



**OBESITY PREVENTION IN CHILDREN AND YOUNG PEOPLE  
AGED 0-18 YEARS  
A Rapid Evidence Review  
SUMMARY REPORT  
Physical Activity, Nutrition and Obesity Research Group  
(PANORG)**

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**Note:** A fully referenced technical version of this report is also available

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## THE KEY MESSAGES

- Meeting the NSW Government target to reduce child overweight and obesity by 5% within 10 years (by 2025) will require a paradigm shift, with substantially enhanced investment for a comprehensive set of initiatives, delivered at scale and sustained for the decade. The purpose of this review is to outline what additional evidence has become available in the last five years on childhood obesity prevention strategies – with particular focus on those that have demonstrated effectiveness, and/ or show particular promise for intervening at a population level and/or children’s settings in NSW.
- Comparing 2015 with 2010 data, NSW is one of the few jurisdictions in the world to have achieved an improvement in childhood obesity rates with modest improvements in the proportion of overweight students in years K, 4 and 6 and apparent stabilization of the overall combined overweight and obesity rate for children age 5-16.
- These modest improvements have been achieved after substantial government investment in a portfolio of obesity prevention and management programs. Maintaining this current portfolio of programs and interventions in NSW at the existing intensity (‘business as usual’), might in the best case scenario, lead to improvements in the prevalence of child overweight and obesity in the range of 0.0% — 0.3% per annum.
- No single solution creates sufficient impact to reverse obesity: only a systemic, sustained, comprehensive portfolio of cumulative initiatives, delivered at scale, is likely to be effective in tackling overweight and obesity.
- Government leadership and policy action are key elements that enable and support the population behaviour change necessary to impact on child obesity. Whilst some policy initiatives may require co-operative action at a national level there are opportunities for NSW to take a leadership role; other policy actions can be initiated at a state level.
- Policy action (especially fiscal policy) reducing consumption of sugar sweetened beverages (SSBs) is identified as the single most cost-effective intervention and would save an estimated \$55 for every \$1 invested. There is strong public support for fiscal policy in Australia, with 69% of grocery buyers reporting they were in favour of a tax on soft drinks to reduce the cost of healthy food, with parents being more supportive than non-parents.
- Policy action reducing marketing of energy dense nutrient poor (EDNP) foods is rated as the second most cost-effective intervention and would save an estimated \$38 for every \$1 invested.
- All policy options identified in this report are highly cost-effective from a societal perspective, and some policy options would generate revenue as well as delivering health gains. All identified policy actions should be considered for inclusion to achieve the comprehensive approach required to achieve the Premier’s 2025 target.
- The review highlights gaps in knowledge of what works, under what circumstances, and for whom, in childhood obesity prevention and makes a series of recommendations for future research priorities. An important evaluation strategy to consider is the implementation of a companion cohort study to the 45 and Up study. That is, follow a large cohort of children through childhood and adolescence, tracking a number of different health outcomes over several years. This would act as an explanatory study of the incidence of obesity – why and how and at what rate do children move from acceptable weight to overweight and obesity. The practical aspects of such a cohort could be used to evaluate NSW interventions and explain weight gain in childhood.

