Community level strategies to reduce weight gain and obesity: a rapid review

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An ***Evidence Check*** Review
brokered by the Sax Institute for the
NSW Department of Health

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NSW HEALTH

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Suggested Citation:

Gill, T., King, L., Hector, D., Hattersley, L., Farrell, L., Chau, J. Community level strategies to reduce weight gain and obesity: An *Evidence Check* rapid review brokered by the Sax Institute (http://www.saxinstitute.org.au) for the Centre for Epidemiology and Research, NSW Department of Health; 2007.

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1 INTRODUCTION

1.1 Purpose of this report

To provide guidance on the main program areas that should be targeted by Area Health Services in NSW to promote healthy weight and prevent weight gain in children and adults.

1.2 Basis of the recommendations in this report

The recommendations in this preliminary report are based on expert opinion after assessment of a series of systematic and non-systematic reviews of the literature relating to obesity prevention. The 2005 report from the NSW Centre for Public Health Nutrition – *Best Options for Promoting Healthy Weight and Preventing Weight Gain in NSW (Gill et al., 2005)* – has served as the foundation of this evidence. More recent reviews of the effectiveness of changing dietary and physical activity behaviours linked to childhood obesity currently being conducted by the Prevention Research Centres (COO, CPHN and CPAH), prepared for submission to NSW Health but not yet published, have provided substantial contributions to this report. Other information has been drawn from:

- Two recent Cochrane reviews
- A literature review of the evidence for interventions to address overweight and obesity in adults and older Australians undertaken by the NSW Centre for Overweight and Obesity, conducted for the Australian Department of Health and Ageing to underpin their framework.
- Reviews undertaken for policy development in Western Australia (WA), South Australia (SA) and Queensland, the UK, Canada and the USA
- Recent systematic and non systematic reviews published in the literature in the last 5 years.

1.3 Placing these recommendations within the context of AHS planning

The terms of reference for this report required the authors to identify the single program and best mix of programs that Area Health Services (AHS) could implement to prevent obesity. Whilst it is feasible to make general judgements of the quality of evidence around the efficacy of various programs or actions that have been evaluated in the literature and identify those with the greatest level of potential, these findings need to be considered within the context of program planning processes with AHS. It is well accepted that no single intervention alone will be sufficient to prevent obesity in the community and that AHS should focus on developing an appropriate portfolio of actions. It is also accepted that the selection of programs to include within this portfolio are

extremely context dependent and will be subject to the influence of a variety of factors, of which the evidence presented here is only one.

1.4 Quality of evidence assessed

Despite the large volume of publications reviewing the evidence relating to obesity prevention programs the findings are relatively consistent but disappointing. The range of programs assessed has been limited and there are considerable gaps in terms of target groups, settings and behaviours addressed which are discussed later. In addition most reported programs have had short implementation periods with limited follow-up. Nevertheless, sufficient evidence can be obtained from a range of information sources to help guide the selection of the most promising programs to promote a healthy weight and prevent weight gain.

1.5 The concept of "promise"

Given the limitations of the available evidence on effective programs for preventing weight gain, innovative approaches need to be applied to appraising the potential benefits of proposed interventions within a program of action. The "promise table" or "promise matrix" has gained wide acceptance since its introduction in the original "Best Options" report (Gill et al., 2005) because it allows the classification of interventions within a matrix based on the estimated population impact (a product of efficacy, population reach and uptake) and the level of confidence provided by the existing evidence that the intervention will produce a benefit under ideal conditions. Interventions can be ranked from least to most promising using this system. This report adopts this approach to assist with the ranking of interventions to prevent obesity.

