

## **Obesity 2016**

1. The management of the obesity crisis in Australia is a national and economic priority, and Australia's response to it must be commensurate with the breadth of its prevalence, the speed of its growth, and major impacts on individuals and society.
2. Combating obesity demands a whole-of-society approach, requiring the participation of governments, non-government organisations, the health and food industries, the media, employers, schools, and community organisations.
3. Accurate data on the prevalence of obesity, as well as monitoring of body weight trends is a vital component of understanding the extent of the problem. Such efforts must recognise and account for potential bias such as low response rates and differences in sampling.
4. A whole of society response should incorporate measures for the prevention and reduction of excess weight in the population, including treatments for individuals.
5. Limitations in current knowledge about which obesity interventions are effective should not be a reason for inaction, or for adopting only tentative and short-term measures.
6. A whole of society response to obesity should be strategic, and coordinated at a national level by the Federal Government, which must commit to specific national goals for reducing obesity and its health effects in Australia.
7. Governments at all levels should employ the full range of policy, regulatory, and financial instruments available to them to modify the behaviours and social practices that promote and sustain obesity.
8. The major focus and effort in preventing obesity should be on children and adolescents. Prevention and early intervention should start with the pregnant mother and foetus, and continue throughout infancy and childhood.
9. National dietary, physical activity, and weight management guidelines must be kept up to date and evidence based. This material should be complemented by national comprehensive and effective social marketing campaigns.<sup>1</sup>

The AMA considers the following measures to promote appropriate dietary behaviour and greater physical activity, and to treat obesity, should be adopted as part of a whole of society approach.

### **Physical activity**

10. Creating healthy communities should be the goal of town planning. Planning regulations governing housing, urban development, and transport infrastructure should mandate the incorporation of measures to promote and facilitate physical activity.
11. School and early learning settings curricula, the physical environment and community relationships must be modelled to promote physical activity and other health related behaviours, outcomes and skills.

### **Nutritional measures**

12. The AMA reaffirms its position that all Australian mothers should be encouraged and supported to solely breastfeed their babies for the first six months of life (unless there are medical contraindications).
13. It is vitally important to increase nutritional literacy among mothers to be and new mothers to support good nutrition for infants and toddlers.

14. Whole of school and early learning settings curriculum programs around nutrition, with the provision of only healthy food choices in the school context, should be promoted so that children have a greater capacity for nutritional literacy, and for making healthy choices later in life.
15. The marketing of energy dense/nutrient poor food to children should be prohibited in all settings.
16. Nutrition labelling for packaged foods that is easy to interpret assists people to make healthy choices about packaged and processed foods.
17. Significantly higher taxes, and therefore higher prices, should apply to products known to significantly contribute to obesity, especially in children (for example, sugary soft drinks).
18. Healthy foods, such as fruit and vegetables, should be subsidised by governments to ensure their prices become and remain very low, particularly in remote areas.
19. The food industry and retail food outlets must adopt measures that aim to reduce the production, sale, and consumption of energy dense and nutrient poor products.
20. Urban planning regulations should ensure that new housing developments make provision for local access to retail outlets for fruit and vegetables (i.e. local grocery stores and supermarkets), and limit the density of convenience and take-away food stores.

**Targeted interventions, community-based programs, research, and monitoring**

21. Specific measures should be prioritised to high risk or vulnerable groups, especially Aboriginal and Torres Strait Islander peoples, and those from lower income groups.
22. There is need for a greater and more sustained investment in research, monitoring, and evidence collection to determine which individual and population measures are successful, which are not, and which may be promising.
23. Community-based pilot programs and initiatives should be established to address obesity in local communities, and best practice knowledge translation and exchange platforms supported<sup>2</sup> for the collection and sharing of information about their successes and challenges.

