Assessing Cost-effectiveness *of* Obesity Prevention Policies *in Australia*

ACE-OBESITY POLICY 2018

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Executive summary

The current obesity epidemic in Australia and around the globe has significant negative health and economic consequences. Addressing this problem will require a comprehensive societal response, including implementation of a suite of multi-sectoral government policies. Informed government action requires reliable comparative evidence on the costs and benefits of various policy options.

ACE-Obesity Policy is a priority-setting study that aimed to evaluate the economic credentials of a range of obesity prevention policies (including both regulatory and program-based interventions), across multiple sectors and multiple areas of governance (local, state and federal governments, and the private sector). The study formed part of the broader body of work of the National Health and Medical Research Council funded Centre of Research Excellence in Obesity Policy and Food Systems (APP1041020: 2012-2018), and answered the research question: "*What are the most effective, cost-effective, affordable and implementable policy options to prevent obesity across a range of settings?*"

The Assessing Cost-Effectiveness (ACE) approach was adopted – characterised by the use of consistent, rigorous methods for the technical cost-effectiveness analyses (including extensive uncertainty analyses), alongside qualitative analyses of key implementation considerations relevant to policy decisions (strength of evidence, equity, acceptability, feasibility, and sustainability). The modelling of expected health benefits and related costs in response to an intervention was based on a previously developed proportional, multi-state, life table Markov model.

Key advancements made to the model as part of the ACE-Obesity Policy study included:

- the integration of physical activity and fruit and vegetables intake as risk factors (in addition to body mass index);
- the development of an equity-focused version of the model that allowed the quantification of the differential cost, health and cost-effectiveness outcomes across different socio-economic position (SEP) groups; and
- modifications to allow better quantification of interventions targeted at children.

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Intervention selection was based on a deliberative process that included consideration of:

1. the potential impact on addressing obesity in Australia;
2. the relevance to current policy decision-making; and
3. the availability of evidence for intervention effectiveness.

Full economic evaluations were conducted for 16 interventions, with 50 different scenarios explored. Evidence reviews were completed for a further 12 interventions, but full economic modelling was not conducted due to the lack of evidence for effectiveness required to complete a robust evaluation.

All 16 interventions were found to be cost-effective approaches to addressing obesity in the Australian population. Eleven of these interventions were estimated to produce health benefits and save costs in the long term (classified as 'dominant'). The five remaining interventions were estimated to produce health benefits at a cost well below the common decision threshold used in Australia (classified as 'cost-effective'). Extensive uncertainty, threshold and scenario analyses showed that results were robust to changes in intervention-specific key input variables and assumptions.

An intervention to increase the price of alcohol through a uniform volumetric tax performed best in terms of its cost-effectiveness credentials and health benefit. This intervention has not previously been evaluated as an obesity prevention measure. Regulations to tax sugar-sweetened beverages and restrict television advertising of unhealthy foods ranked second and third on the cost-effectiveness league table, and have both been recommended by authoritative obesity prevention reports and health promotion bodies as key components of an obesity prevention strategy. This study is the first to evaluate the cost-effectiveness of several other promising obesity prevention interventions such as: restrictions on price promotions of unhealthy foods; supermarket shelf-tags on healthier products; and workplace interventions to reduce sedentary behaviour.

The vast majority (seven out of nine) regulatory interventions evaluated were dominant, compared to around half (four out of seven) of the program-based interventions. These differences were largely driven by the increased implementation costs of program-based interventions. However, the modelling of program-based interventions was generally based on stronger evidence for intervention effectiveness. Due to limitations in the current state of the evidence, the modelling of many of the regulatory interventions was based on their demonstrated impact on dietary and physical activity outcomes; their likely impact on body weight was generally based on the assumption that diet and physical activity outcomes are sustained without compensatory behaviour.