Figure 1 The promise matrix

Certainty of effectiveness* (Risk)	**Potential population impact^ (return)**		
	Low	**Moderate**	**High**
Quite high	Promising	Very promising	Most promising
Medium	Less promising	Promising	Very promising
Quite low	Least promising	Less promising	Promising

*-The confidence from the evidence that the intervention will produce a benefit under ideal conditions
^ -Efficacy x (population reach x uptake)

1.6 Addressing population weight gain and obesity prevention

Weight gain and obesity develop from a sustained period of energy imbalance where energy intake (from food) exceeds energy expenditure (from physical activity and other metabolic processes). Thus prevention of population weight gain must involve the identification and implementation of programs that result in a reduction of energy intake and/or an increase in energy expenditure to the extent that energy balance is restored. This might sound basic but a large number of obesity programs are planned without any reference to the need to produce changes in dietary or physical activity behaviours of a magnitude capable of achieving a return to energy balance.

Health gains are likely to be largest by systematically addressing single target behaviours in a comprehensive manner across population groups and settings, rather than addressing a number of behaviours each by a single intervention type and single setting.

2 WHICH BEHAVIOURS OFFER THE BEST POTENTIAL TO PREVENT WEIGHT GAIN AND OBESITY?

In their expert report on *Diet, Nutrition and the Prevention of Chronic Disease,* the World Health Organisation (2003) identified a range of factors which have been shown to either increase or decrease the risk of weight gain and the development of obesity (see Table 1).

Table 1 Summary of the strengths of evidence on factors that might promote or protect against weight gain and obesity

Evidence	Decreases risk	Increases risk
Convincing	Regular physical activity High dietary fibre intake	High intake of energy-dense foods* Sedentary lifestyles
Probable	Home and school environment that supports healthy food choices for children Promoting linear growth	Heavy marketing of energy dense foods and fast foods outlets Adverse social and economic conditions in developed countries (especially for women) Sugar-sweetened soft drinks and juices
Possible	Low glycaemic index foods Breastfeeding	Large portion sizes High proportion of food prepared outside of homes Rigid restraint/periodic disinhibition eating patterns
Insufficient	Increased eating frequency	Alcohol

* energy dense foods are high in fat/sugar and energy dilute foods are high in fibre and water such as vegetables, fruits, legumes and whole grain cereals

Source: Adapted from WHO 2003

The WHO guide can be used to identify a range of specific behaviours that could be addressed by Area Health Services in NSW to promote healthy weight and prevent weight gain in children and adults.

These include:

A. Reducing energy intake
- Reducing the intake of high energy dense food (i.e. high in fat and sugar)
- Increasing the intake of low energy dense foods (esp. vegetables and fruits)
- Reducing the intake of sugar sweetened soft drinks and juices
- Reducing the intake of food prepared outside of the home
- Reducing portion sizes
- Ensuring regular meals
- Improving family meal patterns
- Increasing the extent and duration of breastfeeding

B. Increasing energy expenditure
- Increased planned/free physical activity
- Increased incidental physical activity
- Reduced time spent in sedentary behaviours (esp. TV watching)

The extent to which each of these behaviours should be a priority for interventions requires the assessment and integration of evidence from a range of sources. The following "criteria" have been used to assess and rank the relative merit of each behaviour in relation to their ability to address weight gain and obesity based on the evidence presented within the reviews and policy documents presented in Appendix 1. These criteria include:
- Evidence that a change in this behaviour has been associated with improved weight status
- Evidence that the behaviour can be changed to a sufficient degree that it is likely to influence energy balance
- Strength of evidence linking behaviour to weight gain
- Evidence for feasibility of implementation within an AHS domain

Together with consideration of:
- The scope for additional health gain
- Relevance to existing NSW Health and AHS policy and programs
- Consensus within existing policy documents, recommendations and guidelines on obesity prevention strategies that identify this as a priority issue.

As a result of this analysis, a few key behaviours appear to offer more potential than others in preventing weight gain and obesity in adults and children (see Table 2). [The full details of the available evidence which informs these criteria is not covered in this report.]