**Treatment and management**

24. Medical professionals have a particular role to play in prevention and early intervention. Opportunities need to be extended for doctors to spend time with patients who are at risk of being overweight, and to have ready sources of current information on interventions, counselling, and local facilities. A role also exists for doctors to provide translation of latest evidence for prevention to the broader community.
25. The AMA considers bariatric surgery an effective measure for long-term reductions in weight and improved health outcomes, primarily for obese adults and, in exceptional cases, for obese adolescents with significant co-morbidities and for whom all other measures have not been successful.
26. The AMA believes there is only a very limited role for pharmacological treatments for obesity, and such treatments need to be provided in conjunction with counselling, monitoring, and behavioural change interventions.

An increasing number of Australians are obese. Obesity substantially contributes to preventable, non-communicable diseases, shortened life-expectancy, and impaired quality of life. The impacts of obesity are significant and warrant considerable and sustained attention.

More than half of Australian adults have a body weight that puts their health at risk. In 2011-12, 62% of adults were overweight or obese (35 per cent overweight, and 27 per cent obese).<sup>3</sup> The proportion of adults who are Obese Class 2<sup>4</sup> or severely obese, increased from 5 per cent in 1995 to almost 10 per cent in 2014.<sup>5</sup>



Obesity may run in families, with research showing that children of obese parents are more than twice as likely to be obese themselves.<sup>6</sup> A quarter of Australian children and adolescents are overweight or obese (18 per cent overweight and 7 per cent obese).<sup>7</sup> More recent estimates applying opt out monitoring methods have achieved far higher participation rates, and suggest the data of 2014 and earlier may underestimate the true childhood prevalence. Accurate data and monitoring around the prevalence of obesity among children and adults are vital.

Obesity is a major risk factor for chronic and preventable conditions such as type 2 diabetes, heart disease, hypertension, stroke, musculoskeletal disorders and impaired psychosocial functioning. About 70 per cent of people who are obese have at least one established morbidity, resulting in medical costs that are about 30 per cent greater than those of their healthy weight peers.<sup>8</sup> Many more have serious health conditions that they are unaware of, for example, it has been estimated that for every five cases of diabetes there are four undiagnosed cases.<sup>9</sup>

Evidence that obesity is overtaking smoking as the major cause of preventable death in Australia is growing.<sup>10</sup> The exact cost of obesity is difficult to determine. In 2011-12, a conservative estimate placed the cost of obesity at \$8.6 billion.<sup>11</sup> An older, but a more expansive estimate of overweight and obesity, including both direct and indirect costs indicated the annual cost of obesity in Australia at \$56.6 billion.<sup>12</sup> The costs of obesity are significant and are likely increasing every year alongside increasing prevalence. The increased health care costs associated with obesity are observable early in life, with recent Australian research indicating that obese children (aged between two and five years) incurring health care costs that were 60 per cent more than children of healthy weight.<sup>13</sup>

Specialised and costly hospital and ambulance equipment is required for the medical care and transport of obese patients. Health care professionals may be at increased risk of manual handling injuries in providing care to obese patients.

At a very basic level, the obesity crisis can generally be explained in terms of individuals' dietary and physical behaviours – individuals either consuming too many calories or being insufficiently physically active.<sup>14</sup> However, individuals' dietary choices and behaviours and their levels of physical activity are influenced by a broad array of factors. The UK Foresight<sup>15</sup> project created the 'obesity systems map', which presents a causal model that begins with energy balance at an individual level, and builds a peripheral set of 108 variables that directly or indirectly influence energy balance including:

- Breastfeeding;
- Birth weight;
- Childhood weight gain;
- Parental weight;
- Maternal smoking;
- Television watching;
- Food availability and affordability;
- Accessibility and affordability of active transport; and
- Socioeconomic status and social networks.

Evidence is emerging that the following factors may also influence obesity: being overweight in adolescence; consuming takeaway foods; childhood smoking; increased price of fruit and vegetables; low self-esteem and depression; low locus of control scores; stressful family life; food insecurity; self-reported dieting (particularly among girls); inadequate sleep; and low rates of breakfast consumption.<sup>16</sup>

Along with environmental contributors to obesity, genetic factors may also play a limited role in the development of obesity. Early research suggests epigenetic influences on susceptibility to obesity.<sup>17</sup>

This is not to suggest that individuals are never responsible for their behaviour - only that an effective response to the obesity crisis will need to be as comprehensive and multi-faceted as the factors that generate and sustain it.<sup>18</sup> A 'whole of society' approach engages stakeholders and agencies in all sectors of society who have the potential to diminish the factors that promote excess weight, and reinforce the factors that protect against it, or reduce it.

