htm.

10 See www.fns.usda.gov/wic/FMNP/FMNPfaqs.htm.

11 See www.fns.usda.gov/wic/FMNP/FMNPfaqs.htm.

12 See www.healthystart.nhs.uk/.

levels of food advertising and marketing, and that the advertised diet is dramatically different from recommended diets, as it predominantly promotes energy-dense nutrient-poor (EDNP) foods. These findings are consistent with evidence from the work conducted by the Institute of Medicine in the United States,(56) as covered in the Technical Report.

There is a substantial and accumulating body of Australian research on food marketing patterns, including studies related to television, magazines, the internet, outdoor settings and point-of-sale.(57-66) This research indicates that food marketing is pervasive, and that children are exposed to high levels in each of these media throughout daily life. The research shows consistently that the content of food marketing directed at children is predominantly for unhealthy foods.

Restrictions on unhealthy food advertising targeted at children and others are proposed as part of a comprehensive approach and only one of a large range of measures required to address obesity. While current evidence is not sufficient to assess the impact of comprehensive advertising restrictions on obesity prevalence in children, especially in conjunction with public education (as this has not occurred in any jurisdiction), even a small association between television advertising and adiposity means limiting advertising would have significant impact across the entire population of children and young people.(56) Small influences can be significant when they affect a large population, are ongoing and cumulative. It is important to note that food marketing has as much impact on food consumption as any other single factor, and is amenable to change.(67, 68)

Persuasive marketing techniques are frequently used to advertise non-core foods to children, as well as to promote children's brand recognition and preference for advertised products. Recent Australian research examined children's exposure to the use of persuasive marketing within television food advertisements. (69) Advertisements broadcast on all three commercial Australian television channels were recorded for an equivalent one-week period in May 2006 and 2007 (714 hours). Food advertisements were analysed for their use of persuasive marketing, including premium offers, such as competitions, and the use of promotional characters, including celebrities and cartoon characters. Advertised foods were categorised as core, non-core or miscellaneous foods. Commercial data were purchased to determine children's peak viewing times and popular programs. A total of 20,201 advertisements were recorded, 25.5% of which were for food.(69)

The study found that significantly more food advertisements broadcast during children's peak viewing times contained promotional characters and premium offers, compared with food advertisements during non-peak times. During programs most popular with children, there were 3.3 non-core food advertisements per hour containing premium offers, compared with 0.2 per hour during programs most popular with adults. The majority of advertisements containing persuasive marketing during all viewing periods were for non-core foods.(69)

Future debate relating to television advertising regulations must consider the need to restrict the use of persuasive marketing techniques to children, including premium offers such as competitions, and the use of promotional characters such as celebrities and c artoon characters.

Food marketing is linked to childhood obesity through its influence on children's food preferences, purchase requests and food consumption. A study by Kelly, Cretikos, Rogers and King aimed to describe the volume and nature of outdoor food advertisements and factors associated with outdoor food advertising in the area surrounding Australian primary schools. Forty NSW primary schools in Sydney and Wollongong were selected using random sampling within population density and socioeconomic strata. The area within a 500-metre radius of each school was scanned and advertisements coded according to pre-defined criteria, including food or non-food



product advertisement, distance from the school, size and location. Food advertisements were further categorised as core foods, non-core foods and miscellaneous drinks (tea and coffee). The number of advertisements identified was 9151, of which one-quarter (25% or 2286) were for food.

There were 1834 non-core food advertisements: this accounted for 80% of food advertisements. Soft drinks and alcoholic beverages were the food products most commonly advertised around primary schools (24% and 22% of food advertisements, respectively). Non-core food products were twice as likely to be advertised close to a primary school (95 non-core food advertisements per square kilometre within 250 metres compared to 46 advertisements per square kilometre within 250–500 metres). The authors concluded that the density of non-core food advertisements within 500 metres of primary schools, and the potential for repeated exposure of children to soft drink and alcoholic beverage advertisements in particular, highlights the need for outdoor food marketing policy intervention. The authors argued that outdoor advertising is an important food marketing tool that should be considered in future debates on the regulation of food marketing to children.(66)

A 2009 review of existing knowledge regarding the impact of marketing addressed the value of various legal, legislative, regulatory and industry-based approaches to change.(70) While reducing food marketing to children has been proposed as one means for addressing the global crisis of childhood obesity, there are significant barriers (social, legal, financial and public perception) associated with this. According to the authors, scientific literature documents that food marketing to children is:

(a) Massive

(b) Expanding in number of venues (product placements, video games, the internet, mobile telephones)

(c) Composed almost entirely of messages for nutrient-poor, calorie-dense foods

(d) Having harmful effects

(e) Increasingly global and therefore difficult to regulate by individual countries

The food industry, governmental bodies and advocacy groups have proposed a variety of plans for altering the marketing landscape.(70)

A recent publication in the *European Journal of Public Health* reported on a mathematical simulation model that estimated the potential effects of reducing the exposure of 6–12-year-old US children to television food advertising on the prevalence of overweight and obesity.(71)

The study concluded that from one in seven up to one in three obese children in the United States might not have been obese in the absence of advertising for unhealthy food on television: reducing the exposure to zero would lower the prevalence of obesity from 17.8% to 15.2% for boys and from 15.9% to 13.5% for girls. This study provides support for limiting the exposure of children to marketing of energy-dense food as a part of a comprehensive approach to improving children's diets.(71)

The UK experience

Previously in the Technical Report we reported on the phasing in of restrictions on the advertising of food products high in fat, salt and sugar (HFSS products) to children in 2007 in the United Kingdom by the UK's broadcasting regulator Ofcom. In summary, HFSS advertisements were banned from children's programming (aimed at children aged under 16 years) on most television channels, and progressively reduced on children's channels.

The first review of these restrictions compared children's exposure to HFSS advertising in 2005 with July 2007–June 2008.(72) The review estimated that over this period the amount of HFSS advertising seen by children on television fell by 34%. Children were also reportedly exposed to less food and drink advertising using licensed characters such as cartoon and film characters; there were fewer advertisements with brand equity characters, free gifts and health claims, but more with celebrities.

Ofcom expects further reductions in children's exposure to advertising to have occurred since the implementation of the final phase of restrictions in January 2009, when all remaining HFSS advertising on children's channels (on Pay TV) was required to be removed.

The review also found that much of the HFSS advertising seen by children is broadcast between 6 pm and 9 pm. While the amount children saw in this period fell by an estimated 29%, the British Heart Foundation and other health and consumer groups have called for full bans due to limitations of the current regulations, which apply to programs aimed at under-16s rather than programs most popular with under-16s.[13] The UK regulations are based on children as a proportion of the audience, and do not apply at times when the largest absolute numbers of children are watching. Programs with a small total audience, of which a high relative proportion are children, would be covered by the regulations, while a program with a large total viewing audience, with higher absolute numbers of children viewing but a relatively lower proportion of children compared to adults, would not be covered. A large number of children therefore are still exposed to food marketing on television(73), despite the specific intent of the restrictions to limit such exposure.

While children's channels in the United Kingdom saw a decline in food and drink advertising revenue, this was more than offset by a growth in advertising revenue overall. The four main commercial channels saw an overall reduction in advertising revenues, with a 6% decline in food and drink advertising revenue. Most other digital commercial channels increased their revenue from food and drink advertising, and children's exposure to HFSS advertising was increased by 7% on these channels.(72) This highlights the importance of applying restrictions across media, including free-to-air and Pay TV, as the latest Ofcom restrictions have been doing since 1 January 2009.

Voluntary regulation in Australia

In October 2008, the Australian Food and Grocery Council (AFGC) announced the Responsible Children's Marketing Initiative of the Australian Food and Beverage Industry to 'address community concerns about inappropriate advertising' to children.(74) The initiative was developed in collaboration with the Australian Association of National Advertisers (AANA) as part of the system of advertising and marketing self-regulation in Australia.(75) The initiative commenced on 1 January 2009. Monitoring of food and beverage advertising to children over a period of 12 months from the commencement of this initiative is to be undertaken through a study commissioned by the AFGC, to be repeated periodically.(75) The study's aim is to measure the industry's response, determine the nature of improvements in performance and to report on the findings.