Table 2 Determining the potential of different behaviours to address overweight and obesity in Area Health Services

Behaviour	Evidence of efficacy in terms of improved weight	Evidence of potential impact on energy balance	Evidence of feasibility of significant behaviour change	Additional health benefits (without harm)	Relevance to NSW Health and AHS policy	Agreement on priority within major guidelines or policy
Reduce high energy dense foods	Low	High	High	High	Moderate	++++
Increase low energy dense foods	_	Low	High	High	High	+++
Reduce sugar sweetened drinks	Low-mod	High	Moderate	High	Moderate	++++
Reduce take away foods	_	Moderate	GAP	Moderate	Low	+++
Reduce portion size	_	GAP	GAP	Low	Low	+
Ensure regular meals	_	V low	Moderate	V low	Low	-
Improve family meals	_	Low	Moderate	Low	Low	-
Improve breastfeeding rates	_	Low	High	High	High	+
Increase mod - vigorous physical activity	Low	Moderate	Moderate	High	Moderate	+++
Increase walking and incidental physical activity	_	Moderate	Moderate	High	Moderate	++++
Reduce sedentary behaviours	Low-mod	Moderate	High	High	Low	+++

The key behaviours which have been identified from this analysis as offering the most potential as intervention points for preventing obesity comprise:

- Reducing consumption of sugar-sweetened drinks
- Reducing time spent in sedentary behaviours (esp. TV watching)
- Reducing the intake of high energy dense foods
- Increasing planned moderate-vigorous physical activity
- Increasing walking & incidental physical activity

The body of available and supporting evidence is not the same for all population groups; Table 3 below indicates those target groups where the current evidence for intervening on the behaviour is most applicable**.**

Table 3 Behaviours that offer the most potential as intervention points within each population group for preventing obesity (alone or in combination with other behaviours)

	Young children 0-5 years	Children	Adolescents	Adults
Best Options		Reducing intake of sugar-sweetened drinks	Reducing intake of sugar-sweetened drinks	
		Reduced time spent in sedentary behaviours (esp. TV watching)	Reduced time spent in sedentary behaviours (esp. TV watching)	
Good Options	Increasing the intake of low energy dense foods (esp. vegetables and fruits)	Reducing the intake of high energy dense food	Reducing the intake of high energy dense food	Reducing the intake of high energy dense food
	Reducing intake of sugar-sweetened drinks	Increased planned moderate to vigorous physical activity	Increased planned moderate to vigorous physical activity	Increased walking and incidental physical activity

While the strength of current evidence for the potential of interventions to make a difference varies across population groups, each of these intervention behaviours is relevant across the whole population. In fact, most health gain is likely to be achieved by systematically addressing a target behaviour in a comprehensive fashion, across population groups and settings.

3 "PROMISING" INTERVENTIONS TO ACHIEVE THESE BEHAVIOUR CHANGES AND CONTRIBUTE TO OBESITY PREVENTION WITHIN AREA HEALTH SERVICES

Previous reviews conducted by the Prevention Research Centres and analyses of other systematic and narrative reviews provide detailed appraisal of evidence on interventions. These reviews have interpreted this data in terms of 'promising' interventions, in order to provide guidance for preventive action.

Some actions are most appropriate at national and state level, and not relevant for implementation by Area Health Services. Those interventions appropriate for Area Health Service level implementation tend to comprise community-based programs, often in partnership with other sectors and agencies, service delivery initiatives, and in some cases policy implementation.

3.1 Suggested promising interventions

1. Reducing sugar-sweetened beverages
    a. School-based education programs to reduce amount of sugar-sweetened beverages consumed
    b. Promoting substitution of sugar-sweetened beverages with water and no sugar alternatives
    c. Increasing availability of water in public places and food service sites to replace sugar-sweetened beverages
    d. Restricting access and availability of sugar-sweetened drinks at schools and public places.