It makes sense to seek to prevent people from becoming obese. It is important to adopt population-based measures and individual treatments to reduce current levels of obesity and its health effects.

There is a body of evidence that engaging in regular, moderate to large amounts of physical activity, and reducing intake of energy-dense/nutrient poor foods can prevent weight gain.<sup>19</sup> The available evidence does not point to any single type or set of interventions that will definitely induce those protective behaviours on a population-scale.<sup>20</sup> The evidence is also variable as to which interventions will produce weight loss on a population-scale.<sup>21</sup>

There is some debate in Australia about whether or not obesity should be recognised as a disease. Those who support conceptualising obesity as a disease cite the World Health Organisation position that medicalising obesity will improve treatment. Others argue that obesity does not meet the definition of disease.

There is strong indirect evidence that population-based health interventions can be effective in changing deeply entrenched behaviours. Population health interventions are not always based on incontrovertible evidence of assured outcomes, but on an assessment of the potential risks and opportunities involved, compared with the potential costs of not intervening.<sup>22</sup> In the case of the obesity crisis, the costs of inaction are proving to be disastrously high.

Obesity is recognised as a National Health Priority Area. Efforts must be strategic in the approach to obesity, and adopt clear and measurable targets to reduce the levels of obesity in the community. The Federal Government has an important role in coordinating and supporting the efforts of other governments, local communities, businesses, health professionals, and individuals in achieving this goal. The Federal Government is well-placed also to monitor and evaluate these collective efforts, and to redirect action and resources where they are needed.

Governments are unique in their capacity to influence and regulate people's behaviour on a large scale. The full range of government instruments, such as taxation, financial penalties and incentives, subsidies and market interventions, policy and legislation should be applied to make it easier for people to make healthier choices.<sup>23</sup> In applying these instruments, governments should recognise that those sections of the food industry that market and profit from energy dense and nutrient poor food products are not bearing the full costs of their activity, but are shifting costs onto the public sector and general community.

Ongoing research into the most effective measures for maintained weight loss is required. This research should recognise that some interventions may be better suited to certain population groups. For example, there is strong evidence that school-based interventions may help prevent childhood obesity in school aged children.<sup>24</sup> Research must also recognise that health benefits are observed in modest weight loss, i.e. loss of 5 per cent of weight, but that it can be difficult to maintain weight loss in the longer term.

Current clinical guidelines recommend that health professionals encourage overweight and obese patients to work towards a 2500 kJ (just under 600 calorie) deficit per day with an appropriate dietary intervention, as well as engaging in 300 minutes of moderate intensity physical activity per week (or 150 minutes of vigorous activity, or a combination of both).<sup>25</sup> Government policies must recognise that (sustained) reductions in energy intake, and increases in physical activity, are particularly relevant for well over half of Australia adults.

There is evidence that obesity and excess weight in childhood and adolescence is a strong predictor of obesity or health problems in adulthood.<sup>26</sup> Foetal development and dispositions toward obesity may also be affected by the weight of the mother during pregnancy.<sup>27</sup> Interventions to prevent excessive weight gain during pregnancy (including physical and nutritional programs) are effective.<sup>28</sup> There is a role for the medical profession in providing counselling to women of child bearing age who are

considering having children on the importance of healthy weight, before, during and after pregnancy. There is also preliminary evidence that obese fathers may pass along predispositions to metabolic conditions to their sons and grandsons including diabetes and heart disease.<sup>29</sup>

### ***Physical activity measures***

There is evidence that the nature of people's habitual physical environment can influence their levels of physical activity.<sup>30 31</sup> There is also evidence that particular urban engineering measures can promote increased activity. Measures recommended for this purpose include development of neighbourhoods with accessible walking paths, cycle paths, parks and recreational facilities, local and accessible shops, facilities and services, and greater street connectivity.<sup>32</sup> Provision of active transport networks for walking and cycling may also be very cost effective in terms of reducing future costs of cardiovascular disease.<sup>33</sup>

Employers, particularly in the health sector, can contribute by developing healthy work environments. Such environments might facilitate cycling to work, for example, through provision of secure bike parking, showers, and change rooms.

