# Feasible diet intervention options to improve health and save costs for the New Zealand population

**An Occasional Report prepared by the BODE[3] Team, University of Otago, Wellington**

Dr Cristina Cleghorn, Prof Tony Blakely, Dr Amanda Jones, Dr Giorgi Kvizhinadze, Dr Anja Mizdrak, Dr Nhung Nghiem, Prof Cliona Ni Mhurchu & Prof Nick Wilson

February 2019

# Recommendations

Results from Burden of Disease Epidemiology, Equity, and Cost-effectiveness (BODE$^3$) diet intervention modelling, as well as the wider research literature, support the recommendation of two key diet-related policy initiatives for the New Zealand (NZ) Government.

**RECOMMENDATION #1: FOOD REFORMULATION**

Initiate a comprehensive government-led food reformulation programme that:

a. Sets maximum targets for sugar, sodium, and saturated fat content for all processed food categories;
b. Reduces total sugar in beverages and other processed foods, following the United Kingdom (UK) sugar reduction model;
c. Reduces sodium in processed foods, especially commonly consumed foods such as bread and very high sodium foods such as processed meats, and sauces, following the UK sodium reduction model;
d. Achieves reductions in total sugar and sodium content without increasing saturated fat or energy content per serving size.

Additional to this food reformulation programme, we recommend a reduction of the serving sizes of single-serve sugary drinks sold in all shops, restaurants, and fast food outlets.

**RECOMMENDATION #2: SOFT DRINKS INDUSTRY LEVY**

Introduce a tiered beverage industry levy based on total sugar, following the highly successful UK model introduced on 1 April 2018.

## Background

NZ has a highly obesogenic environment that has given rise to the fourth highest obesity rate and the 12th highest diabetes rate in the Organisation for Economic Co-operation and Development (OECD).[1] There are substantial health gains to be made in NZ through action on improving the dietary environment.

Other high-income countries have made notable progress in advancing national policies aimed at improving the entire population's diet. For example, since 2003 the UK Government has led a highly successful national sodium reduction strategy centred on reformulation to lower levels of sodium in processed foods and beverages.[2] In 2016, the UK Government launched sugar reduction targets for the food and beverage industry to achieve through reformulation. The targets aim to achieve a 20% reduction by 2020 in sugar levels of the food categories contributing the most sugar to diets. Sodium and sugar reductions form part of the UK's wider reformulation programme.[3]

The Australian Department of Health is also undertaking a comprehensive voluntary reformulation programme focused on reducing sodium, sugar, and saturated fat, with draft targets currently under public consultation.[4] The UK is among approximately 36 countries (including nine European Union countries) to implement a tax on sugary drinks to protect population health (specifically, a tiered levy).[5]

In addition to improving population health, the implementation of food environment enhancing interventions in NZ is expected to preferentially benefit the health of Māori, Pacific, and low-income groups.[6] Furthermore, evidence suggests that stronger policies (eg, mandatory reformulation versus voluntary reformulation targets) will achieve even greater health benefits for the highest risk populations.[7] Diet-related diseases such as cardiovascular disease and diabetes impose relatively higher burdens among these groups,[8] thus interventions will impact a greater proportion of these populations. Additionally, the high intakes of sugar-sweetened beverages (SSBs), sugar, and other specific dietary risk factors are more common in these groups.[9,10]

The purpose of this report is to present simulation modelling evidence on potential diet interventions for government-led action. In particular, we compare the health gains, cost-effectiveness, and inequities reductions for a key selection of nine diet interventions modelled for the NZ population. We also compare these results to two non-diet interventions being operationalised in NZ.

## Methods

We used two existing BODE$^3$ simulation models to examine the potential impact of dietary interventions among the 2011 NZ adult population. Details on these models are previously reported.[11,12] Briefly, the models use a multistate life table design with the NZ population divided into cohorts by age, sex, and ethnicity (Māori/non-Māori). Disease parameters (eg, incidence, mortality), health care costs, and background mortality rates were drawn from HealthTracker and the Integrated Data Infrastructure (IDI). Health system costs consider intervention costs and the cost savings from disease reduction (and health costs due to extra life expectancy as a result of the intervention). Dietary intake was obtained from the 2008/2009 NZ Adult Nutrition Survey, whereas risk factor-disease relationships were primarily obtained from the Global Burden of Disease (GBD) study.[13] We estimated uncertainty for key parameters, such as dietary intake, intervention effects sizes, intervention costs, and relative risks for diseases. For comparison, we include results from modelling two non-health interventions using a comparable approach.[6,14] Table 1 describes the modelled interventions.