## THE EVIDENCE AT-A-GLANCE

### OVERVIEW

- Prevention of childhood overweight and obesity is a priority for the NSW government and has recently been identified as a priority by the State Premier. The NSW Office of Preventive Health (OPH) commissioned The Physical Activity Nutrition Obesity Research Group (PANORG) at the University of Sydney to undertake a rapid evidence review with a focus on obesity prevention in children and adolescents (0-18 years). PANORG is co-located with and was supported by the World Health Organization (WHO) Collaborating Centre for Physical Activity, Nutrition and Obesity. The purpose of the review was to examine new evidence (published since 2011) and to provide advice on obesity prevention policy options for this target population.
- A team of nine researchers examined a wide range of public health scientific databases supplemented with online searches of grey literature, looking especially at higher quality evidence reviews (meta-analyses and systematic reviews of randomised trials or of longitudinal studies). Expert recommendations on childhood obesity prevention were also noted (for example, the report of the WHO Commission on Ending Childhood Obesity (ECHO). This methodology was used to approximate a formal systematic review and to identify evidence-based best practices and policy options. The overall quality of systematic reviews was acceptable with assessments of 34% (n=31) high quality, 59% (n= 55) moderate quality and 8% (n= 7) lower quality; systematic reviews scoring less than 4 on the AMSTAR checklist were excluded from the analysis.
- Section 3 of the report describes the core research questions addressed; section 4 describes the methods sources of evidence and screening process; section 5 maps the relevant evidence against the specified research questions; section 6 discusses policy implications; and section 7 describes the status and limitations of current evidence. Appendices cover model policy options (WHO ECHO), policy options to address harmful marketing, an international overview of relevant taxation policies; knowledge gaps and priorities for future research; a bibliography on systems approaches to obesity; and a tabulation characterising the key scientific studies identified by the research team.
- WHO has stated that obesity *can* be prevented through multisectoral action that simultaneously addresses different sectors that contribute to the production, distribution and marketing of food, while concurrently shaping an environment that facilitates and promotes adequate levels of physical activity (PA).
- NSW can claim to be one of the few jurisdictions in the world to have achieved an improvement in childhood obesity rates. Sub-group analyses from the NSW Schools Physical Activity and Nutrition Survey (SPANS) comparing 2015 data with 2010, provide evidence that modest improvements have been achieved in the proportion of overweight NSW students in years K, 4 and 6 with apparent stabilization of the overall combined overweight and obesity rate for children age 5-16 years.
- A sense of optimism in NSW, within an otherwise gloomy global scenario, has arguably been possible because NSW has taken the long-term strategic approach recommended by WHO. The observed modest improvements have been achieved only after substantial government investment in a range of obesity prevention and management programs in the early childhood and primary school ages (e.g., Munch and Move, Supported Play Groups, and Go4Fun) and in the school setting (e.g., Crunch and Sip, and Live Life Well @ School). The NSW Government target to reduce child overweight and obesity by 5% within 10 years (by 2025) is ambitious. Maintaining the current portfolio of programs and interventions in NSW at the existing intensity ('business as usual'), could lead to reductions in child overweight and obesity in the range of 0.0% — 0.3% per annum.
- Meeting the target will require a paradigm shift with substantially enhanced investment for a comprehensive set of initiatives, delivered at scale and sustained for a decade. No single solution creates sufficient impact to reverse childhood obesity: only a comprehensive, systemic program of multiple interventions is likely to be effective. All of the interventions recommended in this report are highly cost-effective from a societal perspective and some would generate revenue. For example, policy action on SSBs (the single most cost-effective intervention) would save an estimated \$55 for every \$1 invested. Similarly, policy action reducing marketing to children and adolescents of EDNP foods, (the second most cost-effective intervention) would save an estimated \$38 for every \$1 invested. Action on SSBs would also raise substantial revenue annually as well as delivering health gains.
- We identified 5 eligible systematic reviews for examining social marketing strategies. In general, results suggest that social marketing campaigns targeting children can be effective if well designed, implemented, resourced, and evaluated. However, it should be noted that the available evidence is limited, with much of it relating specifically to mass media campaigns.

## ***EVIDENCE FOR ACTION - BY POPULATION GROUP, SETTING AND STRATEGY***

### ***0-5-year-olds***

There is strong evidence, based on several high quality randomised controlled trials (RCTs) for the effectiveness of obesity prevention in children aged 0-2 (4 of these trials are from Australia and New Zealand). The investigators of these four regionally based trials came together to form the Early Prevention of Obesity in Childhood (EPOCH) prospective meta-analysis collaboration. EPOCH interventions have resulted in improvements in BMI at ages 18-24 months, as well as increased breastfeeding duration and a reduction in TV viewing. This approach, involving the largest trials in the 0-2 age group (total N>2000), remains a world first. The most promising obesity prevention interventions for children under 2 years of age appear to be those that focus on diet and responsive feeding. There is moderate evidence for preventive interventions in 3–5 year-old pre-schoolers, with more successful interventions requiring high levels of parental engagement, use of behaviour change techniques, a focus on skill building and links to community resources. Overall design specifications for obesity prevention programs in this age group are set out in Table 3.

### ***Childcare setting***

To date there is weak-to-moderate evidence for the effectiveness of childhood obesity interventions in the childcare setting. Available research suggests that interventions can be effective in impacting weight outcomes and that the likely success factors are (i) high parental involvement; (ii) parents encouraging their children to drink water in preference to SSBs; (iii) including specific diet/PA components in programs; and (iv) ensuring consistency of educational material across settings.