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Two interventions (related to taxing sugar-sweetened beverages, and restricting television advertising of unhealthy foods) were quantitatively evaluated for their impact on equity. Both evaluations found a positive impact on equity of health outcomes, with higher health gains in the lower SEP groups. The qualitative assessment that included a judgement on both process and outcome dimensions of equity, found that many of the most cost-effective interventions also resulted in higher out-of-pocket costs relative to income for lower SEP groups. Governments need to consider the design of obesity prevention interventions to ensure inequities are not exacerbated (e.g., hypothecation of taxes to benefit those in special need and from lower SEP groups).

Effective action to prevent obesity will not be possible without strong governmental leadership and commitment. Challenges will arise from the following:

1. Several interventions evaluated in this study may reduce specific company profits resulting in low levels of industry acceptability.
2. Many of the health benefits and cost-savings may only materialise in the longer term (i.e., beyond any single political cycle).
3. Many of the recommended interventions are cross-sectoral in nature, and successful implementation will require a whole-of-government approach with inter-departmental co-operation and co-ordination.
4. Broad-based societal support for obesity prevention needs to be mobilised.

Despite these challenges, the great potential for substantial health benefits stemming from the obesity prevention interventions evaluated in this study can be used to garner a coalition of support for these policies.

Table 5 *League table of cost-effectiveness result*

Intervention	Intervention type	Intervention component	Target population	Risk factor addressed	Length of intervention/ effect maintenance	ICER (mean, $/HALY gained)	Total HALYs gained	Total intervention costs	Intervention costs in the first 3 years	Total healthcare cost offsets	Total net cost*	Strength of evidence - BMI
Alcohol price increase: uniform volumetric tax	Regulatory	Nutrition	14-100 year olds	BMI	Lifetime	Dominant	471,165	$31.9M	$24.7M	$4.8B	-$4.8B	Low
Sugar-sweetened beverages tax (20%)	Regulatory	Nutrition	2-100 year olds	BMI	Lifetime	Dominant	175,300	$120.5M	$11.8M	$1.7B	-$1.7B	Low
Restricting television advertising of unhealthy foods (mandatory)	Regulatory	Nutrition	5-15 year olds	BMI	Lifetime	Dominant	88,396	$5.9M	$1.5M	$783.8M	-$777.9M	Low
Package size cap on sugar-sweetened beverages (mandatory)	Regulatory	Nutrition	2-100 year olds	BMI	Lifetime	Dominant	73,883	$210.0M	$143.8M	$750.9M	-$540.9M	Low
Supermarket shelf tags on healthier products (voluntary)	Program	Nutrition	2-100 year olds	BMI	3 years/ 3 years	Dominant	72,532	$8.5M	$8.5M	$646.8M	-$638.1M	Low
Menu kilojoule labelling on fast food	Regulatory	Nutrition	2-100 year olds	BMI	Lifetime	Dominant	63,492	$170.4M	$36.9M	$672.0M	-$502.0M	Low
School-based intervention to reduce sedentary behaviour	Program	Sedentary behaviour	8-9 year olds	BMI/PA (SB)	Lifetime	Dominant	61,989	$15.3M	$14.4M	$660.8M	-$676.1M	Medium
School-based intervention to increase physical activity	Program	Physical activity	8-9 year olds	BMI/PA	Lifetime	Dominant	60,780	$10.0M	$9.5M	$640.6M	-$630.5M	Medium
Restrictions on price promotions of sugar-sweetened beverages (mandatory)	Regulatory	Nutrition	2-100 year olds	BMI	Lifetime	Dominant	48,336	$17.0M	$4.6M	$498.0M	-$481.0M	Low
Reformulation to reduce sugar in sugar-sweetened beverages (voluntary)	Regulatory	Nutrition	2-100 year olds	BMI	Lifetime	Dominant	28,981	$44.4M	$31.2M	$295.0M	-$250.6M	Low
National mass media campaign related to sugar-sweetened beverages	Program	Nutrition	18-100 year olds	BMI	3 years/ 3 years	Dominant	13,958	$31.0M	$30.5M	$157.0M	-$127.3M	Low
Reformulation in response to the Health Star Rating system (voluntary)	Regulatory	Nutrition	2-100 year olds	BMI	Lifetime	1,728	4,207	$46.1M	$31.2M	$41.6M	$4.5M	Low
Financial incentives for weight loss by private health insurers	Program	Multi-component	18-100 year olds	BMI	5 years / 11 years	7,376	140,110	$1.7B	$1.6B	$692.2M	$1.0B	High
Fuel excise: 10c per litre increase	Regulatory	Physical activity	18-64 year olds	BMI/PA/ Injury	Lifetime	7,684	237	$4.4M	$4.4M	$2.6M	$1.8M	Low
Community-based interventions	Program	Multi-component	5-18 year olds	BMI	Lifetime	8,155	51,792	$878.2M	$878.2M	$452.0M	$425.7M	High
Workplace intervention to reduce sedentary behaviour	Program	Sedentary behaviour	18-65 year olds	PA (SB)	1 year/ 5 years	28,703	7,492	$269.4M	$269.4M	$54.4M	$215.0M	Low