The initiative is voluntary: 15 member organisations of the AFGC were signed up as of 4 June 2009[14]. The core principles to which participating companies must commit include:(75)

- Participants will not advertise food and beverage products to children under 12 in media unless the products represent healthy dietary choices, consistent with established scientific or Australian Government standards; AND the advertising and/or marketing communication activities reference, or are in the context of, a healthy lifestyle, designed to appeal to the intended audience through messaging that encourages good dietary habits (consistent with established scientific or government criteria) and physical activity.

13 For example, see www.telegraph.co.uk/health/healthnews/3812954/Call-for-full-ban-on-junk-food-adverts-for-children-after-Ofcom-says-part-ban-is-working.html.

14 Companies sign up to the initiative as a minimum commitment and must publish individual *Company Action Plans* outlining how they will meet the initiative's core principles. See AFGC website for Company Action Plans at www.afgc.org.au/index.cfm?id=771 (Accessed 4 June 200).

- Other core principles relate to the use of popular personalities and licensed characters; product placement; use of products in interactive games; advertising in schools; and the use of premium offers.

Limitations of the initiative include:(75)

- Its voluntary nature.
- The lack of specific nutrient criteria to define healthy dietary choice foods and beverages (products covered by the code are as defined by individual participating organisations, making monitoring difficult).
- While sanctions, complaints and compliance systems are to be developed, including a public complaints program, there are no specified deterrents to ensure food companies will comply with the code.
- The code does not cover food marketing on food companies' own websites, only paid advertising on third-party websites.
- Specific times/program types when the code applies are not specified, and are to be interpreted by individual companies. The AFGC has specified definitions for *Advertising or Marketing Communications to Children* (for example, as defined by the AANA Code for Advertising and Marketing Communications to Children – advertising or marketing communications which, having regard to the theme, visuals and language used, are directed primarily to children) and definitions for *Media* (television, radio, print, cinema and third-party internet sites where the audience is predominantly children and/or having regard to the theme, visuals and language used are directed primarily to children). However, in some of the participating company's action plans, 'targeting children under 12 years' on television is defined to be when the majority of the audience is under 12 years, which is extremely rare.[15]

Australian Communications and Media Authority (ACMA) review of the Children's Television Standards (CTS)

Since the original Technical Report which described the ACMA review of the CTS (which regulate the content of children's programs and advertising during designated children's viewing times on commercial free-to-air television) there has been no further update of the standards. The final CTS are expected to be gazetted in mid-2009.[16]

The Taskforce also considered a review commissioned by the Foundation for Advertising Research for Frontier Economics and produced in December 2008, which examined the evidence for the effectiveness of introducing advertising bans on the consumption of targeted foods and beverages, and potential impacts on obesity, as well as the implications of the implementation of a ban in Australia. This analysis concluded that unintended consequences from regulation (due to substitution of advertising to other types of media) and the need to have an agreed set of definitions for EDNP foods cast doubt over the effectiveness of any such regulation.(76)

This review highlighted for the Taskforce the need for any regulatory approach to restrictions on advertising and marketing of EDNP foods to be carefully developed and implemented in a comprehensive manner.

15 For example, the Coca-Cola, Pepsico, Nestlé and Cereal Partners Worldwide commitments each define 'targeting children under 12 years' on television as an ACMA classified C or P program, or where predominantly or >50% of the audience is under 12 years. OzTAM ratings data for January–June 2006 indicate no time slots across weekdays or across weekends when children 0–14 years comprise the majority of the overall viewing audience across commercial channels. While specific programs (on particular channels and particular days) may have predominantly children in their audience, this is a very limited occurrence. Reference 10.

16 See www.acma.gov.au/WEB/STANDARD/pc=PC_310262.

Improve public education and information

Effective social marketing programs need to motivate community members to participate in a supportive social movement, such as programs designed to make lives healthier. The *Healthy Weight Healthy Lives* social marketing campaign in the United Kingdom, for example, aims to engage stakeholders from the public and commercial sectors, and create a practical healthy living campaign driven by ordinary people.(77) It is based on research indicating that people want help to live healthier lives and want to be broadly supported to do this, including by government and commercial organisations.

Food and menu labelling

Evidence suggests that displaying information about restaurant menu items at point of sale or on menus is more effective than making this information available to the public via other means, such as on the internet, and may be associated with lower calorie purchases by consumers who see the information.(78)

In the Technical Report, we described the introduction of restaurant menu labelling into various US jurisdictions. Several initiatives have commenced in the United Kingdom concerning menu labelling:

- The UK Department of Health is developing the Healthy Food Mark for the public sector, to signal where public sector caterers are providing healthier, nutritious food and encouraging healthier eating. The initial focus of the Healthy Food Mark will be on meeting general guidelines on food, macronutrients and salt. Caterers will also be asked to meet agreed environmental standards as part of the criteria. Guidelines on making the procurement of food more sustainable will be developed for this purpose. The Healthy Food Mark will be developed and piloted throughout 2009 in central government staff canteens, prison service and National Health services, to assess its practicality and impact in each institutional setting.(34)
- The FSA introduced a voluntary scheme for food service outlets to display calorie counts in January 2009.(79) By June 2009, more than 450 food outlets, including workplace caterers, sit down and quick-service restaurants, theme parks and leisure attractions, pub restaurants, cafes and sandwich chains, are expected to introduce calorie information, some on a pilot basis.(80) Outlets include 18 major catering companies and businesses such Burger King, KFC, Marks and Spencer, Sainsbury's Cafes, Pizza Hut, Subway, and Tesco and Unilever staff restaurants. Each company will:
- Display calorie information for most food and drink they serve
- Print calorie information on menu boards, paper menus or on the edge of shelves
- Ensure the information is clear and easily visible at the point where people choose their food

Research is planned to assess customer understanding and use of the system, as well as practicalities and costs. This will be used to inform the next steps for a wider roll-out of calorie labelling on menus.

Reshape urban environments towards healthy options

Tackling obesity is about reshaping behaviours for positive outcomes in an environment of nutritional abundance that serves aesthetic and emotional needs as well as nutritional requirements. Food and alcohol play an important part in the social fabric of life, as does sedentary social behaviour; simply lecturing people or taking a prohibitionist approach is unlikely to be successful or appropriate.

The energy balance equation is strongly affected by dietary and physical activity patterns – `the major modifiable factors through which many of the external forces promoting weight gain act'.(81) The relative contributions of eating and activity patterns have been subject to substantial scientific debate;(82) however, it is clear that there is a strong and positive relationship between dietary factors (including fat and energy intake) and excess body weight, while decreasing physical activity levels and increased sedentary behaviour also play a key role in weight gain and the development of obesity.(81)

In August 2008, an independent expert panel was appointed to make recommendations and investigate reforms on improving the ways in which sport is run, promoted and managed in Australia.(83) Chaired by David Crawford, the expert panel is examining sport at the elite and grassroots community level. The review will pay particular attention to the most effective way in which sport and physical activity can play a strong role in building a healthier Australia, and will form part of the Australian Government's preventative health agenda. This is included as one of the Terms of Reference to which recommendations will be particularly directed: *Better place sport and physical activity as a key component of the Government's preventative health approach*. This covers:

- Examining Australian Government frameworks to ensure an on-going focus on grassroots and community sport and physical activity
- Examining Australian Government programs to increase participation rates in sport and physical activity, including analysis of existing programs
- Identifying and recommending opportunities to break down barriers to participation at junior, adult and senior ages with a view to making it simpler and easier for Australians to participate in the sport or physical activity of their choice, including for women, the disabled and Indigenous people
- Recommending strategies to increase the effectiveness of the promotion of sport by the Australian Government to better communicate positive health and activity messages to the broader community

The Panel is due to report to the Australian Government in 2009.[17]

Cycling strategy

In April 2009, the Australian Government announced a $40 million cycle path fund for bicycle infrastructure to be administered by the Department of Infrastructure, Transport, Regional Development and Local Government. The funding was made under the Local and Community Infrastructure Program (CIP). Applications were due in May 2009 for funding to commence in July 2009 and to end in June 2011.[18] Over 100 councils have committed to allocating some of the funding received through the CIP for cycling and shared path infrastructure.(84)

The funding may be provided for new routes and extensions or refurbishment of existing infrastructure, including off-road bicycle paths (but not dedicated mountain bike trails); on-road bicycle lanes (for example, road-widening and marking bike lanes on an existing road); and bicycle parking facilities. Projects of up to $2 million could be funded, with a requirement for a 50% joint funding contribution from each project.