2. Reducing time spent in sedentary behaviours
    a. School-based programs encouraging reduced TV watching
    b. Parent education to restrict access to TV
    c. Rewards system linked to TV access

3. Reducing the intake of high energy dense foods
    a. Pricing interventions by food retailers to increase cost of high sugar/fat snacks and reduce cost of low energy dense snacks and fruit
    b. Food service policy interventions in preschool/school canteens and worksite meal services
    c. Point of purchase prompts

4. Increasing moderate to vigorous physical activity
    a. School-based physical education (especially with parent involvement)
    b. Enhanced access to places and facilities for physical activity
    c. Use of prompts e.g. pedometers, playground markings

5. Increasing walking and incidental physical activity
    a. Social support interventions in a community setting (buddy system)
    b. Enhanced access to places and facilities for physical activity
    c. Point of decision prompts to use stairs

3.2 Gaps in intervention evidence

It is important to note that the research on interventions is highly clustered on various issues and settings (fruit and vegetable consumption, and schools programs, for example), and does not comprehensively cover the full range of potential topics, interventions or target groups. This is significant, as it means there are substantial gaps in the evidence base – where there may be substantial potential for effective interventions, but where none have been tried. One implication of these gaps is that further innovation remains a high priority – designing and evaluating new interventions. As this can form part of an AHS approach, some innovative approaches are considered as promising interventions.

Table 4 Gaps in current intervention evidence relating to obesity prevention

	Limitations of current evidence	
	Children	**Adults**
Setting	Heavy focus on schools and individuals Some focus on family Limited focus on early childhood services, and environmental changes	Focus on workplace and primary health care Limited focus on neighbourhood or community–wide programs
Issue/behaviour	Heavy focus on increasing fruit and vegetables and on moderate –vigorous activity at school Some focus on TV viewing but little on other small screen recreation behaviours Little on incidental activity, energy-dense foods, portion size, take-aways, soft drinks Little on parenting behaviours and early nutrition	Focus on increasing fruit and vegetables Focus on reducing fat intake Little on portion size, take-aways, soft drinks, alcohol, sedentary behaviours
Type of intervention	Emphasis on education/information Little on environmental & policy interventions	Emphasis on education/information Little on environmental & policy interventions
Age group	Focus on school-aged Little on pre-schoolers or adolescents	Emphasis on middle-aged and older adults Minimal work on young adults, or young families
Social and cultural groups	Primarily US studies, including Afro-Americans Little on cultural groups relevant in Australia Minimal focus on Aboriginal and Torres Strait Islander Peoples	Primarily US studies, including Afro-Americans Little on cultural groups relevant in Australia Minimal focus on Aboriginal and Torres Strait Islander Peoples

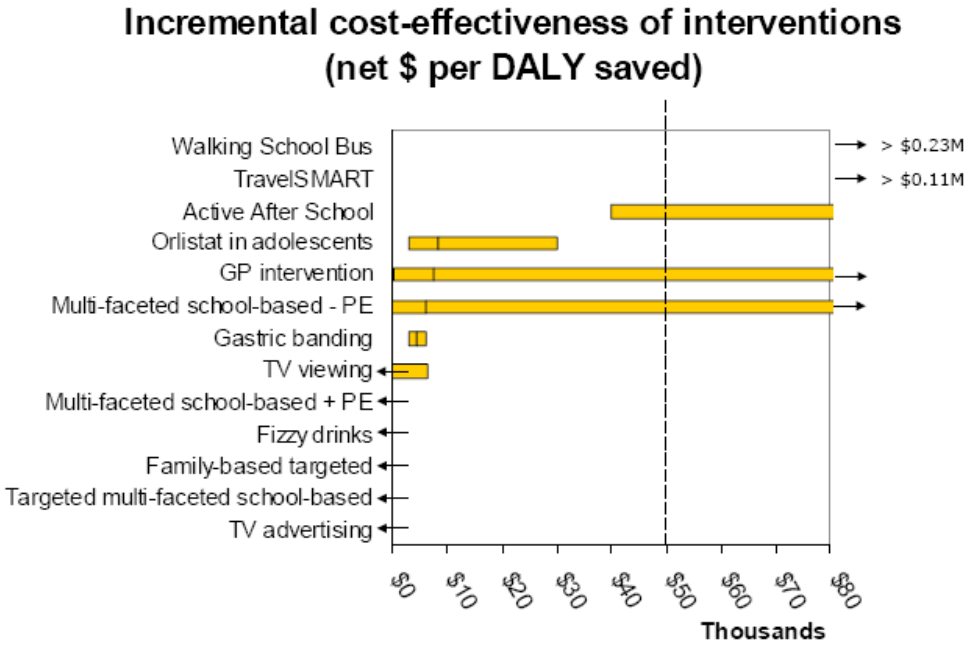
4 WHAT ARE LIKELY TO BE THE MOST COST EFFECTIVE PROGRAMS ?