### ***School Setting***

There is strong evidence for the effectiveness of child obesity prevention programs improving BMI, particularly for programs targeted to children aged 6 to 12 years. Most evidence comes from programs located in the school setting itself (with involvement of other settings in some cases). There is strong evidence for the effectiveness of (i) PA-only interventions delivered in schools with home involvement and for (ii) combined diet– PA interventions delivered in schools when *both* home and community components are also included. There is moderate evidence for the effectiveness of school-based interventions: (i) targeting either diet or PA singly; (ii) combining interventions delivered in schools with home *or* community components; and (iii) combining interventions delivered in the community with a school component.

### ***Children aged 5-12 years/ Primary schools***

There is strong evidence for multi-component interventions as noted above however PA (only) focussed programs can be effective. There is moderate evidence for effective environmental components including (i) organised physical activities during breaks, before and after school, (ii) improved availability of PA opportunities in and around the school environment; (iii) increased physical education lesson time; (iv) improved availability or accessibility of healthy food options; and (v) restricted availability and accessibility of unhealthy food options. Moderate evidence supports the effectiveness of sedentary behaviour interventions which can have small but significant effects on reducing BMI, with consistent findings for the benefits of restrictions on TV viewing time. The level of parental involvement is an important success factor for these sedentary behaviour interventions.

### ***Young people aged 13-18 years***

Young people or adolescents (13-18 years old) pose a challenge for obesity prevention program designers and currently we lack strong conclusive evidence on effective interventions. Parental involvement has less influence here compared to younger age groups. Targeting adolescents specifically with obesity prevention /education programs appears not to be as effective as a taking a broader community-wide approach, incorporating interventions which target environments and upstream prevention strategies noted elsewhere in this report (for example, tackling marketing of EDNP foods including SSBs). The implication is that unless public policy addresses marketing of EDNP foods and affordability/accessibility of SSBs, gains achieved with younger age groups may be lost during adolescence.

### ***School food services and environments including school canteens***

There is strong and consistent evidence that multi-component interventions, particularly interventions of longer duration, that include changes to the nutrition environment, can be effective in influencing weight status, and specific food consumption patterns such as an increase in fruit and vegetable consumption. Program success factors appear to centre on (i) changing the availability of foods at school; (ii) incorporating a mix of educational and environmental interventions; and (iii) ensuring sustained duration of interventions. This strong evidence is confined to primary-school-age children. For the secondary school phase there is moderate evidence for the effectiveness of educational interventions on food intake and weak evidence for multi-component interventions. Promising new evidence supports: (i) interventions to target portion size (specifications are detailed in Table 7 of the full report); (ii) audit and feedback processes to support implementation of healthy school canteens; and (iii) investing in more intense/ higher 'dose' of program interventions to support healthy food provision in schools. Broad implementation of healthy food procurement policies (in schools and other public settings relevant to children, adolescents and their parents) has the potential to increase the overall demand for more healthy products, and to drive the reformulation of foods by food manufacturers.

### ***Active travel strategies***

There is consistent moderate evidence that active travel strategies can result in modest increases in PA and fitness, with active traveller school students accumulating more daily moderate-to-vigorous physical activity (MVPA) than those using motorised transport in the majority of studies. A growing evidence base suggests that interventions to promote the uptake and maintenance of active travel through adolescence may offer protection against the development of excess BMI. New evidence from a UK longitudinal study of over 2000 pupils shows that a consistently or predominantly active travel pattern is associated with a lower BMI for boys; an effect on girls BMI was not apparent however. The high tracking of active travel from childhood through adolescence (ages 12 to 17 in the UK study) suggests that early intervention during the transition from primary to secondary school, followed by interventions to promote maintenance of active travel through adolescence, may be of greatest benefit. The NSW Active Travel Charter for Children is an important and highly recommended initiative in this context.

### ***Home and family-centred strategies***

There is strong evidence for the home and family setting as a context to address reductions in TV viewing / screen time in younger children. There is weak to moderate evidence for other home-/ family-centred strategies. Intervention success is generally found to be higher in younger compared to older children. Four success factors have been identified for designing more effective interventions: (i) consistency of educational material across settings; (ii) capacity building of parents; (iii) parents encouraging their children to drink water in preference to SSBs; and (iv) level of parental satisfaction and participation. As noted above, the most promising obesity prevention interventions for children under 2 years of age appear to be those that focus on diet and responsive feeding. Interventions to promote healthy family meals can be effective; suggested program design specifications include goal setting, interactive group activities, interventions focussed on cooking and food preparation, cost, shopping, and adolescent influence.