17 See www.sportpanel.org.au/internet/sportpanel/publishing.nsf/Content/home.

18 See www.infrastructure.gov.au/local/cip/index.aspx; www.deewr.gov.au/Employment/Documents/Jobs%20Fund%20Guidelines%20APPROVED%20FINAL%20_2_.pdf?utm_source=MailingList&utm_medium=email&utm_content=Cycling+Promotion+Fund+Information+Bulletin+-+Government+announces+details+of+%2440m+Cycle+Path+Fund.

Urban planning and design

It is worth noting that more disadvantaged areas have more retail outlets selling fruits and vegetables, but also more fast food outlets.(85) One effective regulatory action for local government to reduce access to foods high in fats and salt is the adoption or strengthening of planning regulations to manage the proliferation of fast food outlets in particular areas; for example, near schools and in socially disadvantaged neighbourhoods. Research from the United States and Australia indicates that less-advantaged areas tend to have greater access to fast food retailers.(86)

An Australian study examined the association between neighbourhood fast food outlets and obesity in children and adults (the CLAN Study). Children's measured and parents' self-reported heights and weights were used to calculate BMI, while locations of major fast food outlets were geocoded. Bivariate linear regression analyses examined associations between the presence of any fast food outlet within a 2km buffer around participants' homes, fast food outlet density within the 2km buffer, and distance to the nearest outlet and BMI. Each independent variable was also entered into separate bivariate logistic regression analyses to predict the odds of being overweight or obese.

Among older children, lower BMI z-scores were found among those with at least one outlet within 2km. Fathers' BMI increased with the distance from an outlet. Among 13–15-year-old girls and their fathers, the likelihood of overweight/obesity was reduced by 80% and 50%, respectively if they had at least one fast food outlet within 2km of home. Among older girls, the likelihood of being overweight/obese was reduced by 14% with each additional outlet within 2km. The odds of fathers being overweight/obese increased by 13% for each additional kilometre to the nearest outlet.

The authors concluded that while consumption of fast food has been shown to be associated with obesity, the study provided little support for the concept that exposure to fast food outlets in the local neighbourhood increases risk of obesity.(87)

A systematic review examining the relationship between obesity and the community and/or consumer food environment identified the need for additional research in this area.(88) The authors identified only seven studies for review. These studies used cross-sectional designs to examine the community food environment defined as the number per capita, proximity or density of food outlets. The studies varied substantially in sample populations, outcome variables, units of measurement and data analysis. Two studies did not find any significant association between obesity rates and community food environment variables, while five studies found significant results. Many of the studies were subject to limitations that may have mitigated the validity of the results.

The authors identified several gaps in knowledge in this area and concluded that research examining obesity and the community or consumer food environment is at an early stage. They suggested that future research should directly measure multiple levels of the food environment and key confounders at the individual level.(88)

Consumption of fast food products, which have high energy densities and glycaemic loads, and expose customers to excessive portion sizes, may be greatly contributing to and escalating the rates of overweight and obesity in the United States. A systematic review of the relationship between weight gain and fast food consumption found that while more research needs to be conducted, specifically in regard to the effects of fast food consumption among subpopulations such as children and adolescents, sufficient evidence exists for public health recommendations to limit fast food consumption and facilitate healthier menu selection.(89)

The author concluded that the scientific findings and corresponding public health implications of the association between fast food consumption and weight are critical, due to the increase of the fast food industry globally.(89)

Interventions for children

Since the Technical Report was published, several evidence reviews relating to the management and prevention of obesity have been released. In January 2009, an updated Cochrane review examining the evidence on interventions for treating obesity in children was published.(90) It concludes that family-based, lifestyle interventions, which include a behavioural program aimed at changing diet and physical activity, provide significant and clinically meaningful decreases in overweight and obesity in both children and adolescents compared with standard care or self-help regimes. Family-based lifestyle interventions that not only modify diet and physical activity but also include behaviour therapy programs can help obese children lose weight and maintain that loss for at least six months. The review also found that in adolescents the effect lasts for at least 12 months. Adding the weight-controlling drugs orlistat or sibutramine to behaviour change programs for adolescents may provide additional benefits.

These findings represent a difference from a systematic review performed in 2003 which could not find enough data to draw any conclusions about the effects of different programs.(91) This time the researchers identified 64 randomised controlled trials involving 5230 participants, enabling them to see some definite effects.(90)

Research gaps identified include what types or aspects of different interventions work better for different groups of children, depending on their age, gender, socioeconomic background, faith or ethnic groups; the importance of self-esteem in influencing how successful an intervention will be; and whether there are any characteristics of individual families or patients that could help to identify success.(90)

A systematic review and meta-analyses of randomised trials on behavioural interventions to prevent childhood obesity was published in 2008.(92) The objective was to summarise evidence on the efficacy of interventions aimed at changing lifestyle behaviours (increased physical activity and decreased sedentary activity, increased healthy dietary habits and decreased unhealthy dietary habits) to prevent obesity. Trials with interventions lasting more than six months (compared with shorter trials) and trials with post-intervention outcomes (compared with in-treatment outcomes) yielded marginally larger effects.

The authors concluded that paediatric obesity prevention programs caused small changes in target behaviours and no significant effect on BMI compared with control. The authors also concluded that trials evaluating promising interventions applied over a long period, using responsive outcomes and with longer measurement timeframes, are urgently needed.(92)

Pre-school setting

A study examining the relationships between weight status and child, parent and community characteristics in pre-school children in Australia collected cross-sectional data from 140 children and their parents from 11 randomly selected pre-schools in New South Wales. Compared with non-overweight children, overweight children spent more time in quiet play and watching television and less time in active play and physical activity. Perceived competence and motor development were similar for both overweight and non-overweight children. The study concluded that the results showed little difference between overweight and non-overweight children in relation to a variety of child, parent and community variables. However, for some characteristics, differences in older children have been reported.

The authors concluded that longitudinal studies are required to confirm when these characteristics begin to differ, what effects these differences have on behaviour and weight status, and therefore when targeted treatment should be provided during a child's development.(93)

School-based programs

A Cochrane systematic review of studies on physical activity programs in schools published in January 2009 concluded that school-based health and exercise programs have positive outcomes despite having little effect on children's weight or the amount of exercise they do outside of school. The researchers reviewed data from 26 studies of physical activity promotion programs in schools in Australia, South America, Europe and North America. Most studies tried to encourage children to exercise by explaining the health benefits and changing the school curriculum to include more physical activity for children during school hours. Programs included teacher training, educational materials and providing access to fitness equipment.(94)

The review showed that school-based programs increased the time children spent exercising and reduced the time spent watching television. Programs also reduced blood cholesterol levels and improved fitness – as measured by lung capacity. However, programs made little impact on weight, blood pressure or leisure time activities.(94)

The lead researcher suggested that physical activity classes may be too closely associated with school work, meaning some students may feel like they are being made to do more work. In this case, a key strategy would be to promote physical activity by getting children and adolescents to 'play' in ways that represent fun and adventurous activities, while at the same time promoting better fitness levels.(95)

