



Submission to The House of Representatives Standing Committee on Health, Aged Care and Sport Inquiry into Diabetes in Australia

Cancer Council Australia

31st August 2023



Cancer Council is supportive of the House of Representatives Standing Committee on Health, Aged Care and Sport Inquiry into the prevention and management of all forms of diabetes and obesity, and its effect on the Australian population, and welcomes the opportunity to provide a submission to this important issue. Cancer Council would also welcome any further opportunities to discuss the issues outlined in our submission below.

Cancer Council is the peak, non-Government cancer control organisation in Australia. As the national body in a federation of eight state and territory member organisations, Cancer Council Australia works to make a lasting impact on cancer outcomes by: shaping and influencing policy and practice across the cancer control continuum; developing and disseminating evidence-based cancer information; convening and collaborating with cross sectorial stakeholders and consumers to set priorities; and speaking as a trusted voice on cancer control in Australia.

Cancer Council acknowledge the traditional custodians of the lands on which we live and work. We pay respect to Aboriginal and Torres Strait Islander elders past, present and emerging, and extend that respect to all other Aboriginal and Torres Strait Islander people.

This submission was authorised by:

Megan Varlow
Director, Cancer Control Policy, Cancer Council Australia

Submission contact:

Amanda McAtamney
Manager, Public Health Policy, Cancer Council Australia

Contents

Contents	2
Introduction	3
Key Recommendations	4
Terms of Reference (1): The causes of diabetes (type 1, type 2 and gestational) in Australia, including risk factors such as genetics, family history, age, physical inactivity, other medical conditions and medications used	4
Terms of Reference (3): The broader impacts of diabetes on Australia’s health system and economy .	5
Terms of Reference (4): Any interrelated health issues between diabetes and obesity in Australia, including the relationship between type 2 and gestational diabetes and obesity, the causes of obesity and the evidence-base in the prevention, diagnosis and management of obesity	5
References	7

Introduction

In Australia, cancer is the leading cause of disease burden, and over one million Australians currently live with, or have had cancer. It is estimated that between 2022 and 2031, a total of 1.7 million new cases of cancer will be diagnosed in Australia. (1) Obesity and diabetes are two prevalent chronic conditions in Australia, which both have an interconnected relationship with cancer. Diabetes is one of the most common chronic conditions in Australia, with more than 1.3 million (1 in 20) Australians living with this condition in 2021. (2) The incidence of diabetes is also found to increase with age, with close to 1 in 5 Australians aged 80–84 living with diabetes in 2021. (2) In addition to this, in 2017–18, 67% of Australian adults had overweight or obesity, which is equivalent to approximately 12.5 million people. (3) Almost 25% of Australian children were living with overweight or obesity in 2017–18. (3)

In 2013, it was estimated that 4.3% (5,371 cases) of all cancers diagnosed were attributable to overweight and obesity. (4) Further to this, recent research has shown that between 1983 and 2017 the rate of obesity-related cancers in Australia almost quadrupled, with more than 1 million cases of cancers with an association with obesity, diagnosed in the 35-year period. (5)

Individuals with type 2 diabetes also experience an increased risk of developing several cancers, including pancreatic, liver, endometrial, colorectal, and breast cancer. (6)

This Inquiry provides an important opportunity to highlight the impact of diabetes and obesity, their significant impact on the cancer burden, and their contribution to the overall disease burden in Australia.

Cancer Council proposes several recommendations to address the obesogenic environment that currently exists, and to address the causes and risk factors of diabetes and obesity in Australia at the population level. The environment in which we live can have a positive or negative influence on a person's health, and Australia's food environment has become one which allows for the promotion, and provision of, widely available access to nutrient poor, energy-dense, highly processed food. This has resulted in an increased incidence of type 2 diabetes, and overweight and obesity. Strategies that take population wide approaches to address the environmental drivers of obesity have the maximum potential to achieve positive health improvements.

At the forefront of our recommendations, we urge the Committee to recommend that the Australian Government implements and adequately funds the actions under the National Obesity Strategy (2022 – 2032) and the National Preventive Health Strategy (2021 – 2030). Both these strategies aim to reduce rates of overweight and obesity, improve dietary intake, and increase physical activity. Given that the National Obesity Strategy is not solely a Commonwealth government strategy, as it was led by the Queensland government on behalf of the State, Territory and Commonwealth governments, an implementation plan must clearly articulate priority actions and agreed targets for all governments. This will help to provide coordinated action and collective accountability which will ensure the National Obesity Strategy is implemented effectively. Funding the implementation of the National Obesity Strategy and the National Preventive Health Strategy together would reduce the burden of overweight and obesity, and subsequently the burden of type 2 diabetes and obesity-related cancers on the Australian community and provide opportunities to deliver long term health benefits for many Australians.