We present two intervention outcomes: health gains and health system costs offsets (often large cost savings due to preventing future disease and costs to the health system). Health gains are reported in quality-adjusted life-years (QALYs) and discounted at 3% per year into the future with the intervention beginning in 2011. A result of ‘100,000 QALYs gained’ is interpreted as: 100,000 QALYs gained for the NZ population alive (4.4 million) over the remainder of their lives. This value is equivalent to 23 discounted healthy life years gained per 1,000 people or 8.3 healthy days per person. If discounting was not applied, the health gains would be roughly three times as great. To examine the potential equity implications, we also present the age-standardised ratio of Māori to non-Māori per capita health gains for our most recently modelled interventions.

**Table 1. Modelled health interventions**

| FOOD REFORMULATION TO IMPROVE NUTRIENT PROFILE |
|---|
| **Reformulation to reduce SODIUM in bread, processed meats, and sauces (UK, voluntary)**<br>A government-led voluntary programme that achieves sodium reduction targets for bread (12-37% reduction), processed meats (35-55% reduction), and sauces (30-63% reduction). These are plausible targets based on the UK experience. Bread, processed meats, and sauces are leading contributors to dietary sodium intake and can be reformulated with relative ease (without jeopardising taste). Full results in Nghiem et al (2016)[15]; publication available on request. |
| **Reformulation to replace 59% of SODIUM in processed foods with potassium and magnesium salts (UK)**<br>Processed foods are reformulated to replace 59% of sodium with potassium and magnesium salts (healthier salts). Such salt substitution is already performed for some processed foods in NZ, but at a much lower level. Full results in Nghiem et al (2015)[16]; publication available on request. |
| **Reformulation to reduce SUGAR by 20% in non-alcoholic beverages**<br>Reformulation to achieve a 20% reduction in the total sugar content of beverages containing sugar: sugar-sweetened carbonated soft drinks, energy drinks, cordials, powdered drinks, fruit drinks, sports drinks, and fruit and vegetable juices. Fruit and vegetable juices includes juices with ingredients used to impart sweetness such as juice concentrates and fruit purees. Due to model limitations, some modelled juices may not be conducive to real-world reformulation. Milk and alcoholic drinks are excluded. Assumes no substitution with other beverages or foods. |
| **Reformulation to reduce SUGAR by 20% in processed foods**<br>Reformulation to achieve a 20% reduction in the total sugar content of foods within the following categories: sugary drinks (same beverage types as the above intervention), confectionary, dairy products, biscuits, cakes and muffins, bread, and breakfast cereals. Energy content is reduced due to the removal of sugar content. Fruit, vegetables, milk and alcoholic drinks are excluded. Assumes food manufacturers do |