A systematic review of school-based interventions that focus on changing dietary intake and physical activity levels to prevent childhood obesity was conducted to update the obesity guidelines produced by the National Institute for Health and Clinical Excellence and published in 2009. The review found that school-based physical activity interventions may help children maintain a healthy weight but the results were inconsistent and short term. Physical activity interventions may be more successful in younger children and in girls. Studies were heterogeneous, making it difficult to draw conclusions on what interventions were effective. While the findings were inconsistent, they suggested overall that combined diet and physical activity school-based interventions may help prevent children becoming overweight in the long term. Physical activity interventions, particularly in girls in primary schools, may help to prevent these children from becoming overweight in the short term.(96)

As with the Cochrane systematic review,(94) a systematic review and meta-analysis undertaken by Canadian researchers found that school-based physical activity interventions did not improve BMI, although they had other beneficial health effects.(97) The review to determine the effect of school-based physical activity interventions on BMI in children found that BMI did not improve with physical activity interventions (weighted mean difference -0.05kg per square metre, 95% confidence interval -0.19 to 0.10). The authors concluded that current population-based policies that mandate increased physical activity in schools are unlikely to have a significant effect on the increasing prevalence of childhood obesity.(97)

Ecological approaches that recognise the interaction between individuals and the settings in which they spend their time are currently at the forefront of public health action. In a literature review published in 2009, Canadian researchers examined schools as a setting for action on physical inactivity, as they have been identified as a key setting for health promotion.(98) The review addressed the promotion of physical activity in schools and showed that school-based strategies (elementary or high school) using classroom-based education only did not increase physical activity levels; one notable exception was screen time interventions. The authors concluded that although evidence is sparse, active school models and environmental strategies (interventions that change policy and practice) appear to promote physical activity in elementary schools effectively. The review also found strong evidence to support multi-component models in high schools,

particularly models that incorporate a family and community component. An emerging trend is to involve youth in the development and implementation of interventions.

The authors highlighted the importance of modest increases in physical activity levels in school-based trials in the context of childhood obesity and sedentary lifestyles.

The review also concluded that school initiatives must be supported and reinforced in other community settings. The key role of health professionals as champions in the community, based on their influence and credibility, was also identified: health professionals can lend support to school-based efforts by asking about and emphasising the importance of physical activity with patients, encouraging family-based activities, supporting local schools to adopt an 'active school' approach, and advocating for support to sustain evidence-based and promising physical activity models within schools.(98)

An Australian study examining the predictors of BMI changes in Victorian 5–10-year-old primary school children found BMI change (measured in 1997 and 2000/2001) to be positively associated with frequency of takeaway food, food quantity, total weekly screen time, non-Australian paternal country of birth, maternal smoking during pregnancy, and maternal and paternal BMI.(99) Inverse associations were noted for the presence of siblings and rural residence. Multivariable models suggested individual determinants have a cumulative effect on BMI change. The authors found that while it was hard to identify predictors of change based on strong short-term tracking of BMI, putative determinants across all six domains assessed (children's diet, children's activity level, family composition, sociodemographic factors, prenatal factors and parental adiposity) were independently associated with adiposity change.

The study concluded that multifaceted solutions are likely to be required to successfully deal with the complexities of childhood overweight.(99)

A systematic literature review published in 2009 examined the effectiveness of school-based food and nutrition policies in improving diet and reducing obesity.(100) Drawing on published and unpublished literature, most evidence of effectiveness was found for the impact of both nutrition guidelines and price interventions on intake and availability of food and drinks, with less conclusive research on product regulation. Despite the introduction of school food policies worldwide, few large-scale or national policies have been evaluated. All included studies were from the United States and Europe. The authors concluded that while some current school policies have been effective in improving the food environment and dietary intake in schools, there is little evaluation of their impact on BMI. As schools have been proposed worldwide as a major setting for tackling childhood obesity, it is essential that future policy evaluations assess the long-term effectiveness of a range of school food and nutrition policies in tackling both dietary intake and overweight and obesity.

A 2009 article by Story et al.(101) explored the role of schools in obesity prevention efforts in relation to four key areas: school food environments and policies; school physical activity environments and policies; school BMI measurements; and school wellness policies. Focusing on the US context, the authors concluded that:

- Competitive foods (foods sold outside federally reimbursed school meals) are widely available in schools, especially secondary schools. Studies have related the availability of snacks and drinks sold in schools to students' high intake of total calories, soft drinks, total fat and saturated fat, and lower intake of fruits and vegetables.
- Physical activity can be added to the school curriculum without academic consequences and can also offer physical, emotional and social benefits. Policy leadership has come predominantly from the districts, then the states, and, to a much lesser extent, the federal government.

- Few studies have examined the effectiveness or impact of school-based BMI measurement programs.
- Early comparative analyses of local school wellness policies suggest that the strongest policies are found in larger school districts and districts with a greater number of students eligible for a free or reduced-price lunch.

The authors found that while studies show schools have been making some progress in improving the school food and physical activity environments, much more work is needed. Stronger policies are needed to provide healthier meals to students at schools; limit their access to low-nutrient, energy-dense foods during the school day; and increase the frequency, intensity and duration of physical activity at school.(101)

In the European Union (EU), public health, particularly obesity, is for the first time being seen as a driver of agricultural policy.(102) In 2007, European Ministers of Agriculture were asked to back new proposals for school fruit and vegetable programs as part of agricultural reforms, and in 2008 the European Commission (EC) conducted an impact assessment to assess the potential impact of this new proposal on health, agricultural markets, social equality and regional cohesion.

A systematic review published in 2008 examined the effectiveness of interventions to promote fruit and/or vegetable consumption in children in schools.(102) The review was conducted to inform the EC policy development process. The results showed that school schemes are effective at increasing both fruit and vegetable intake and knowledge. Of the 30 studies included, 70% increased fruit and vegetable intake, with none decreasing intake. The majority of the studies (23) had follow-up periods of more than one year and provided some evidence that fruit and vegetable schemes can have long-term impacts on consumption. One study led to both increased fruit and vegetable intake and reduction in weight, while one study showed that school fruit and vegetable schemes can also help to reduce inequalities in diet. Effective school programs have used a range of approaches and been organised in ways which vary nationally depending on differences in food supply chain and education systems.

The authors concluded that EU agriculture policy for school fruit and vegetable schemes should be an effective approach, resulting in both public health and agricultural benefits. Aiming to increase fruit and vegetable intake amongst a new generation of consumers, it will support a range of EU policies including obesity and health inequalities.(102)

A systematic review and meta-analysis published in 2008 was undertaken to determine the effectiveness of school-based strategies for obesity prevention and control.(103) Peer-reviewed studies published between 1966 and October 2004 were considered for review, with criteria including 3–18-year-olds targeted in a school setting, reported weight-related outcomes, control measurement included and at least a six-month follow-up period. Studies employed interventions related to nutrition, physical activity, reduction in television viewing or combinations of these. Twenty-one papers describing 19 studies were included in the systematic review, with eight of these included in the meta-analysis. Nutrition and physical activity interventions resulted in significant reductions in body weight compared with control. Parental or family involvement of nutrition and physical activity interventions also induced weight reduction. Combination nutrition and physical activity interventions were effective at achieving weight reduction in school settings.