There is evidence that whole-of-school approaches to health can be effective in promoting physical activity and healthy eating.<sup>34</sup> A multifactorial approach would encompass the classroom teaching of health skills and knowledge, changes to the physical school environment, cultivation of health-relevant links to the local community, and aspects of the 'hidden curriculum', such as teacher behaviour and modelling, and school culture. There would be opportunity within this approach to reinforce with parents the importance of creating active households for their children, and of families eating together.

### ***Nutritional measures***

Efforts must be directed at improving the nutritional literacy of the population, with specific efforts targeting women of child-bearing age, as well as toddlers and children. Dietary education should be included as a standard component of all antenatal care.

There is an overwhelming amount of non-evidence-based nutrition advice and associated products that are promoted to the public. Most of the advice and associated products are endorsed by celebrities, which may appear to give them legitimacy. Many, if not all, of these arrangements are based on generating revenue, and do not provide sustainable advice about healthy eating.

There is evidence that school nutrition programs and policies, including gardening and food preparation activities, can have a positive impact on children's dietary behaviour and weight.<sup>35</sup> These are likely to be particularly effective if they connect to the broader community and their families.

Food marketing to children occurs through a number of media (e.g., television, internet, food packaging, product placement in films), and is typically for highly processed, energy dense foods. There is considerable evidence that this marketing affects children's consumption and diet-related behaviour.<sup>36</sup> One study has argued that restricting television marketing would be very cost-effective, at \$3.70 per disability adjusted life year saved.<sup>37</sup>

Labelling of packaged food items must facilitate healthy food choices by enabling consumers, from all socio-economic and cultural backgrounds, to easily recognise and compare food items in terms of their effects on weight and health. Research shows that consumers make choices on the basis of nutritional information, and prefer 'at a glance' information.<sup>38</sup>

The Health Star Rating System is a simplified and uniform 'front of pack' labelling system that has been developed in partnership between the health sector, the food industry, and governments in Australia. There is a grace period for uptake of the system, but uptake will need to be monitored and if insufficient, the labelling will need to be mandated. It is important that the System is supported by ongoing research to evaluate effectiveness and support evolution to ensure maximum utility for healthy food choices.

The price of food and drink influences people's consumption choices. The purchasing behaviour of children is particularly sensitive to price. Modest changes in eating behaviour can have significant effects over time. For example, increasing the consumption of fruit and vegetables in the Australian population by one serve per day has been estimated to save the health system \$157 million annually, in relation to heart disease alone.<sup>39</sup> Governments need to explore options for regulating the production and sale of energy dense and nutrient poor food products to reduce consumption.

Price signals are one tool that governments have available to them that encourage the consumption of healthier foods. Currently, poorer food choices are typically cheaper than more nutritious options, and the discrepancy increases for people living in regional and remote areas. Caution should be exercised around any national policies, such as the GST, that may inadvertently increase the price of healthier foods.

Recent evidence from Mexico indicates that implementing health-related taxes on sugary drinks and on 'junk' food can decrease purchase of the intended food and drinks without affecting purchase of other food and drink items.<sup>40</sup> A recent Australian study predicted that increasing the price of sugary drinks by 20 per cent could reduce consumption by 12.6 per cent.<sup>41</sup> Further, a recent systematic review indicated that, in addition to being effective, a sugary drinks tax is also likely to reduce inequalities in purchase and consumption of sugary drinks.<sup>42</sup> Revenue raised by such a measure should initially be directed to an evaluation of effectiveness. In the longer term, revenue may be used to subsidise and market healthy food choices, as well as the promotion of physical activity.