There have been very few cost-effectiveness analyses conducted on published interventions to address obesity (Wang et al., 2003). One recent study assessed the cost-effectiveness and cost-benefit of Planet Health, a school-based intervention designed to reduce obesity in youth of middle-school age. The school-based intervention was compared with a no intervention alternative, whereby students received the usual curricula and physical education classes. The authors concluded that the Plant Health program was cost effective and that school-based prevention programmes of this type were likely to appropriate uses of public funds.

To overcome this lack of reported cost-effectiveness analyses of obesity prevention programs, the Victorian Department of Human Services (Victorian Department of Human Services, 2006) modelled the cost-effectiveness of intervention to address childhood obesity based on limited published efficacy data from 13 selected interventions. The report was not intended to be a comprehensive assessment of all possible interventions but was instructive in terms of the features of those interventions that were ranked most cost-effective. In general, interventions that have the largest reach and uptake and address dietary change produce the best cost-effectiveness ratios. Thus reducing soft drink consumption which has a large potential reach and uptake and results in a reasonable reduction in energy intake is very cost effective whilst walking school buses which have a low reach and uptake and do not result in large increases in daily energy expenditure rank poorly in terms of cost- effectiveness. It is instructive that both reductions in sweetened drink intake and programs to reduce time watching TV were among a group of six interventions that were rated extremely good value-for-money (i.e. ‘dominant’ net Incremental Cost Effectiveness Ratios) – see Figure 2.

The ACE project (Victorian Department of Human Services, 2006) restricted its analysis to interventions tackling childhood obesity and most agencies tend to direct the majority of resources at developing interventions for preventing obesity children and adolescents. However as Seidell et al (2005) argue, intervention programmes are much more likely to be cost-effective in older adults than in children, which indicates that adults should not be neglected as target populations for obesity prevention.

Figure 2 Summary of the cost effectiveness ratios of the 13 selected interventions assessed in the ACE Obesity project (Victorian DHS, 2006)



5 BEST BUYS FOR OBESITY PREVENTION STRATEGIES AT AN AHS LEVEL

5.1 Priority buys

On the basis of the evidence reviewed within this report the following strategies are rated as being of the most value to AHS in addressing weight gain and obesity at a population level.

1. Reduce sugar-sweetened beverage consumption.

This is a distinct behaviour change with no negative consequences, can result in a significant reduction in energy intake, meets other health objectives and is rated highly cost effective by the ACE project. It is particularly relevant for children and adolescents but has relevance for adults (especially young adults) as well.

Current evidence for effective interventions to achieve this objective is limited. The four studies identified in our recent review (Gill et al., 2005) show that sugar-sweetened beverage consumption is likely to be decreased by a number of different actions, including education to encourage reduction in consumption, substitution with sugar-free beverages and providing free water or increasing its availability. However the consistency of the findings of limited interventions as well as the results of longitudinal studies assessing the strength of the impact of sugar-sweetened drinks on weight gain make this a high priority target behaviour.

2. Reduce time spent in small screen sedentary behaviours

This is a simple, discrete behaviour to change, may be associated with improved dietary outcomes and can be promoted in a variety of settings and in combination with other behaviour change. It is also rated highly cost-effective by the ACE project. Appears to be more relevant for older children but may have a benefit in adults. Current evidence for effective interventions is limited.