The authors concluded that several promising strategies for addressing obesity in the school setting were suggested, warranting replication and further testing.(103)

A related article by Katz(104) published in 2009 drew on the same evidence as in the systematic review and meta-analysis described above(103) and concluded that available research evidence does present a case for school-based

interventions. The author found that despite marked variation in measures, methods and populations in studies examining school-based interventions for obesity prevention and control and for related health promotion, evidence clearly demonstrated that school-based interventions had significant effects on weight. Katz states that the urgency of the obesity and diabetes epidemics demands action, in spite of limited evidence to date; intervention and methodologically robust evaluation is necessary based on current evidence and common sense.(104)

Community setting

In spite of greater awareness of the need for action to reduce obesity, the evidence on sustainable community approaches to prevent childhood and adolescent obesity is surprisingly sparse. A paper published in 2008 described the design and methodological components of a demonstration site for obesity prevention in the Barwon south-west region of Victoria, Australia, that aims to build the programs, skills and evidence necessary to attenuate and eventually reverse the obesity epidemic in children and adolescents.(105) The Sentinel Site for Obesity Prevention is based on a partnership between the region's Deakin University and the health, education and local government agencies. The three basic foundations of the Sentinel Site are: multi-strategy interventions across multiple settings; building community capacity; and undertaking program evaluation and population monitoring. While three intervention projects cover different age groups – pre-school (2–5-year-olds), primary school (5–12-year-olds) and secondary school (13–17-year-olds) – each project has many common characteristics. These include community participation and ownership of the project; intervention duration of at least three years; and full evaluations with behavioural impact and anthropometric outcome measures compared with regionally representative comparison populations.(105)

It is well known that obesity prevention initiatives must consider both physical activity and nutrition to be effective. Community sports venues have the capacity to promote healthy lifestyles through physical activity as well as healthy food choices. In research published in 2008, a telephone survey was conducted among parents of children aged 5–17 years in New South Wales to determine the nature of food and beverages purchased by children at community sporting venues, and to determine parental perceptions of the role that government should play in regulating the types of food and beverages sold at these outlets.(106)

The majority of canteens at children's sporting venues were considered to sell mostly unhealthy food and beverages (53%). Very few parents reported that canteens sold mostly healthy food and beverages. Parents reported that the food and beverage items their children most frequently purchased at outdoor sports fields were water, chocolate and confectionery, soft drink and sports drinks, and ice cream. At community swimming pools, the most frequently purchased items were ice cream, followed by snack foods, including chips, cakes and biscuits. Most parents (63%) agreed that government should restrict the types of food and beverages that can be sold at children's sporting venues. The authors concluded that children are receiving inconsistent health messages at sporting venues, with healthy lifestyles being promoted through sports participation, but unhealthy dietary choices being provided at sports canteens.(106)

While overweight is often established by school entry age, not all mothers of children who are overweight at this point report weight concerns. Enhancing maternal concern might assist lifestyle change, but could lead to child body dissatisfaction. A prospective community study conducted in Melbourne investigated perceived/desired body size and body dissatisfaction in mothers and their 6.5-year-old children, and the impact of earlier maternal concern about overweight on children's BMI status and body dissatisfaction.(107) BMI correlated with perceived body size for all three

actual BMI perceived size pairings: mother self-report, mother's report about her child, and child self-report. Similarly, all three dissatisfaction scores were greater with increasing BMI status. Children's own dissatisfaction scores correlated with their actual BMI, but were not related to mothers' own body dissatisfaction scores or with mothers' dissatisfaction with children's body size. Maternal concern about overweight at the age of four years was not associated with BMI change, or child body dissatisfaction by the age of 6.5 years.

The authors concluded that despite low rates of recognition of child overweight, maternal perceptions of the child's body correlated strongly with the child's actual BMI. Maternal concerns about child BMI did not appear to impact on child BMI change or child body dissatisfaction.(107)

Australian research published in 2008 examined associations between family physical activity and sedentary environment and changes in BMI among 10–12-year-old children over three years.(108) The study measured height and weight at baseline and follow-up; aspects of the family physical activity and sedentary environment (parental and sibling modelling, reinforcement, social support, family-related barriers, rules/restrictions, home physical environment) were measured with a questionnaire completed by parents at baseline. At baseline, 29.6% of boys and 21.9% of girls were overweight or obese. Over the study period there was a significant change in BMI z-score among girls but not boys. The authors concluded that sibling physical activity and environmental stimuli for sedentary behaviours and physical activity within the home may be important targets for prevention of weight gain during the transition from childhood to adolescence.(108)

Workplace setting

A joint report by the World Health Organization (WHO) and the World Economic Forum notes there is clear and persuasive evidence that many workplace health promotion programs targeting non communicable disease have been successful at improving employees' health by reducing risk factors, increasing employees' fruit and vegetable consumption, improving employee engagement and productivity, and producing return on investment (through cost savings and increased productivity).(109)

A systematic review examining obesity status and sick leave was published in 2009.(110) While 36 studies on the relation between obesity status and sick leave were identified, pooling of effect estimates was not possible due to great heterogeneity between studies regarding definition of sick leave (short term/long term), measure of obesity (BMI/waist circumference/percentage body fat), definition of obesity status (WHO standards/other), study population (sex/age/occupation/country) and exposure and outcome ascertainment (self-reported/objectively assessed). Nevertheless, a clear trend towards greater sick leave among obese compared with normal weight workers could be discerned, especially for spells of longer duration. In studies from the United States, which consistently reported around five times a lower number of sick leave days per person-year than European studies, obese workers had approximately one to three extra days of absence per person-year compared with their normal weight counterparts. In European studies, the corresponding difference was about 10 days. The data were conflicting for overweight workers, indicating either increased or neutral level of sick leave compared with normal weight.

Studies examining underweight were very few and concerns regarding direction of causality were greater. The review identified four interventional studies; all of these found that substantial weight loss in obese subjects resulted in at least temporary reductions in sick leave.

The authors concluded that increasing obesity in children and adults is likely to negatively affect future productivity as obesity increases the risk of sick leave, disability pension and death.(110)

A recent literature review for the New Zealand Ministry of Health cites the workplace as a pivotal location for promoting and supporting wellness, as described in the Technical Report. The review states: 'in terms of importance, the workplace is matched only by the education system as the most effective front line approach to preventing chronic disease and promoting health' (page 6). Reasons for this crucial role of workplaces include ease of access to a large number of people, existing infrastructures in the workplace (for example, communication channels, teams), the cost-efficiency of workplace health promotion programs relative to clinical or community-based programs, and the opportunity to address multiple levels of influence, including individual, interpersonal, organisational and environmental factors on health.(111)

Examples of workplace health promotion programs cited in the report include: stress management, smoking cessation, weight management, back care, health screenings, nutrition education, workplace safety, prenatal and well baby care, CPR and first aid classes, employee assistance programs (EAP), work–life balance policies, flexi-time, exercise/fitness groups, discounts to local fitness facilities, healthful food choices at work meetings, events, training programs and family-friendly policies and facilities (such as bicycle racks, showers and gym equipment).(111)

Benefits to employees include health benefits (such as physical wellbeing and clinical health improvements: reduced cholesterol, reduced risk of chronic disease, reduced incidence of musculoskeletal disorders); increased mental wellbeing, energy and resilience, reduced stress and depression, and increased quality of life; financial benefits; and improved job satisfaction.(111)

Benefits to employers from workplace health promotion programs include:(111)

- A healthy, happy and present workforce with reduced absenteeism and presenteeism; improved employee engagement, recruitment and retention; a happier, more resilient workforce; a positive workplace culture; and improved industrial relations.
- Increased employee performance and productivity.
- Financial benefits including reduced healthcare costs; reduced costs relating to absenteeism and presenteeism; return on investment (from improved productivity or cost savings).