Food manufacturers and retailers should also be encouraged to engage in more socially responsible activities, including the display, placement and pricing of products in supermarkets; the portion-controlled packaging of energy dense products; and, the gradual altering of existing products in modest ways to reduce calorie density. Where there is a failure on the part of manufacturers and retailers to voluntarily adopt such practices, governments should apply penalties.<sup>43</sup>

Research from the US shows that the prevalence of obesity increases and consumption of fruit and vegetables decreases, with increasing distance to grocery stores and supermarkets in metropolitan areas.<sup>44</sup> There is also evidence indicating that people living in neighbourhoods with a higher density of convenience stores and take away-food outlets also have reduced fruit and vegetable consumption.<sup>45</sup>

### ***Targeted Interventions, Community-based programs, Research and Monitoring***

There is substantial evidence showing an association between risk factors for excess weight and socio-economic and educational status. Other priority groups for whom interventions may need to be tailored or targeted include the elderly, those from culturally and linguistically diverse backgrounds, and those with certain disabilities. The greater risk of obesity with disadvantaged status (in developed countries) may suggest that, to reduce obesity, inequality should also be minimised.

Obesity is estimated to contribute to 16 per cent of the health gap between Aboriginal and Torres Strait Islander people and the total Australian population.<sup>46</sup> Obesity is associated with risk factors for the main causes of morbidity and mortality among Aboriginal and Torres Strait Islander peoples through health conditions such as diabetes and ischaemic heart disease. Targeted, culturally appropriate programs, services and support are an essential aspect of reducing the impacts of obesity in the health of Aboriginal and Torres Strait Islander peoples.

There continue to be gaps in the evidence about what contributes to, protects against, and reduces overweight and obesity, particularly with respect to certain population groups (e.g., Aboriginal and Torres Strait Islander peoples, those with disabilities, those from culturally and linguistically diverse backgrounds). There is also a strong need to closely monitor and evaluate the effectiveness of the measures and treatments that are implemented to address obesity.

Local action should be a central component of a whole of society approach to obesity. There is evidence that well-resourced, informed, and coordinated community-based initiatives can impact on unhealthy weight gain.<sup>47</sup> Such initiatives can provide information about experiences and outcomes that could be added to an evidence bank for other communities to use in their planning.

Primary Health Networks (PHNs) are currently being established to support access to medical services at a local level. Given the significant impacts of obesity on many communities throughout Australia, it is likely that PHNs will play a key role in supporting prevention and treatment efforts. This may include facilitating access to programs including those that seek to improve dietary patterns, or increase participation in physical activity. PHNs also play a role in identifying and addressing gaps in the health workforce. If this is done effectively, when it comes to managing patient obesity, GPs should be confident that their patients are able to access referred services in a coordinated and timely manner.

### ***Individual Treatment and Management***

The goal should be to provide patients with skills and motivations to help manage their condition. Research indicates that advice provided by general practitioners is highly regarded by the public, and can be effective in bringing about behavioural change.<sup>48</sup>

General practice is well suited to the initiation and coordination for weight management of individuals. Evidence suggests that interventions (or combinations of interventions) delivered via multidisciplinary care arrangements may be more effective, particularly when the usual healthcare provider is also involved.<sup>49</sup> General practitioner-led multidisciplinary care for weight management may also be informed by dietitians, exercise physiologists, psychologists, diabetes educators, nurses, physiotherapists, occupational therapists, and social workers.

Moderate evidence supports the use of weight loss medication, in addition to lifestyle changes. However, as with all medicines, there is a risk of adverse effects (which will influence prescribing decisions). Prior to medication, a very low calorie diet is recommended as an initial step in any intensive obesity treatment program.<sup>50</sup> For some patients, more intensive and coordinated intervention will be required.