In our recent review of interventions with children and adolescents (Gill et al., 2005), nine separate studies found a significant reduction in sedentary behaviours compared with a control group. In many of the studies interventions were designed to both promote physical activity and reduce time spent in sedentary or small screen recreation. In some cases, both outcomes were achieved together with an improvement in weight status (as assessed against controls), but not necessarily. Another recent systematic review by DeMattia et al (2006) also included clinic-based studies and found consistent improvements in health behaviours and weight status in children from programs addressing sedentary behaviours across all age groups of children.

Overall, it appears that it is feasible to achieve reductions in time spent viewing TV, and in some cases there may be increases in (measured) physical activity. Specific strategies found to be effective in reducing TV viewing comprise curriculum, in school and preschool settings, providing advice to parents to limit children's TV viewing, advice and goal setting in a clinical setting, and using accelerometers for young people to gain feedback on their activity levels.

3. Reduce intake of high energy-dense foods

This behaviour change has significant potential to reduce energy intake and impact on weight, and is relevant for adults, adolescents and children. There is no single, well defined intervention that stands out as most effective; however multiple strategies to achieve this outcome have been evaluated. For example, reduced intake of high energy-dense foods could be achieved by reducing fat intake/foods high in fat, or reducing consumption of extra foods, such as hot chips, potato crisps and confectionary - most of which are energy-dense. Another potential approach is to seek to substitute fruit and vegetables for energy-dense foods, both as snacks and in meals. Thus, promoting fruit and vegetables could be considered as a complementary intervention.

In our recent review (Gill et al., 2005), most studies related to children were interventions to change the fat content of foods sold in schools or increase the availability of low fat food options. Nearly all of the studies were in North American schools in which 95% of students are offered the National School Lunch Program (NSLP); thus are not directly relevant to the Australian setting. Several of the studies did not intend to decrease the calorific content of foods served overall, and most did not measure nutrient intakes outside of the school environment thereby not permitting determination of the effect of any compensatory effect. Overall, school policy that limits the sale of unhealthy food options across all food services and vending outlets appears promising and appropriate. While foods from school canteens constitute only a small proportion of overall dietary intake, the suggested 'ripple' effect' of school canteens (Bell & Swinburn 2005) might help to reduce the overall energy intake of children.

Generally interventions on foods sold in schools resulted in a lower intake of fat as a percentage of calories consumed, which has obvious longer term health impacts in terms of cardiovascular disease, but may not be sufficient to impact on daily energy intake.

The evidence from studies promoting specific foods or food types and limiting the availability of other food types suggests that such approaches can be applied in other settings (e.g. canteens in workplaces or other food service outlets) and applied to other food types, such as soft drinks. Studies on pricing and point of purchase prompts, conducted in US worksites and canteen settings, show consistent positive effects on food purchasing and food consumption (French 2003). The inclusion of point-of-purchase promotions including active participation and encouragement by school service staff such as use of a verbal prompt, together with increased availability, has shown

promise in increasing consumption of fruit and vegetables (e.g. Schwartz et al 2007; Perry et al 2004; Perry et al 1998).

Increasing the intake of low energy-dense foods has been promoted as a complimentary strategy which also has the capacity to reduce the intake of high energy-dense foods. Fruit and vegetables are the most widely promoted low energy-dense foods which are thought to lower the risk of obesity through improved satiation and a displacement in the consumption of energy dense foods, thereby reducing energy intake. However, evidence of the relationship between increased intake of fruit and vegetables and reduced energy intake or weight status is very limited and currently restricted to small clinical trials. Very young children may be an age group where a focus on low energy dense foods such as fruits and vegetables may be more productive than a focus on high energy-dense foods and snacks. This is a time when dietary behaviours and patterns are being formed and where the displacement of high energy snacks with fruits and vegetables is also more likely to have an impact on the energy content of transitional diets.