The review cites research showing that the economic return on investment for various workplace health promotion programs ranged from US$1.50 to US$5.96 saved for every US$1 spent.(111)

The review notes that 'the challenge for organisations today is no longer whether or not workplace health promotion programs should be implemented but rather how they should be designed, implemented and evaluated to achieve optimal benefits (i.e. health and cost-effectiveness)'(111) (page 7). Effectiveness of such initiatives can be achieved through careful planning and informed design; long-term focus and strategic goals; creating a culture of health (that is, a culture supportive of workplace health promotion, including active leadership and a healthy environment); maximising employee engagement and participation; having an appealing communications strategy; and research and evaluation.(111)

The review provides an outline of the design and implementation components of successful workplace health promotion programs based on the literature:(111)

Aspects of successful workplace health promotion program design:

- Being based on theory (for example, on improving self-efficacy, stage of change etc)
- Having clear goals and objectives (linked to organisational objectives)
- Being comprehensive (holistic, multi-component)
- Including tailored/targeted interventions (based on employee characteristics)
- Focusing on modifiable risk factors (for example, things employees can change such as diet and level of physical activity) and improving employees' self-efficacy (belief in their ability to achieve certain outcomes)
- Promoting the inclusion of existing social support systems (for example, involving spouses/family) and the creation of new social support systems (such as weight loss teams, sports teams)
- Including a participatory approach to development and implementation (involving employees – using peers for design, promotion and delivery)
- Offering flexibility (for example, holding additional sessions in work time at different times of day, offering different options for participation)
- Including health risk assessments/screenings
- Having a long-term focus
- Removing barriers to participation
- Including research and evaluation

Aspects of successful workplace health promotion program implementation:

- Fostering networks and partnerships (for example, potential wellness collaborators)
- Using a variety of communication/education strategies
- Including environmental support (for example, environmental modifications such as healthy foods in vending machines, signage promoting healthy behaviours, provision of facilities such as bicycle racks, showers and changing rooms)
- Including the use of incentives and rewards
- Having strong management support (for example, endorsement, resourcing and policy sign-off)

Update on Victorian WorkHealth program

The Victorian WorkHealth pilot, delivered by WorkSafe, ran in 2008 and involved 657 workers in nine Victorian workplaces taking part in health checks at their workplaces. In March 2009 the Premier announced that the pilot of the initiative to screen workers for preventable diseases has been highly effective, with two in three workers referred to a GP for further medical attention.(112)

The five-year program commenced roll-out in regional Victoria in March 2009, with roll-out in Melbourne to start in mid-2009. The remainder of regional areas will follow in early 2010.

As part of the program, participating workers fill out a questionnaire about lifestyle, personal and family medical history, followed by a one-on-one session with a trained health professional to assess health risk through waist circumference, blood pressure, blood cholesterol, diabetes score and blood glucose.

Employers with an annual remuneration of less than $10 million will be fully reimbursed the cost of health checks, meaning they are free, whilst those employers with annual remuneration greater than $10 million will be required to pay a $30 contribution per worker. Some organisations in regional areas will be eligible for a grant for health and wellbeing activities.

Town planning and building design

The built environment plays an important role in influencing participation in physical activity. Australian research published in 2009 examined whether urban sprawl in Sydney was associated with overweight/obesity and levels of physical activity.(113) The authors used a cross-sectional multilevel study design to relate urban sprawl (based on population density) measured at an area level to overweight/obesity and levels of physical activity measured at an individual level, controlling for individual and area level covariates in metropolitan Sydney. Information was available on 7290 respondents using data from the 2002 and 2003 New South Wales Population Health Survey. The study found that living in more sprawling suburbs increases the risk of overweight/obesity and inadequate physical activity, despite the relatively low levels of urban sprawl in metropolitan Sydney. For an inter-quartile increase in sprawl, the odds of being overweight were 1.26 (95% CI=1.10–1.44), the odds of being obese were 1.47 (95% CI=1.24–1.75), the odds of inadequate physical activity were 1.38 (95% CI=1.21–1.57), and the odds of not spending any time walking during the past week were 1.58 (95% CI=1.28–1.93). The authors concluded that modifications to the urban environment to increase physical activity may be worthwhile.(113)

Active environments

A review of active transportation (walking, cycling and public transport) and obesity rates in Europe, North America and Australia between 1994 and 2006 was published in 2008.(114) Countries with the highest levels of active transportation generally had the lowest obesity rates. Europeans walked more than United States residents (382km versus 140km per person per year) and bicycled further (188km versus 40km per person per year) in 2000. Walking and bicycling were far more common in European countries than in the United States, Australia and Canada. Active transportation was found to be inversely related to obesity in these countries. While the results do not prove causality, they suggest that active transportation could be one of the factors explaining international differences in obesity rates.(114)

Recent declines in children's active commuting (walking or cycling) to school has become an important public health issue. Recent programs have promoted the positive effects of active commuting on physical activity and overweight. However, the evidence supporting such interventions among schoolchildren has not been previously evaluated. A systematic review of the association between active commuting to school and outcomes of physical activity, weight and obesity in children was published in 2008.(115) The review identified 32 studies assessing the association between active commuting to school and physical

activity or weight in children. Most studies that assessed physical activity outcomes found a positive association between active commuting and overall physical activity levels. However, almost all studies were cross-sectional in design and did not indicate whether active commuting leads to increased physical activity or whether active children are simply more likely to walk. Only three of 18 studies examining weight found consistent results, suggesting that there might be no association between active commuting and reduced weight or BMI. The authors concluded that although there are consistent findings from cross-sectional studies associating active commuting with increased total physical activity, interventional studies are needed to help determine causation.(115)

A review of interventions, policies and research on physical activity and food environments published in 2009 concluded that numerous cross-sectional studies have consistently demonstrated that some attributes of built and food environments are associated with physical activity, healthful eating and obesity.(116) Residents of walkable neighbourhoods who have good access to recreation facilities are more likely to be physically active and less likely to be overweight or obese. Residents of communities with ready access to healthy foods also tend to have healthier diets. Disparities in environments and policies that disadvantage low-income communities and racial minorities have been documented as well. Evidence from multilevel studies, prospective research and quasi-experimental evaluations of environmental changes are just beginning to emerge.

The authors recommend environmental, policy and multilevel strategies to improve diet, physical activity and obesity control, based on a rapidly growing body of research and the collective wisdom of leading expert organisations. They also conclude that a public health imperative to identify and implement solutions to the obesity epidemic warrants the use of the most promising strategies while continuing to build the evidence base.(116)

Walking and physical activity

Australian research published in 2009 examined population trends in lifestyle walking in New South Wales between 1998 and 2006.(117) Telephone surveys were conducted in 1998 and annually from 2002 to 2006. The weighted and standardised prevalence estimates of any walking (AW) for exercise, recreation or travel (greater than or equal to 10 minutes per week) and of regular walking (RW; greater than or equal to 150 minutes per week over greater than or equal to five occasions) in population sub-groups were determined for each year. Adjusted annual change was calculated using multiple regression analyses.

The study found that the prevalence of AW was high in 1998 (80.0%), increasing to 83.5% in 2006. The prevalence of RW was stable at around 29% between 1998 and 2003, gradually increasing between 2004 (32.9%) and 2006 (36.5%). The annual increases differed in magnitude but were significant for all population sub-groups including 75 years and older, the obese, people living in remote locations and those in the most disadvantaged SES quintile. Socioeconomic differential in RW was no longer significant in 2006.

The authors concluded that over time, everyday walking has the potential to reduce health inequalities due to inactivity. Public health efforts to promote active living and address obesity, as well as a rise in petrol prices, might have contributed to this trend.(117)

A systematic review published in 2009 examining the effectiveness of walking in relation to prevention of cardiovascular disease in men and women found that generally there were dose-dependent reductions in cardiovascular disease risk with higher walking duration, distance, energy expenditure and pace.(118)

The need to increase physical activity in all aspects of daily life

Increasing participation in leisure-time physical activity has been central to strategies aimed at preventing major chronic diseases (type 2 diabetes, cardiovascular disease, breast and colon cancer) and obesity in developed and developing nations.(119, 120) The main focus of a wide range of strategies (from clinical practice to community programs and mass-media campaigns) has been encouraging and supporting individuals to be more active, largely during discretionary or leisure time. However, for most people, discretionary, leisure-time activity accounts for a small proportion of overall activity levels. Significant improvements in the physical inactivity of the population have therefore not been achieved using this focus.(121) The promotion of active commuting (using public transport, walking and cycling) must therefore feature more prominently in approaches from public health and other sectors such as urban planning and transport.