In Australia, bariatric surgery is recommended for adults with a BMI > 40 or with a BMI > 35 combined with serious medical co-morbidities, who have not successfully reduced weight by other means.<sup>51</sup> The AMA believes that bariatric surgery is not appropriate for children, but older adolescents (15-18 years) may be considered in circumstances involving appropriate pre-operative education and post-operative follow-up, long-term multidisciplinary care, and adequate engagement of the young person and the family. For suitable patients, access to bariatric surgery should be available publicly and privately. Monitoring the immediate and longer-term outcomes of patients who have had bariatric surgery is vitally important.

Reproduction and distribution of AMA position statements is permitted provided the AMA is acknowledged and that the position statement is faithfully reproduced noting the year at the top of the document.

*This position statement was developed by the AMA's Obesity Working Group. The Working Group would like to acknowledge the contribution of Prof Steven Allender.*

## References

- <sup>1</sup> Content provided by Anna Peeters.
- <sup>2</sup> Allender S, Swinburn B, Foulkes C, Waters E, Gill T, Coveney J, Nichols M, Armstrong R, De Silva Sanigorski A, Pettman T, Millar L. A new platform for increasing capacity in community based intervention: CO-OPS Mark II. *Obesity Research & Clinical Practice* (Vol.6) Supplement 1, Pages 86-87, DOI: 10.1016/j.orcp.2012.08.178).
- <sup>3</sup> ABS 2013, *Profiles of Health, 2011-13*, ABS Cat. No. 4338.0.
- <sup>4</sup> DoHA: <http://www.health.gov.au/internet/main/publishing.nsf/Content/health-pubhlth-strateg-hlthwt-obesity.htm>
- <sup>5</sup> ABS 2013, *Profiles of Health, 2011-13*, ABS Cat. No. 4338.
- <sup>6</sup> Whittaker, R.C., Wright, J.A., Pepe, M.S., et. al., 1997, "Predicting obesity in young adulthood from childhood and parental obesity", *New England Journal of Medicine*, 337, pp. 869-873.
- <sup>7</sup> <http://www.aihw.gov.au/who-is-overweight/#children>
- <sup>8</sup> Withrow D, Alter DA. The economic burden of obesity worldwide: a systematic review of the direct costs of obesity. *Obes Rev* 2011;12(2):131-41.
- <sup>9</sup> Shaw, J. & Tanamas, S. (2012) *Diabetes: The silent epidemic and its impact on Australia*. Baker IDI Heart and Diabetes Institute, Diabetes Australia and Juvenile Diabetes Research Foundation. Available at: <https://static.diabetesaustralia.com.au/s/fileassets/diabetes-australia/e7282521-472b-4313-b18e-be84c3d5d907.pdf>
- <sup>10</sup> See, for example: Hocking S, Draper G, Somerford P, Xiao J, Weeramanthri T. The Western Australian Chief Health Officer's Report 2010. Perth: Department of Health, WA, 2010. <http://www.public.health.wa.gov.au/3/1045/1/chief> and Queensland Health, 2010. health\_officers\_report\_pm
- <sup>11</sup> Pricewaterhouse Cooper. (2015). Weighing the cost of obesity: A case for action. Available from: <https://pwc.docalytics.com/v/weighing-the-cost-of-obesity-final>
- <sup>12</sup> Stephen Colagiuri, Crystal M Y Lee, Ruth Colagiuri, Dianna Magliano, Jonathan E Shaw, Paul Z Zimmet and Ian D Caterson. The cost of overweight and obesity in Australia. *MJA* 2010; 192: 260-264.
- <sup>13</sup> Hayes, A., Chevalier, A., D'Souza, M., Baur, L., Wen, L.M., & Simpson, J. (2016). Early childhood obesity: Association with healthcare expenditure in Australia. *Obesity*, 00,00-00. doi:10.1002/oby.21544.
- <sup>14</sup> The biological premise underlying this being that excess body weight is the result of an imbalance over time in a body's energy consumption compared to its energy expenditure.