It is also vital that the Committee considers the social, economic, environmental, and commercial determinants of health when developing its report and recommendations. It is essential to acknowledge that these determinants have a significant impact on a person's health and can create inequities which prevent Australians from accessing healthcare services, and present barriers which prevent Australians from purchasing nutritious food options. (7) Cancer Council recommends the Committee prioritises policies that change the structural and daily living conditions of those living with disproportionate rates of overweight and obesity, as well as those which address broader health and socio-economic

determinants. Evidence has demonstrated that obesity interventions which require greater levels of individual agency, or those that focus solely on education and behaviour change will more likely benefit those with higher levels of socio-economic position and have a negative impact on equity. (8) As such, there is a clear need for universal strategies and whole of population approaches to deliver equitable and improved outcomes.

Key Recommendations

Collectively, the independent risk factors of overweight and obesity, physical inactivity, and inadequate diet are second only to tobacco as modifiable risk factors for cancer. (4, 9)

Cancer Council strongly recommends introducing a comprehensive range of measures which address the areas of:

- nutrition,
- overweight and obesity, and
- levels of physical activity.

This will in turn reduce the incidence of several chronic diseases, including both type 2 diabetes and cancer. Addressing these risk factors is an important objective for reducing Australia's cancer burden given obesity and overweight have reached record levels in the Australian population.

Terms of Reference (1): The causes of diabetes (type 1, type 2 and gestational) in Australia, including risk factors such as genetics, family history, age, physical inactivity, other medical conditions and medications used

The causes of diabetes are multi-faceted and complex, and often result from a combination of risk factors, including genetics, family history, overweight and physical inactivity. There are also common risk factors for diabetes and cancer, including overweight and obesity and physical inactivity. (10) As such, it is imperative that comprehensive policy measures are taken to ensure that risk factors which contribute to both diabetes and other conditions such as cancer, are adequately addressed in Australia.

For those living with diabetes, there is clear evidence of the association between type 2 diabetes and an increased risk of cancer incidence and mortality. Recent studies have strongly suggested a causal association with type 2 diabetes and liver, pancreatic, and endometrial cancer incidence, as well as pancreatic cancer mortality. (11) Further to this, individuals who are diagnosed with cancer and have pre-existing diabetes have been found to have increased all-cause mortality, and increased post-operative mortality across all cancer types. (12)

Physical activity is important for good health and wellbeing and can help to prevent some cancers and a range of chronic diseases. In 2018, physical inactivity accounted for 2.5% of the total disease burden in Australia and was responsible for 20% of the total disease burden due to type 2 diabetes, 17% of the uterine cancer burden, 12% of the bowel cancer burden, and 3% of the breast cancer burden. (13) To proactively address physical inactivity, all levels of government together with urban planners, developers and dedicated Agencies need to work together to ensure built environments encourage and support people to be more physically active. Both the National Obesity Strategy and National Preventive Health Strategy have identified targets to reduce the prevalence of insufficient physical activity among children, adolescents and adults by at least 15% by 2030, and to reduce the prevalence of Australians (≥ 15 years) undertaking no physical activity by at least 15% by 2030. (14, 15) As such, it is important that the implementation of both the National Preventive Health Strategy and National Obesity Strategy are fully funded.

Terms of Reference (3): The broader impacts of diabetes on Australia's health system and economy

The interlinked relationship between type 2 diabetes and cancer means it is important for the government to implement a range of comprehensive policies which will address nutrition, physical activity, and the obesogenic environment in Australia, to prevent the development of both type 2 diabetes and cancer. Most Australians currently do not eat a healthy diet, with less than 1% of the population eating in accordance with the Australian Dietary Guideline recommendations (16), less than one in 10 eating the recommended serves of vegetables (3), and around a third of energy coming from discretionary foods. (17) As a result, many Australians are experiencing poor health, overweight, obesity, and poor diets, increasing their risk of type 2 diabetes and cancer.