4. Increase moderate to vigorous physical activity

Undertaking a sufficient level of moderate to vigorous physical activity meets numerous health objectives. However, the ability of this behaviour to impact on weight status is limited when not used in conjunction with other interventions. A wide range of strategies have been successful in achieving an increase in moderate-to-vigorous physical activity. This is relevant to all age groups but may require different implementation strategies and mechanisms for different age groups and genders.

Our recent review of interventions for primary school aged children (Gill et al., 2005) identified a number of different approaches that are effective. Creating environments which facilitate and promote physical activity, such as providing equipment and stimulating playground areas has been found to increase time spent in moderate-to-vigorous physical activity at school. A number of programs that combined curriculum components with promotion of opportunities for participation in extra-curricula activities have been found to increase physical activity levels. A more indirect approach, providing professional development and support can result in increases in the amount of activity delivered as part of the school day (Naylor et al 2006, Van Beurden et al 2003). Programs that integrate strategies into the school curriculum and augment these with family involvement have produced positive outcomes (Christodoulos et al 2006, Manios and Kafatos 2006). One particularly substantial program of six years duration comprised a sequential learning process, appropriate reinforcement of key themes and full integration into the existing curriculum, as well as professional development for teachers and intensive and ongoing family involvement (Manios and Kafatos 2006). The positive effects of this program were sustained over time and after four years post-intervention the physical activity levels of the intervention group remained higher than at baseline.

A recent review of interventions for adolescents showed that parent involvement, altering the school environment, school wide promotion of physical activity and altering program or lesson delivery to allow more time for actual activity are key strategies. The review also suggests that the specific strategies required differ between boys and girls. For example, school policies and environments which facilitate physical activity in girls include altering uniform requirement, engaging community providers, focusing on fun rather than competition, altering approaches to lesson delivery and, in some cases, offering girls only classes (Pate et al 2005, Fairclough & Stratton 2006). Boys increased their physical activity when strategies included making of equipment available to students, and organising and promoting lunchtime activity (Sallis et al 2003). Interventions which aim to develop adolescent skills in planning to be active, setting targets, monitoring personal activity levels, as well as identifying and overcoming barriers to being active have also produced positive results (Young et al 2006, Hortz & Petosa 2006).

5. Increase walking and incidental physical activity

There is no evidence from existing studies that increasing walking and incidental physical activity leads to improved weight status however it does have considerable potential to contribute to maintaining energy balance and is a key component of total daily energy expenditure. This behaviour is the easiest physical activity behaviour to influence and is associated with considerable health benefits and no harm. It is likely to be more effective in assisting obesity prevention when combined with other strategies. This strategy is more appropriate to adults.

A review undertaken buy the Prevention Research Centres (not published) for the Federal Department of Health and Ageing in 2005 identified multiple small studies that identified ways of increasing adult levels of physical activity, particularly walking. Initiatives which promote and support participation in community-based physical activity options, through conducive environments, availability of programs across a range of organisations and social support, in the form of buddy systems have all been shown to contribute. There is some evidence that brokerage systems can facilitate referral and uptake of appropriate intensity programs, and support primary health care interventions and advice. In some cases, physical activity programs may form part of weight management or chronic disease prevention programs. While workplace physical activity programs can be effective, there is limited evidence on what is required to ensure widespread uptake by workplaces and employees, appropriateness across workplaces and sustainability.

The implementation of urban planning guidelines which increase walkability appears worthy of further action and investigation. Such approaches can have widespread benefits.

The US Centers for Disease Control and Prevention undertook a systematic review of the effectiveness of selected population-based interventions designed to increase levels

of physical activity in 2001 (Kahn et al., 2001). This study identified point-of-decision prompts placed by elevators and escalators to encourage people to use nearby stairs for health benefits or weight loss were effective at increasing physical activity. Overall these signs increased stair use by around 54%. This intervention was shown to be effective in a variety of settings including train, subway, and bus stations, shopping malls, and university libraries and in a variety of population subgroups including men and women, both obese and not obese.