- <sup>15</sup> Vandenbroeck IP, Goossens J, M. C Foresight Tackling Obesities: Future Choices—Building the Obesity System Map. Government Office for Science, UK Government's Foresight Programme. Available: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/295154/07-1179-obesity-building-system-map.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/295154/07-1179-obesity-building-system-map.pdf). Published October 2007. Accessed 16 October 2014.
- <sup>16</sup> NHMRC. (2013). East for health: Providing the scientific evidence for healthier Australian diets.
- <sup>17</sup> Herrera, B. M., Keildson, S., & Lindgren, C. M. (2011). Genetics and epigenetics of obesity. *Maturitas*, 69(1), 41-49. <http://doi.org/10.1016/j.maturitas.2011.02.018>
- <sup>18</sup> "Curbing the Obesity Epidemic", Editorial, *The Lancet*, 2006, Vol. 367, p. 1549.
- <sup>19</sup> See, for example, Hill, J.O., Wyatt, H.R., Peters, J.C., (2012) Energy balance and obesity. *Circulation*; 126(1):126-132.
- <sup>20</sup> National Health and Medical Research Council (2013) *Clinical practice guidelines for the management of overweight and obesity in adults, adolescents and children in Australia - Systematic Review*. Melbourne: National Health and Medical Research Council.
- <sup>21</sup> See, for example, Summerbell, CD, et al., 2007, *Interventions for preventing obesity in children (Review)*, Cochrane Review, Cochrane Collaboration; and Avenell, p., et. al., 2004, "Systematic review of the long-term effects and economic consequences of treatments for obesity and implications for health improvement" 2004, *Health Technology Assessment* Vol. 8, No. 21.
- <sup>22</sup> Parson, W. 1995. Public Policy, Edward Elgar. Cheltenham, UK.
- <sup>23</sup> 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.
- <sup>24</sup> Waters E, de Silva-Sanigorski A, Burford BJ, Brown T, Campbell KJ, Gao Y, Armstrong R, Prosser L & Summerbell CD. (2011). Interventions for preventing obesity in children (Review). *Cochrane Database of Systematic Reviews* 2011, Issue 12. Doi:10.1002/14651858.CD001871.pub3.
- <sup>25</sup> National Health and Medical Research Council (2013) *Clinical practice guidelines for the management of overweight and obesity in adults, adolescents and children in Australia*. Melbourne: National Health and Medical Research Council.
- <sup>26</sup> Venn, A.J. et. Al. (2007). Overweight and obesity from childhood to adulthood: a follow up of participants in the 1985 Australian Schools Health and Fitness Survey. *MJA*, 186 (9) 458-460.
- <sup>27</sup> Callaway, L., et. al., 2006. 'The prevalence and impact of overweight and obesity in an Australian obstetrics population', *MJA*, 184. 2. Pp. 56-59.
- <sup>28</sup> See, for example, Muktabant, B., Lawrie, T.A., Lumbiganon P., Laopaiboon M. (2015). *Diet or exercise, or both, for preventing excessive weight gain in pregnancy*. *Cochrane Database of Systematic Reviews* 2015, Issue 6.
- <sup>29</sup> Croplet, J.E., Eaton, S.A., Aiken, A., Young, P.E., Giannoulatou, E., et al. (2016). Male-lineage transmission of an acquired metabolic phenotype induced by grand-paternal obesity. *Molecular Metabolism*, doi: 10.1016/j.molmet.2016.06.008.
- <sup>30</sup> Sallis, James F et al. Physical activity in relation to urban environments in 14 cities worldwide: a cross-sectional study. *The Lancet*, Volume 387, Issue 10034, 2207 - 2217.
- <sup>31</sup> National Heart Foundation of Australia. *Blueprint for an active Australia*. 2nd edn. Melbourne: National Heart Foundation of Australia, 2014.
- <sup>32</sup> National Institute for Health and Clinical Excellence, 2008, *Promoting and creating built or natural environments that encourage and support physical activity*, NICE Public Health Guidance 8, January 2008.
- <sup>33</sup> By a factor of 4 to 1 in some cases. See, National Institute for Health and Clinical Excellence, 2007. *A rapid review of economic literature related to environmental interventions that increase physical activity levels*. NICE 2007.