In 2022, the Australian government allocated \$0.7 million over four years to develop a National Nutrition Policy Framework. The framework will take a multi-sector, 'whole of government' approach to identify, prioritise, drive, and monitor healthy eating in Australia. Cancer Council recommends that the development of this policy framework is guided by the World Health Organization (WHO) recommendations for national nutrition policies. The National Nutrition Policy should take a comprehensive approach, including a focus on improving the sustainable supply of healthy foods; promoting healthy foods consistent with the Australian Dietary Guidelines, and decreasing the supply and promotion of discretionary choices. (18–20) Further to this, Cancer Council recommends that the actions under both the National Obesity Strategy and the National Preventive Health Strategy regarding nutrition are implemented. This includes adults and children (≥ 9 years) maintaining or increasing their fruit consumption to an average of 2 serves per day by 2030 and maintaining or increasing their vegetable consumption to an average of 5 serves per day by 2030. Further, children and adults' total energy intake from discretionary foods should be reduced from $>30\%$ to $<20\%$ by 2030. (14, 15)

Terms of Reference (4): Any interrelated health issues between diabetes and obesity in Australia, including the relationship between type 2 and gestational diabetes and obesity, the causes of obesity and the evidence-base in the prevention, diagnosis and management of obesity

Having overweight and obesity has been found to increase the risk of several chronic diseases including cancer, and are associated with increased incidence of morbidity and mortality. (2) In particular, the excess body fat found in overweight and obesity contributes to the development of biomedical risk factors, which in turn increases blood pressure and the levels of abnormal blood lipids, leading to an increased risk of type 2 diabetes. (2)

It is known that having obesity is a leading risk factor for the development of type 2 diabetes, and having high body mass has demonstrated to increase the risk of 13 types of cancer. (21) Recent estimates of the lifetime burden of cancer (2016–2098) show that 333,100 future cancers will be attributable to overweight or obesity. (22) However, Australians are currently living in an obesogenic environment, and factors which influence weight gain and the subsequent development of overweight and obesity, are often out of the control of the individual. The causes of weight gain are complex and include lack of access to environments that promote physical activity, lack of access to nourishing foods, high-levels of marketing, promotion, and availability of unhealthy food and drinks, life events that result in eating as a coping mechanism, and medications and health conditions that promote weight gain. Therefore, it is

important that there are policies and structures in place which make it easier for people to eat well and be physically active, as these benefit everyone, and are crucial for establishing healthier communities.

Both the National Obesity Strategy and National Preventive Health Strategy have outlined targets to halt the rise and reverse the trend in the prevalence of obesity in adults by 2030, and to reduce overweight and obesity in children and adolescents aged 2-17 years by at least 5% by 2030 which must be implemented in Australia. (14, 15)

There is strong evidence that food and beverage marketing influence the type of food and beverages children demand, desire, and consume. (23-25) In Australia, voluntary industry codes aimed at restricting the marketing of unhealthy food and beverages to children have proved ineffective. (26-29) To reduce children's exposure to food advertising that promotes unhealthy foods, Cancer Council therefore recommends Government develop and implement a comprehensive food marketing policy framework and embed this framework in statutory regulation. Specifically, Cancer Council supports the four action areas identified in the Brands Off our Kids! Report (30) of:

- ensuring TV, radio and cinemas are free from unhealthy food marketing from 6am to 9:30pm,
- preventing processed food companies from targeting children,
- ensuring public spaces and events are free from unhealthy food marketing, and
- protecting children from digital marketing of unhealthy food.

Cancer Council also supports the implementation of independent and consistent nutrition criterion to determine which foods are classified as unhealthy and therefore unsuitable to be promoted to children. The Council of Australian Government (COAG) Health Council developed a guide to define food and drink categories that are not recommended for promotion (31) which was demonstrated to be simple and easy to use criteria that aligns with the Australian Dietary Guidelines. (32)

Price is a key driver of consumer decision making when purchasing food and drinks, and therefore adjusting taxation on different foods has the potential to affect population diets. The use of fiscal levers such as taxation incentives, grants, pricing, and subsidies could be used to encourage physical activity and healthy diets and has been shown to be effective overseas.(33, 34) Cancer Council Australia recommends that the Federal Government implement a sugar-sweetened beverage health levy to affect a price increase of at least 20%, aimed at changing purchasing habits, achieving healthier diets and raising revenue for initiatives aimed at promoting healthy behaviours. (35) The health levy on sugary drinks is also predicted to reduce healthcare spending with a 2018 analysis of cost-effective policies to address obesity in Australia identifying that a health levy on sugary drinks would save the Australia Government \$1.7 billion in total healthcare cost offsets, while costing relatively little (~\$11.8 million) to implement. (36) There are also opportunities for Governments to further subsidise healthy food options, increasing their affordability, particularly in remote communities where fresh produce can cost up to 30% more than in urban areas. (37) Incorporating subsidies into a tax design to support those on low incomes may help to combat the impact of a tax on unhealthy foods and may result in higher consumption of healthier foods, such as fruit and vegetables. (38)