### ***Community-based strategies***

There is moderate evidence for the effectiveness of community-based initiatives that include a school component. Improvements have generally been limited to weight change in primary school-aged children, with limited evidence of changes in healthy eating or PA (but not weight change) in the other age groups. There is more convincing local evidence of effectiveness from one community-based program implemented in NSW (Good for Kids); a case study is provided as Table 5 of the full report.

### ***Primary health care/ health service setting***

For prevention there is as yet only weak evidence for the effectiveness of primary care-based interventions and the current generation of programs is generally very resource intensive. For treatment / management of paediatric overweight and obesity there is strong evidence for the effectiveness of interventions in the primary care setting; results are modest but important. Success factors for interventions are: (i) training for health professionals before intervention delivery; (ii) including behaviour change components (healthy diet, PA and sedentary behaviour); (iii) effecting behaviour change via a combination of counselling, education, written resources, support and motivation; and (iv) tailoring intervention intensity according to whether behavioural, anthropometric or metabolic changes are the clinical priority.

### ***Equity and ethical perspectives on prevention strategies***

There is weak evidence that community-based initiatives at the very least do not worsen health inequalities and may actually reduce them; similarly, there is weak evidence that school-based interventions do not exacerbate inequalities. There is weak-to-moderate evidence that programs targeting socioeconomically disadvantaged children under 2 years of age can be effective. Few obesity prevention studies report assessing the possible harm or unintended consequences of interventions; current evidence suggest that these strategies do not increase body image concerns, unhealthy dieting practices, level of underweight, or unhealthy attitudes to weight, and that all children can benefit. Obesity prevention interventions should incorporate safeguards and ensure evaluation of unintended consequences as well as intended outcomes.

### ***Strategies to reduce consumption of sugar-sweetened beverages (SSBs)***

Policy action (especially fiscal policy) reducing consumption of SSBs is identified as the single most cost-effective intervention and would save an estimated \$55 for every \$1 invested. There is strong public support for fiscal policy in Australia, with 69% of grocery buyers reporting they were in favour of a tax on soft drinks to reduce the cost of healthy food, with parents being more supportive than non-parents. The WHO Commission on Ending Childhood Obesity (ECHO) report has recommended that governments consider fiscal policies, such as taxes to reduce the consumption of unhealthy foods such as SSBs and EDNP foods.

### ***Strategies to reduce children's exposure to marketing of EDNP foods***

Research evidence shows that unhealthy food marketing contributes to the high prevalence of childhood overweight and obesity. Policy action reducing marketing of EDNP foods is rated as the second most cost-effective intervention and would save an estimated \$38 for every \$1 invested. Reducing children's exposure to the marketing of EDNP foods and beverages would constitute a significant environmental change, but one which is feasible and cost-effective to implement, and has been widely endorsed. The WHO ECHO report has recommended that governments develop regulations on marketing to limit the consumption of foods and beverages high in fat, sugar and salt by infants and young children.