- <sup>34</sup> Waters E, de Silva-Sanigorski A, Burford BJ, Brown T, Campbell KJ, Gao Y, Armstrong R, Prosser L, Summerbell CD. Interventions for preventing obesity in children. *Cochrane Database of Systematic Reviews* 2011, Issue 12. Art. No.: CD001871.
- <sup>35</sup> Waters E, de Silva-Sanigorski A, Burford BJ, Brown T, Campbell KJ, Gao Y, Armstrong R, Prosser L, Summerbell CD. Interventions for preventing obesity in children. *Cochrane Database of Systematic Reviews* 2011, Issue 12. Art. No.: CD001871.
- <sup>36</sup> Hastings G, McDermott L, et al. The extent, nature and effects of food promotion to children: a review of the evidence. Geneva: World Health Organisation; 2006.
- <sup>37</sup> Moody, M., et. al., 2006, "Assessing cost-effectiveness of obesity interventions in children and adolescents", Department of Human Services, Victoria.
- <sup>38</sup> UK Food Standards Agency, 2007, *Front of Pack Signpost Labelling – Exploratory Research*, Report COI 280040 1095 JS, April 2007.
- <sup>39</sup> National Health Priorities Action Council, 2006. Op. cit.
- <sup>40</sup> Cochero, M., et al. (2016). Beverage purchases from stores in Mexico under the excise tax on sugar sweetened beverages: observational study. *BMJ*, 352, and Batis C, Rivera JA, Popkin BM, Taillie LS (2016) First-Year Evaluation of Mexico's Tax on Nonessential Energy-Dense Foods: An Observational Study. *PLoS Med* 13(7): e1002057. doi:10.1371/journal.pmed.1002057
- <sup>41</sup> J Veerman, G Sacks, N Antonopoulos, J Martin, 'The Impact of a Tax on Sugar-Sweetened Beverages on Health and Health Care Costs: A Modelling Study', *PLoS One* (2016) 11(4).
- <sup>42</sup> [The impact of a tax on sugar-sweetened beverages according to socio-economic position: a systematic review of the evidence.](#) Backholer K, Sarink D, Beauchamp A, Keating C, Loh V, Ball K, Martin J, Peeters A. *Public Health Nutr.* 2016 May 16:1-15.
- <sup>43</sup> See, for example, Wansink, B. and Huckabee, M., 2005, "De-Marketing Obesity", *California Management Review*, Vol. 47, No. 4, pp. 1-13.
- <sup>44</sup> Michimi, A. & Wimberly MC. (2010). Association of supermarket accessibility with obesity and fruit and vegetable consumption in the conterminous United States. *International Journal of Health Geographics*, 9: 49.
- <sup>45</sup> Pearce, J., Hiscock, R., Blakely, T., & Witten, K. (2008). The contextual effects of neighbourhood access to supermarket and convenience stores on individual fruit and vegetable consumption.
- <sup>46</sup> Vost, T., Barker, B., Stanley, L. & Lopez, A.D. (2007). *The Burden of Disease and Injury in Aboriginal and Torres Strait Islander Peoples: Summary report*. School of Population Health. The University of Queensland.
- <sup>47</sup> Pettman, T., et. Al., 2015. A snapshot of the scope of obesity prevention practice in Australia. *Health Promotion International*, 1-13
- <sup>48</sup> Centre for Health Economics, Monash University, 2006., op. cit.
- <sup>49</sup> National Health and Medical Research Council. (2013). *Clinical Practice Guidelines for the Management of Overweight and Obesity in Adults, Adolescence and Children in Australia*. NHMRC, Commonwealth Department of Health.
- <sup>50</sup> National Health and Medical Research Council (2013), *Clinical practice guidelines for the management of overweight and obesity in adults*. Melbourne: National Health and Medical.
- <sup>51</sup> Medical Services Advisory Committee. (2011) Public Summary Document Application 1180r – Review of items for the surgical treatment of obesity.