Sedentary behaviour

Lifestyle intervention programs encompassing exercise and healthy diets are an option for the treatment and management of obesity and type 2 diabetes, and have long been known to exert beneficial effects on whole-body metabolism, in particular leading to enhanced insulin-sensitivity. Obesity is associated with increased risk of several illnesses and premature mortality. However, physical inactivity is itself associated with a number of similar risks, independent of BMI, and is an independent risk factor for more than 25 chronic diseases, including type 2 diabetes and cardiovascular disease.(122)

In the context of chronic disease prevention, the impacts on health of *too* much sitting need to be considered, in addition to the well-established preventative health concerns about too little exercise. A recent body of work has identified sedentary behaviour (time spent sitting at work, at home and in various modes of transport) as a novel and potentially important risk factor for the development of chronic disease. Changes in transport, occupations, domestic tasks and leisure activities have had negative effects on daily energy expenditure. Sedentary behaviours represent those behaviours for which energy expenditure is low, including prolonged sitting time in transport, at work, at home and in leisure time.(123, 124)

A body of new evidence identifies the time that adults spend sitting as being an important ingredient of the physical activity and health equation.(123) Findings from the national AusDiab study(123, 125) have shown television viewing time – which may reflect some people's broader dispositions to spending a large amount of time sitting(126) – to be significantly related to metabolic health. Prolonged television viewing time (particularly more than four hours a day) has been shown to be associated with greater waist circumference, higher blood sugar levels, higher blood fat levels and greater risk of metabolic syndrome. These detrimental associations of television viewing time with metabolic health were observed even in adults who met the criteria for the National Physical Activity Guidelines.(127)

AusDiab findings also show that the average person spends more than half of their waking hours (~9 hours) in sedentary behaviours – primarily prolonged sitting. The remainder of the day is spent in light-intensity activities, with only 4–5% of the day spent in moderate-to-vigorous

intensity physical activity.(124, 128) Importantly, participation in light-intensity activities (which can include housework, standing and moving about in office environments, or shopping) has been shown to be beneficially associated with blood sugars and waist circumference.(123, 128) Additionally, those who interrupted their sedentary time more frequently (for example, got up to get a drink, stood up to answer the phone) had a better health profile than those whose sitting time was mostly uninterrupted.(128)

While further evidence from prospective studies and controlled trials is required, both national and international evidence strongly suggest that we may be sitting our way to poor health.(123) In order to address the high volumes of prolonged sitting time that now characterise the typical lifestyles of Australian adults and children, specific recommendations on reducing, and breaking up, sedentary time should be considered.

5. Strengthen, upskill and support primary healthcare and public health workforce to support people in making healthier choices

A systematic review published in 2009 of primary care physicians' knowledge, attitudes, beliefs and practices regarding childhood obesity showed that while almost all physicians agreed on the necessity to treat childhood obesity, they perceived themselves to have a low self-efficacy regarding such treatment. (129) They also experienced a negative feeling regarding obesity management. Although extensive heterogeneity in the assessment of childhood obesity between the different studies was observed, awareness of the importance of using BMI increased among physicians over the period of the review (1987–2007). Almost all of the identified studies noted that physicians recommended dietary advice, exercise or referral to a dietitian.

The authors concluded that the results of the review indicated a clear need for the education of primary care physicians to increase the uniformity of the assessment and to improve physicians' self-efficacy in managing childhood obesity. They identified multidisciplinary treatment (including GPs, paediatricians and specialised dietitians) as a key component in addressing the growing obesity epidemic and cited the importance of primary care physicians in initiating, coordinating and participating in obesity prevention initiatives.(129)

The management of overweight and obesity presents many challenges for primary healthcare providers. An article by Anderson in 2008 addressed six questions in an attempt to close the gap between primary care activities and public health goals to reduce overweight and obesity.(130) The issues covered included:

- What is overweight and obesity?
- What is the health impact of overweight and obesity?
- Is individually directed advice effective in reducing overweight and obesity?
- Can we increase the involvement of primary care in reducing overweight and obesity?
- How can public health actions complement the role of primary care?
- How do we chose cost-effective interventions?

Systematic reviews and key texts were identified from literature searches to provide a narrative summary to respond to these questions. The author found there is a positive relationship between the level of BMI and a wide range of conditions, including cancers and cardiovascular diseases. There is evidence that individually directed advice can reduce overweight and obesity or its risk, and mixed evidence for the effectiveness of strategies in increasing the involvement of primary care

in reducing overweight and obesity. There are many examples of public health actions that complement the role of primary care in reducing overweight and obesity. While overall cost-effective policy analyses per se for overweight and obesity were not identified in this review, the author reported that a combination of personal and non-personal interventions can be effective and cost-effective in reducing cardiovascular events.

The study concluded that the gap between primary care and public health in reducing overweight and obesity can be closed, but it requires sustained political support and investment.(130)

As gatekeepers to the health system, GPs are placed in an ideal position to manage obesity. Yet, very few consultations address weight management. Australian research published in 2008 explored reasons why patients are not engaging with their GP for weight management.(131) It also examined patients' perceptions of the GP's role in managing their weight. Conducted in 2006, the study involved 367 17–64-year-olds recruited from three general practices in Melbourne. Participants completed a self-administered questionnaire in the waiting room. Questions included basic demographics, the role of the GP in weight management, the likelihood of the patient bringing up weight management with their GP and reasons why they would not, and their nominated ideal person to consult for weight management. Physical measurements to determine weight status were then completed.

Almost three-quarters (74%) of patients reported that they were not likely to bring up weight management when they visited their GP; negative reasons reported included time limitation on both the patient's and doctor's part, and the doctor lacking experience. The GP was the least likely person to tell a patient to lose weight after partner, family and friends. Of the 14% of participants who had been told by their GP to lose weight, 90% had cardiovascular obesity-related comorbidities. Participants cited GPs as fourth in the list of ideal people to manage weight. The authors concluded that patients do not have confidence in their GPs for weight management, preferring other health professionals who may lack evidence-based training. They also concluded that it appeared currently GPs target only those with obesity-related comorbidities.

The authors recommended further studies evaluating GPs' opinions about weight management, and the development and implementation of effective strategies that can be implemented in primary care, including coordination of a team approach.(131)

Further Australian research examined the prevalence and rate of management of childhood overweight and obesity in Australian general practice.(132) A cross-sectional study was conducted among 3978 GPs, randomly selected using Medicare Australia claims, who recorded 42,515 encounters with 2–17-year-olds – including 12,925 sub-sampled encounters with self- or carer-reported height and weight collected. A total of 29.6% of sub-sampled children were classified as overweight (18.3%) or obese (11.4%). GPs managed overweight and obesity during 215 encounters, or once per 200 encounters with children aged 2–17 years, and once per 58 encounters with overweight or obese children.

The content of encounters in overweight and non-overweight children did not differ. Children who were managed for overweight or obesity presented with these conditions as reasons for the encounter significantly more often and were managed for more problems, particularly depression, than average per 100 encounters. Consultations for overweight or obesity were significantly longer than average. The authors concluded that while overweight and obesity are prevalent in children presenting to Australian general practice, GPs do not use most of the available opportunities to manage this problem.(132)

While a common policy response to the childhood obesity epidemic is to recommend that primary care physicians screen for and offer counselling to the overweight/obese,

there is evidence to suggest this may not be the most effective approach. For example, an economic evaluation of a primary care trial – *Live Eat and Play* (LEAP) – to reduce weight gain in overweight/obese children was undertaken in Victoria in 2002–03.(133) LEAP was a randomised controlled trial of a brief secondary prevention intervention delivered by family physicians and targeting overweight/mildly obese children aged 5–9 years. Primary care use was audited prospectively using medical records; parents reported family resource use by written questionnaire. Outcome measures were BMI and parent-reported physical activity and dietary habits in intervention compared with control children. The cost of LEAP per intervention family was $4094 greater than for control families, mainly due to increased family resources devoted to child physical activity. Total health sector costs were $873 per intervention family and $64 per control. At 15 months, intervention children did not differ significantly in adjusted BMI or daily physical activity scores compared with the control group, but dietary habits had improved.