## EVIDENCE SUMMARY TABLE

| STRATEGIES & SETTINGS  | POPULATION  |   |   |
|--|---|---|---|
|  | Preschool –aged children (0-5 years)  | Primary school-aged children (5-12 years)   | Secondary school aged young people (13-18 years)  |
| Setting: Childcare /pre-school   | [Weak-to-moderate evidence]<br>(i) high parental involvement; (ii) parents encouraging their children to drink water; (iii) including specific diet/PA components in programs; and (iv) ensuring consistency of educational material across settings.   | Not applicable  | Not applicable  |
| Setting: School education  | Not applicable  | <p><b>[Strong Evidence]</b><br/>(i) physical activity-only interventions delivered in schools with home involvement and for (ii) combined diet–physical activity interventions delivered in schools when both home and community components are also included.<br/>(iii) targeting either diet or physical activity singly; (iv) combining interventions delivered in schools with home or community components; and (v) combining interventions delivered in the community with a school component.</p> <p><b>[Moderate Evidence]</b><br/>(i) organised physical activities during breaks, before and after school,<br/>(ii) improved availability of physical activity opportunities in and around the school environment; (iii) increased physical education lesson time; (iv) improved availability or accessibility of healthy food options; (v) restricted availability and accessibility of unhealthy food options; and (vi) sedentary behaviour interventions with parental involvement</p> | <b>Lack of evidence</b> for consistently effective interventions. Broader community-wide approach, incorporating interventions which target environments and upstream prevention strategies ( Environmental change, social norms, tackling marketing of EDNP foods including SSBs). |
| Strategy: school canteens/food services  | Not applicable  | <p><b>[Strong Evidence]</b><br/>Multi-component interventions, particularly interventions of longer duration, that include changes to the nutrition environment</p>   | <b>[Moderate Evidence]</b><br>Educational interventions on food intake; multi-component interventions   |
|  | Promising emerging evidence supports: (i) interventions to target portion size; (ii) audit and feedback to support implementation of healthy school canteens; and (iii) investing in more intense/ higher ‘dose’ programs to support healthy food provision in schools; ((iv) broad implementation of healthy food procurement policies to increase the overall demand for healthier products, and to drive the reformulation of foods by food manufacturers. |   |   |
| Strategy: sugar sweetened beverages [SSBs] [reduce consumption]                  | <b>Most cost-effective intervention</b> overall and would save an estimated \$55 for every \$1 invested. Strong public support (69%). Recommended by WHO Commission on Ending Childhood Obesity [ECHO]  |   |   |
| Strategy: marketing of energy dense nutrient poor [EDNP] foods [reduce exposure] | <b>Second most cost-effective intervention</b> overall and would save an estimated \$38 for every \$1 invested. Recommended by WHO Commission on Ending Childhood Obesity [ECHO]  |   |   |

## EVIDENCE SUMMARY TABLE

| STRATEGIES & SETTINGS                               | POPULATION  |  |   |
|---|---|--|---|
|   | Preschool –aged children (0-5 years)  | Primary school-aged children (5-12 years)  | Secondary school aged young people (13-18 years)  |
| Strategy: Active travel                             | Not applicable  | <b>[Moderate Evidence]</b><br>Early intervention during the transition from primary to secondary school, followed by interventions to promote maintenance of active travel through adolescence<br><i>NSW active travel charter for children</i>          | <b>[Moderate Evidence]</b><br>Early intervention during the transition from primary to secondary school, followed by interventions to promote maintenance of active travel through adolescence<br><i>NSW active travel charter for children</i> |
| Setting: Home and Family                            | <b>[Strong Evidence]</b><br>Programs focused on reductions in TV viewing / screen time in <i>younger</i> children. Design specifications for effective interventions: (i) consistency of educational material across settings; (ii) capacity building of parents; (iii) parents encouraging their children to drink water; and (iv) high level of parental satisfaction and participation<br><b>[Weak-to Moderate Evidence]</b><br>Interventions to promote healthy family meals can be effective provided they include goal setting, interactive group activities, and interventions focused on cooking and food preparation, cost, shopping, and adolescent influence |  |   |
| Setting: Community                                  | Insufficient evidence   | <b>[Moderate Evidence]</b><br>Community-based initiatives that include a school component.<br><b>Note:</b> More promising local evidence exists for NSW from the <i>Good for Kids - Good for Life</i> Program Evaluation (see case study in full report) | Insufficient evidence   |
| Setting: Primary Health Care and Health Services    | <b>[Strong Evidence]</b><br><b>0 -5 years</b><br>Treatment / management (but not prevention) of paediatric overweight and obesity with modest improvements<br><b>0-2-years</b><br>EPOCH styled intervention increased breastfeeding duration and a reduction in TV viewing<br><b>[Moderate Evidence ]</b><br><b>3-5-years</b><br>Parental engagement, behaviour change techniques, skill building, links to community resources   | <b>[Strong Evidence]</b><br>Treatment / management (but not prevention) of paediatric overweight and obesity with modest improvements  |   |
| Strategy: Social Marketing and Mass Media Campaigns | Effective if well designed, implemented, resourced, and evaluated. Evidence is limited to mass media campaigns  |  |   |



# PANORG

Physical Activity Nutrition Obesity Research Group



WHO Collaborating Centre  
for Physical Activity Nutrition and Obesity

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