Notes: B: billion; BMI: body mass index; HALY: health adjusted life year; ICER: incremental cost-effectiveness ratio; M: million; PA: physical activity; SB: sedentary behaviour; $: Australian dollars 2010; * Negative numbers indicate total net cost-savings. The willingness-to-pay threshold for this analysis is $50,000 per health adjusted life year. Dominant: the intervention is both cost-saving and improves health.

Table 6 *Results of implementation considerations*

Intervention	Intervention type	Strength of evidence - BMI	Strength of evidence - PA/diet	Equity	Acceptability - Government	Acceptability - Industry	Acceptability - Public	Feasibility	Sustainability	ICER (mean, $/HALY gained)
Community-based interventions	Program	High	N/A	Neutral	High	High	High	Medium	Medium	8,155
Financial incentives for weight loss by private health insurers	Program	High	N/A	Negative	High	Medium	Medium	High	Medium	7,376
School-based intervention to reduce sedentary behaviour	Program	Medium	Medium	Positive	High	High	High	High	Medium	Dominant
School-based intervention to increase physical activity	Program	Medium	Medium	Positive	High	High	High	High	Medium	Dominant
Reformulation in response to the Health Star Rating system (voluntary)	Regulatory	Low	Medium	Positive	High	Medium	High	High	Medium	1,728
Restricting television advertising of unhealthy foods (mandatory)	Regulatory	Low	Medium	Positive	Medium	Low	High	High	High	Dominant
Reformulation to reduce sugar in sugar-sweetened beverages (voluntary)	Regulatory	Low	Medium	Positive	High	Medium	Medium	High	Medium	Dominant
Menu kilojoule labelling on fast food	Regulatory	Low	Medium	Neutral	High	Medium	High	High	High	Dominant
Supermarket shelf tags on healthier products (voluntary)	Program	Low	Medium	Neutral	High	Medium	High	High	Medium	Dominant
Workplace intervention to reduce sedentary behaviour	Program	Low	Medium	Neutral	High	Medium	High	Medium	Low	28,703
Sugar-sweetened beverages tax (20%)	Regulatory	Low	Medium	Neutral	Medium	Low	Medium	High	High	Dominant
Alcohol price increase: uniform volumetric tax	Regulatory	Low	Medium	Negative	Medium	Low	Low	High	High	Dominant
Package size cap on sugar-sweetened beverages (mandatory)	Regulatory	Low	Low	Positive	Low	Low	Low	Low	Medium	Dominant
National mass media campaign related to sugar-sweetened beverages	Program	Low	Low	Neutral	Medium	Medium	Medium	High	Medium	Dominant
Fuel excise: 10 cent per litre increase	Regulatory	Low	Low	Negative	Low	Medium	Low	High	High	7,684
Restrictions on price promotions of sugar-sweetened beverages (mandatory)	Regulatory	Low	Low	Negative	Low	Low	Low	Low	High	Dominant

Notes: BMI: body mass index; HALY: health adjusted life year; ICER: incremental cost-effectiveness ratio; PA: physical activity; The willingness-to-pay threshold for this analysis is $50,000 per health adjusted life year. Dominant: the intervention is both cost-saving and improves health.