The Health Star Rating (HSR) is an interpretive front-of-pack labelling scheme, which supports consumers to select healthier food products, and encourages industry to produce healthier foods. (39) To improve the availability of healthier food options, Cancer Council therefore recommends that the HSR system should:

- be mandatory,
- be regularly reviewed to allow for improvement to align with emerging evidence and changes to the food market,
- incorporate transparent processes,
- be underpinned by transparent governance structures which are free from commercial conflict, and
- align with best practice dietary advice.

Public awareness of the link between excess body weight, poor diet, physical inactivity, and cancer is low. (40) Social marketing campaigns to raise community awareness and educate the community have been shown to be essential to support behaviour change. Evidence has demonstrated that well designed and executed social marketing campaigns on health issues that are sustained over time can be effective in changing health knowledge, beliefs, attitudes, and behaviours across large populations. (41-43) Several studies have shown that social marketing interventions can be effective in increasing physical activity and improving nutrition (41, 44-47), and recent evidence demonstrates that campaigns which present hard-hitting information about the health consequences of overweight and obesity appear to be the most effective. (48, 49)

There is an urgent need for the Federal Government to implement a sustained, effective, and adequately funded social marketing campaign that encourages the population to adopt healthier eating and physical activity behaviours. These campaigns should be sufficiently well funded by governments to include evidence-based development, comprehensive implementation, and robust evaluations. We recommend that a social marketing campaign not only focus on supporting and motivating individual behaviour change, but also facilitate and increase public support for changes made to the environment, such as food labelling and food marketing reform.

The National Obesity Strategy cites ‘tackling weight stigma and discrimination’ and ‘empowering personal responsibility’ as guiding principles. (14) Some studies highlight “hard-hitting” information about the health risks of a higher body weight as a key characteristic of effective obesity prevention campaigns. (48, 49) It is therefore important for any social marketing campaign to be cognisant of the tension between current research in the area, and developing messaging which aligns with national priorities and community expectations.

It must also be acknowledged that while campaigns can assist in shifting knowledge, norms, self-efficacy and behaviour, complementary public health strategies such as implementing policies and programs to create supportive, sustainable and healthy environments, and restricting competing marketing messages, are crucial to long term success. (50, 51)

In a public health setting, public education mass media campaigns are often supported by complementary messaging through other channels including healthcare providers and community programs. (52) This allows for integrated universal and targeted approaches, so that social marketing campaigns are supported by local level initiatives tailored to the needs of specific communities. For example, the Western Australia LiveLighter® public education campaign to address overweight and obesity includes mass media, advocacy initiatives, and education and support tools.

References

1. Australian Institute of Health and Welfare. Cancer in Australia 2021. Canberra: AIHW; 2021. Report No.: Cancer series no. 133 Cat. no. CAN 144.
2. Australian Institute of Health and Welfare. Diabetes: Australian facts. Canberra: AIHW; 2023.
3. Australian Bureau of Statistics. National Health Survey: First results 2017-18 Canberra: ABS; 2018 [Available from: <https://www.abs.gov.au/statistics/health/health-conditions-and-risks/national-health-survey-first-results/2017-18>].
4. Wilson LF, Antonsson A, Green AC, Jordan SJ, Kendall BJ, Nagle CM, et al. How many cancer cases and deaths are potentially preventable? Estimates for Australia in 2013. *International Journal of Cancer*. 2018;142(4):691-701.