5.2 How should the best buys be implemented?

The best buys identified above are framed in terms of behavioural objectives. There are many different ways in which related programs could be implemented, separately or in some cases, in combination. Either way, program implementation is frequently organised and conducted through local settings. For example, implementation settings may comprise:

- schools
- childcare services
- community organisations, including sporting and recreation groups
- local government
- workplaces
- commercial and food retail outlets
- health settings and services.

There is considerable evidence of effectiveness, and popular appeal, in support of conducting initiatives through schools. This is certainly a significant setting for reaching children, and to a lesser extent parents. The strength of evidence may be somewhat misleading, however, to the extent that the majority of studies are conducted in this setting. Thus, the absence of studies in other settings does not mean they cannot be similarly effective avenues for implementing programs. It is particularly difficult to obtain high quality evidence of effectiveness regarding interventions in community settings, as it is difficult to control potential sources of bias; thus, the effectiveness of programs in these settings may be somewhat under-represented in research studies.

5.3 Other issues need to be considered in defining priority programs for obesity prevention

5.3.1 Identify a portfolio

It is obvious that no single intervention will have the capacity to prevent obesity in the community and that to achieve changes in obesity outcomes, Area Health Services will need to implement a portfolio of actions. That is, a mix of complementary interventions which reinforce each other and address a mix of behaviours and target groups will be required to achieve changes in population levels of weight status. In fact, to achieve sufficiently large changes in energy intake and energy expenditure that could effect

energy balance at the population level, the public health effort needs to be intense, wide-reaching and sustained over a long period.

Generally, the implementation and effectiveness of programs will be enhanced by supplementary initiatives, such as communication and public education through local media and other channels, promotion and reinforcement through health professionals' capacity to opportunistically provide accurate information and consistent advice.

5.3.2 Implement as appropriate

To make judgements concerning the best mix of interventions for area-level portfolios will also involve further planning and further processes of selection. At area level, specific considerations relate to appropriateness and feasibility. These local level criteria also include:

- Issues of equity (who has access and who benefits)
- Relevance and acceptability to the community (taking account of socio-economic, Aboriginal and Torres Strait Islander, and cultural and linguistic diversity characteristics)
- Likely cost of implementation
- Availability of appropriate resources
- Capacity of staff
- Level of engagement of key partners.

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Appendix 1 PROMISE TABLE

Intervention	Very promising - high gain, medium certainty	Very promising - moderate gain-high certainty	Promising - high gain, low certainty	Promising - moderate gain, medium certainty	Less promise – moderate gain, low certainty
SUGARY DRINKS					
Nutrition education on reducing sugary drinks consumption	√				
Promoting substitution with water and no sugar alternatives	√				
Increasing access to/availability of water and promoting water as a preferred beverage			√		
Restricting access and availability of sugar-sweetened drinks at schools and public places				√	
Interventions to promote water and reduce sugary drinks with older adolescents and young adults			√		
SEDENTARY BEHAVIOURS					
School-based programs encouraging reduced TV watching	√				
Parent education to restrict access to TV			√		
Rewards system linked to TV access					√
ENERGY_DENSE FOODS					
Pricing interventions by food retailers/ canteens to increase cost of high sugar/fat snacks and reduce cost of low energy dense snacks and fruit		√			
Food service policy interventions – covering food service menus, pricing, vending machines and lunchboxes (children) - in preschool/ school canteens and worksite meal services				√	
Point of purchase prompts			√		
MOD-VIGOROUS PHYSICAL ACTIVITY					

Intervention	Very promising - high gain, medium certainty	Very promising - moderate gain-high certainty	Promising - high gain, low certainty	Promising - moderate gain, medium certainty	Less promise – moderate gain, low certainty
School-based physical education (especially with parent involvement)		√			
Enhanced access to places and facilities for physical activity				√	
Use of prompts e.g. pedometers, playground markings			√		
WALKING AND INCIDENTAL ACTIVITY					
Social support interventions in a community setting (buddy system)				√	
Enhanced access to places and facilities for physical activity				√	
Point of decision prompts to use stairs				√	