The authors concluded that this brief intervention resulted in higher costs to families and the healthcare sector, which could have been devoted to other uses creating benefits to health and/or family wellbeing; this has implications for countries such as the United States, the United Kingdom and Australia, where current guidelines recommend routine surveillance and counselling for high child BMI in the primary care sector.(133)

6. Maternal and child health

Obesity has become a serious global public health issue and has consequences for nearly all areas of medicine. Within obstetrics, obesity not only has direct implications for the health of a pregnancy but also impacts on the weight of the child in infancy and beyond. As such, maternal weight may influence the prevalence and severity of obesity in future generations. Pregnancy may be a good time to target health behaviour changes by using the extra motivation women tend to have at this time to maximise the health of their child.

A 2009 review of the current evidence for interventions to promote weight control or weight loss in women around the time of pregnancy found few intervention strategies to have been suggested in the published literature, in spite of numerous reports of the prevalence and complications of maternal obesity.(134) The review also concluded that there is a deficiency of appropriately designed interventions for maternal obesity and highlights areas for developing a more effective strategy.(134)

A systematic review and meta-analysis examined the association between increasing maternal BMI and elective/emergency caesarean delivery rates.(135) Caesarean delivery risk was found to increase by 50% in overweight women and to be more than double for obese women compared with women with normal BMI.(135)

A review published in 2009 on obesity, gestational diabetes and pregnancy outcomes noted the rising prevalence of both obesity and gestational diabetes mellitus (GDM) globally.(136) Evidence on the complications of diabetes affecting the mother and foetus is clear: maternal complications include preterm labour, pre-eclampsia, nephropathy, birth trauma, caesarean section and postoperative wound complications. Foetal complications include foetal wastage from early pregnancy loss or congenital anomalies, macrosomia, shoulder dystocia, stillbirth, growth restriction and hypoglycaemia. The presence of obesity among diabetic patients compounds these complications. The review found that short-term complications can be mediated by achieving the desired level of glycaemic control during pregnancy. However, GDM during pregnancy is associated with increased risk of early obesity, type 2 diabetes during adolescence and the development of metabolic syndrome in early childhood. In addition, GDM is a marker for the development of overt type 2 diabetes and metabolic syndrome for the mother in the early future.(136)

WHO published a report in 2007 entitled `Evidence of the long-term effects of breastfeeding: systematic reviews and meta-analysis'. The report concluded that `the evidence suggests that breastfeeding may have a small protective effect on the prevalence of obesity', and that the protective effect of breastfeeding was not likely to be due to publication bias. A overview by Cope and Allison(137) published in 2008 which critiqued the section of the WHO report on breastfeeding and obesity concluded that, while breastfeeding may have benefits beyond any putative protection against obesity, and the benefits of breastfeeding most likely outweigh any harms, any statement that a strong, clear or consistent body of evidence shows that breastfeeding causally reduces the risk of overweight or obesity is unwarranted at this time.(137)

A US review used 1990 US Institute of Medicine (IOM) gestational weight gain recommendations to determine healthy weight gain during pregnancy.(138) The review examined the relationship of gestational weight

gain to infant size at birth; pregnancy, labour and delivery complications; neonatal, infant and child outcomes; and maternal weight and health outcomes in US and European populations. It was found that pregnancy weight gains within IOM recommendations are associated with better outcomes. The possible exception is very obese women, who may benefit from weight gains less than the 7kg recommended. Review findings indicated that only about 33% to 40% of US women gained weight within IOM recommendations. Excessive gestational weight gain was found to be more prevalent than inadequate gain, and women's gestational weight gains tended to follow the recommendations of healthcare providers. The review identified opportunities for advice and intervention to minimise weight gain among pregnant women, with current interventions demonstrating efficacy in influencing gestational weight gain in low-income women with normal and overweight BMI in the United States and obese women in Scandinavia.(138)

A review published in 2008 examining the impact of obesity on female fertility and fertility treatment highlighted the extent of the impact obesity and overweight have on reproductive health.(139) The authors found there to be a high prevalence of obese women in the infertile population, with numerous studies demonstrating the link between obesity and infertility. Obesity contributes to anovulation and menstrual irregularities, reduced conception rate and a reduced response to fertility treatment, as well as increasing miscarriage and contributing to maternal and perinatal complication. Reduction in obesity, particularly abdominal obesity, is associated with improvements in reproductive functions; the authors therefore recommended that treatment of obesity itself should be the initial aim in obese infertile women, before embarking on ovulation-induction drugs or assisted reproductive techniques. Despite the existence of weight-reduction strategies such as pharmacological and surgical interventions, the authors concluded that lifestyle modification continues to be of paramount importance.(139)

7. Disadvantaged communities

A review of psycho-behavioural obesity interventions targeting multi-ethnic and minority adults in the United States examined data from 24 controlled intervention studies, representing 23 programs and involving 13,326 adults.(140) Results suggested that future obesity prevention interventions targeting these populations might benefit from incorporating individual sessions, family involvement and problem solving strategies into multi-component programs that focus on lifestyle changes.(140)

8. The National Aboriginal and Torres Strait Islander Nutrition Strategy and Action Plan (NATSINSAP) 2000–2010

NATSINSAP[19] provides a framework for action to improve Aboriginal and Torres Strait Islander health and wellbeing through better nutrition. NATSINSAP was designed to build on existing efforts to improve access to nutritious and affordable food across urban, rural and remote communities across all levels of government, in conjunction with partners from industry and the non-government sector. Developed in recognition that poor diet is central to the poor health and disproportionate burden of chronic disease experienced by Indigenous Australians, NATSINSAP highlights seven key areas for action to improve Aboriginal and Torres Strait Islander health and wellbeing through better nutrition:

- Food supply in remote and rural communities
- Food security and SES
- Family-focused nutrition promotion: resourcing programs, disseminating and communicating 'good practice'
- Nutrition issues in urban areas
- The environment and household infrastructure
- Aboriginal and Torres Strait Islander nutrition workforce
- National food and nutrition information systems

Independent evaluation of the plan has been commissioned by DoHA and is to be completed by October 2009. Although NATSINSAP is due to run until 2010, the key role of NATSINSAP Project Officer is funded only until 30 June 2009.

In order to achieve improvements in Indigenous nutrition, clear and specific objectives, actions and goals with adequate resourcing for implementation are required. The results of the NATSINSAP evaluation should be used to identify successful components of the project. Initiatives for improving indigenous nutrition must be better positioned to be central to the funding available within indigenous health rather than outsourced; similarly, a central coordinating body is required. Clearly established lines of accountability for implementation are also essential.

19 See www.health.gov.au/internet/main/publishing.nsf/Content/health-pubhlth-strateg-food-nphp.htm.

9. Build the evidence base, monitor and evaluate effectiveness of actions

In 2007, the US National Cancer Institute convened a meeting to discuss priorities for a research agenda to inform obesity policy, based on the serious implications for public health and the economy associated with the dramatic rise in obesity levels in the United States over the past several decades.(141) The power of public policy as a tool to effect structural change modifying population-level behaviour has been demonstrated through experiences in other public health initiatives such as tobacco control. Issues considered were how to define obesity policy research, key challenges and key partners in formulating and implementing an obesity policy research agenda, criteria by which to set research priorities, and specific research needs and questions. Five key themes that emerged were:

- The embryonic nature of obesity policy research
- The need to conduct 'natural experiments' resulting from policy-based efforts to address the obesity epidemic
- The importance of research focused beyond individual-level behaviour change
- The need for economic research across several relevant policy areas
- The overall urgency of taking action in the policy arena

The meeting concluded that timely evaluation of natural experiments is of especially high priority for future work. The variety of policies intended to promote healthy weight in children and adults being implemented in communities and at the state and national levels were explored. While some of these policies were supported by the findings of intervention research, the need for additional research to evaluate the implementation and to quantify the impact of new policies designed to address obesity was also highlighted.(141)



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