5. Feletto E, Kohar A, Mizrahi D, Grogan P, Steinberg J, Hughes C, et al. An ecological study of obesity-related cancer incidence trends in Australia from 1983 to 2017. *The Lancet Regional Health - Western Pacific*. 2022;29:100575.
6. Shaw J, Climie R, Magliano D. *Dark Shadow of Type 2 Diabetes*. Melbourne: Baker Heart and Diabetes Institute; 2020.
7. Australian Institute of Health and Welfare. *Social determinants of health*. Canberra: AIHW; 2022.
8. Sacks G, Looi E, Cameron A, Backholer K, Strugnell C, et al. *Population-level strategies to support healthy weight: an Evidence Check rapid review brokered by the Sax Institute for Queensland Health*. 2019.
9. World Cancer Research Fund/American Institute for Cancer Research. *Diet, Nutrition, Physical Activity and Cancer: a Global Perspective. Continuous Update Project Expert Report*. 2018.
10. American Diabetes Association. *Know the Diabetes-Cancer Link 2023* [Available from: <https://diabetes.org/tools-support/diabetes-prevention/diabetes-and-cancer>].
11. Ling S, Brown K, Miksza JK, Howells L, Morrison A, Issa E, et al. Association of Type 2 Diabetes With Cancer: A Meta-analysis With Bias Analysis for Unmeasured Confounding in 151 Cohorts Comprising 32 Million People. *Diabetes Care*. 2020;43(9):2313-22.
12. Shahid RK, Ahmed S, Le D, Yadav S. *Diabetes and Cancer: Risk, Challenges, Management and Outcomes*. *Cancers*. 2021;13(22):5735.
13. Australian Institute of Health and Welfare. *Australian Burden of Disease Study 2018: Interactive data on risk factor burden*. Canberra: AIHW; 2021.
14. Commonwealth of Australia. *The National Obesity Strategy 2022-2032*. Canberra, Australia; 2022.
15. Department of Health. *National Preventive Health Strategy 2021-2030*. Canberra, Australia; 2021.
16. National Health and Medical Research Council. *Australian Dietary Guidelines*. Canberra: National Health and Medical Research Council; 2013.
17. Australian Institute of Health and Welfare. *Nutrition across the life stages*. Canberra: AIHW; 2018.
18. Public Health Association Australia. *National Nutrition Strategy Background Paper*. Deakin, ACT: PHAA.
19. Dietitians Australia. *National Nutrition Strategy Position Paper*. Deakin, ACT: Dietitians Association of Australia; 2021.
20. Dietitians Australia. *National Nutrition Strategy Evidence Brief*. Deakin, ACT: Dietitians Association of Australia; 2021.
21. Lauby-Secretan B, Scoccianti C, Loomis D, Grosse Y, Bianchini F, Straif K. *Body Fatness and Cancer — Viewpoint of the IARC Working Group*. *New England Journal of Medicine*. 2016;375(8):794-8.
22. Carey RN, Whiteman DC, Webb PM, Neale RE, Reid A, Norman R, et al. *The future excess fraction of cancer due to lifestyle factors in Australia*. *Cancer Epidemiology*. 2021;75:102049.
23. Norman J, Kelly B, McMahon A-T, Boyland E, Baur LA, Chapman K, et al. *Sustained impact of energy-dense TV and online food advertising on children's dietary intake: a within-subject, randomised, crossover, counter-balanced trial*. *International Journal of Behavioral Nutrition and Physical Activity*. 2018;15(1).
24. Halford JC, Boyland EJ, Hughes GM, Stacey L, McKean S, Dovey TM. *Beyond-brand effect of television food advertisements on food choice in children: the effects of weight status*. *Public Health Nutrition*. 2008;11(9):897-904.
25. Harris JL, Bargh JA, Brownell KD. *Priming effects of television food advertising on eating behavior*. *Health Psychology*. 2009;28(4):404-13.
26. Watson WL, Lau V, Wellard L, Hughes C, Chapman K. *Advertising to children initiatives have not reduced unhealthy food advertising on Australian television*. *Journal of Public Health*. 2017;39(4):787-92.
27. King L, Hebden L, Grunseit A, Kelly B, Chapman K. *Building the case for independent monitoring of food advertising on Australian television*. *Public Health Nutrition*. 2013;16(12):2249-54.

28. Lumley J, Martin J, Antonopoulos N. Exposing the Charade - The failure to protect children from unhealthy food advertising. Melbourne: Obesity Policy Coalition; 2012.
29. Smithers L, Lynch J, Merlin T. Television marketing of unhealthy food and beverages to children in Australia: A review of published evidence. Canberra: Australian National Preventative Health Agency; 2012.
30. Hickey K, Schmidtke A, Martin J. Brands off our kids! Four actions for a childhood free from unhealthy food marketing. Melbourne: Obesity Policy Coalition; 2021.
31. COAG Health Council. National interim guide to reduce children's exposure to unhealthy food and drink promotion. COAG Health Council; 2018.
32. Watson WL, Khor P, Hughes C. Defining unhealthy food for regulating marketing to children - What are Australia's options. *Nutrition & Dietetics*. 2021;78(4):406-14.
33. Batis C, Rivera JA, Popkin BM, Taillie LS. First-Year Evaluation of Mexico's Tax on Nonessential Energy-Dense Foods: An Observational Study. *PLOS Medicine*. 2016;13(7):e1002057.
34. Sánchez-Romero LM, Canto-Osorio F, González-Morales R, Colchero MA, Ng S-W, Ramírez-Palacios P, et al. Association between tax on sugar sweetened beverages and soft drink consumption in adults in Mexico: open cohort longitudinal analysis of Health Workers Cohort Study. *BMJ*. 2020:m1311.
35. World Health Organization. Guideline - Sugars intake for adults and children. Geneva: WHO; 2015.
36. Ananthapavan J, Sacks G, Brown V, Moodie M, Nguyen P, Barendregt J, et al. Assessing Cost-Effectiveness of Obesity Prevention Policies in Australia 2018 (ACE-Obesity Policy). Melbourne: Deakin University; 2018.
37. Harrison MS, Coyne T, Lee AJ, Leonard D, Lowson S, Groos A, et al. The increasing cost of the basic foods required to promote health in Queensland. *Medical Journal of Australia*. 2007;186(1):9-14.
38. Lal A, Mantilla-Herrera AM, Veerman L, Backholer K, Sacks G, Moodie M, et al. Modelled health benefits of a sugar-sweetened beverage tax across different socioeconomic groups in Australia: A cost-effectiveness and equity analysis. *PLOS Medicine*. 2017;14(6):e1002326.
39. Mhurchu C, Eyles H, Choi Y-H. Effects of a Voluntary Front-of-Pack Nutrition Labelling System on Packaged Food Reformulation: The Health Star Rating System in New Zealand. *Nutrients*. 2017;9(8):918.
40. Kippen R, James E, Ward B, Buykx P, Shamsullah A, Watson W, et al. Identification of cancer risk and associated behaviour: implications for social marketing campaigns for cancer prevention. *BMC Cancer*. 2017;17(1).
41. Wakefield MA, Loken B, Hornik RC. Use of mass media campaigns to change health behaviour. *The Lancet*. 2010;376(9748):1261-71.
42. Abroms LC, Maibach EW. The Effectiveness of Mass Communication to Change Public Behavior. *Annual Review of Public Health*. 2008;29(1):219-34.
43. Noar SM. A 10-Year Retrospective of Research in Health Mass Media Campaigns: Where Do We Go From Here? *Journal of Health Communication*. 2006;11(1):21-42.
44. Gordon R, McDermott L, Stead M, Angus K. The effectiveness of social marketing interventions for health improvement: What's the evidence? *Public Health*. 2006;120(12):1133-9.
45. Huhman ME, Potter LD, Duke JC, Judkins DR, Heitzler CD, Wong FL. Evaluation of a national physical activity intervention for children: VERB campaign, 2002-2004. *Am J Prev Med*. 2007;32(1):38-43.
46. Pomerleau J, Lock K, Knai CC, McKee M. Interventions Designed to Increase Adult Fruit and Vegetable Intake Can Be Effective: A Systematic Review of the Literature. *The Journal of Nutrition*. 2005;135(10):2486-95.
47. Xia Y, Deshpande S, Bonates T. Effectiveness of Social Marketing Interventions to Promote Physical Activity Among Adults: A Systematic Review. *J Phys Act Health*. 2016;13(11):1263-74.
48. Dixon H, Scully M, Durkin S, Brennan E, Cotter T, Maloney S, et al. Finding the keys to successful adult-targeted advertisements on obesity prevention: an experimental audience testing study. *BMC Public Health*. 2015;15(1).

49. Morley B, Niven P, Dixon H, Swanson M, Szybiak M, Shilton T, et al. Population-based evaluation of the 'LiveLighter' healthy weight and lifestyle mass media campaign. *Health Education Research*. 2016;31(2):121-35.
50. Grunseit A, Bellew B, Goldbaum E, Gale J, Bauman A. Mass media campaigns addressing physical activity, nutrition and obesity in Australia: An updated narrative review. Sydney: The Australian Prevention Partnership Centre; 2016.
51. Kelly B, Bochynska K, Kornman K, Chapman K. Internet food marketing on popular children's websites and food product websites in Australia. *Public Health Nutrition*. 2008;11(11):1180-7.
52. Evans WD. How social marketing works in health care. *Bmj*. 2006;332(7551):1207-10.