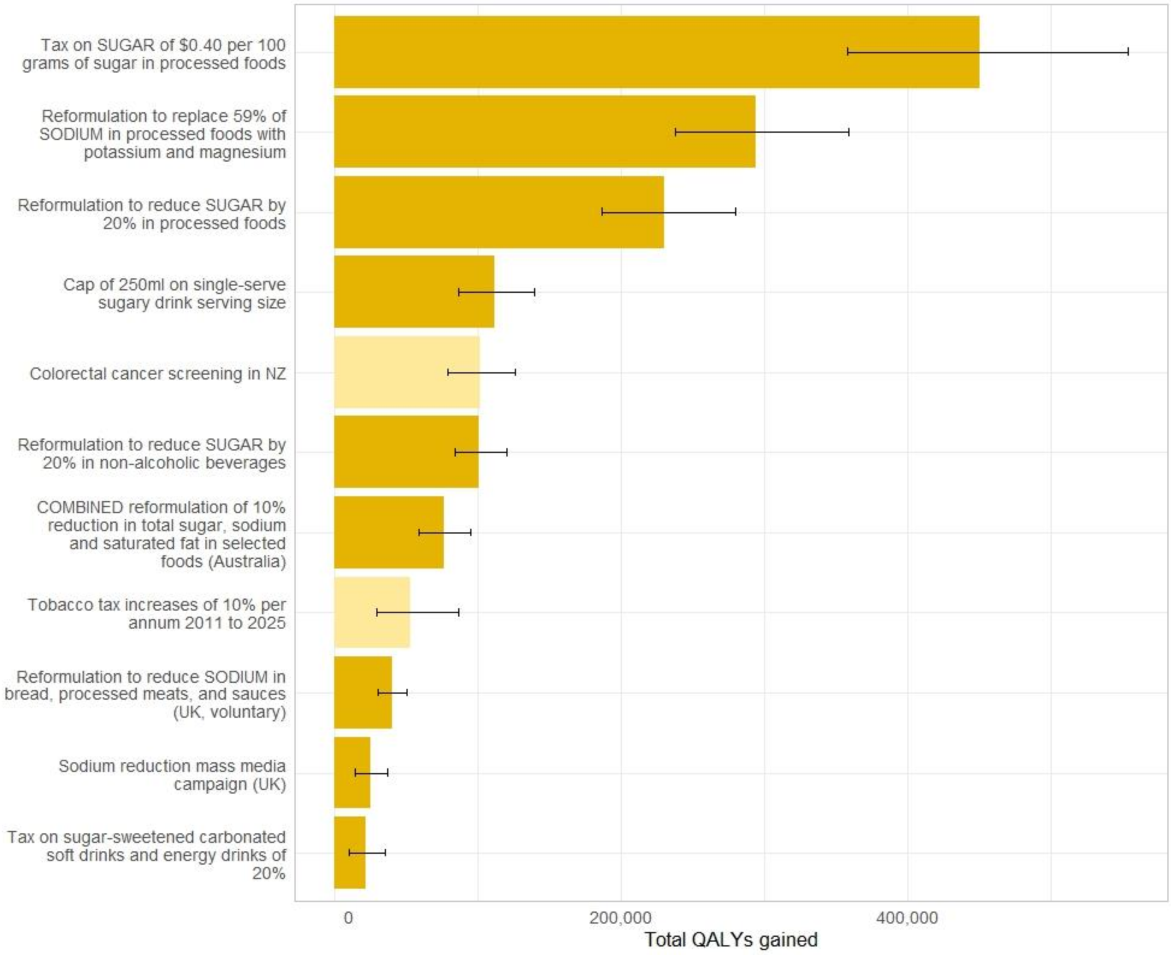
| | |
|---|---|
| not replace sugar with another ingredient (eg, another carbohydrate). Assumes consumers do not substitute reduced sugar and energy intake with other beverages or foods. | |
| **COMBINED reformulation of 10% reduction in total sugar, sodium and saturated fat in selected foods (Australia)**<br>Reformulation of processed foods to achieve a 10% reduction of total sugar, sodium, and saturated fat content in selected food groups. Alcoholic drinks are excluded. Energy content is reduced due to the removal of these nutrients. Assumes food manufacturers do not replace these nutrients with another ingredient. Assumes consumers do not substitute reduced sugar, sodium, and saturated fat intakes with other beverages or foods. The intervention is based on the voluntary Australian reformulation programme.[17] | |
| **HEALTH-PROMOTING TAXES/LEVIES** | |
| **Tax on SUGAR of $0.40 per 100 grams of sugar in processed foods**<br>Increase the price by $0.40 per 100 grams of total sugar, with the tax applied to all processed foods. Foods high in total sugar would be taxed more. Fruit, vegetables, milk, and alcoholic drinks are excluded. | |
| **Tax on sugar sweetened carbonated soft drinks and energy drinks of 20%**<br>20% ad valorem tax on sugar-sweetened carbonated soft drinks and energy drinks. This intervention is not the same as the UK tiered levy on the drinks industry, but gives some sense of magnitude of impact. | |
| **OTHER INTERVENTIONS** | |
| **Salt reduction mass media campaign (UK)**<br>UK-style mass media campaign to encourage the NZ population to reduce sodium consumption. Full results in Nghiem et al (2015)[16]; publication available on request. | |
| **Cap on serving size of single-serve sugary drinks**<br>Reduce all single-serve servings of sugary drinks sold in all shops, restaurants and fast food outlets to 250 ml; assumes no substitutions with other beverages or foods. Sugary drinks consist of sugar-sweetened carbonated soft drinks, fruit drinks, energy drinks, sports drinks, fruit juices, and sweetened milks. Full results in Cleghorn et al (2019)[18]; publication available on request. | |
| **NON-DIET INTERVENTIONS BEING OPERATIONALISED IN NZ (for comparison)** | |
| **Colorectal cancer screening in NZ**<br>Screening programme for colorectal cancer. The programme consists of biennial iFOBT (human haemoglobin immunochemical based faecal occult blood test) from age 50-74 for all people age 30+ in 2011. Full results in McLeod et al (2017)[14]; publication available on request. This screening intervention is being rolled out in NZ, albeit at a reduced scale at present and with differences in the details. | |
| **Tobacco tax increases in NZ**<br>10% annual tobacco tax increases from 2011 to 2025 (the year of the Smokefree 2025 Goal). Full results in Blakely et al (2015)[6]; publication available on request. This intervention is currently in operation in NZ, albeit to January 2020. | |

# Results

**HEALTH GAINS**

All nine modelled interventions produced health gains for the NZ population alive in 2011, over the remainder of their lifespans, and many of the interventions have very large impacts (Figure 1). In our experience, approximately 10% to 20% of these health gains occur in the first 20 years post-intervention (more precise estimates available on request). The most impactful interventions are 1) a tax on sugar in processed foods, 2) reformulation to replace sodium in processed foods with healthier salts, and 3) reformulation to reduce sugar in processed foods. Compared to the non-diet interventions, the health gains resulting from dietary interventions are substantially greater. For example, the health gains for the top three most impactful diet interventions are 4.4, 2.9, and 2.3 times greater than colorectal cancer screening, and 8.5, 5.5, and 4.3 times greater than annual tobacco tax increases.

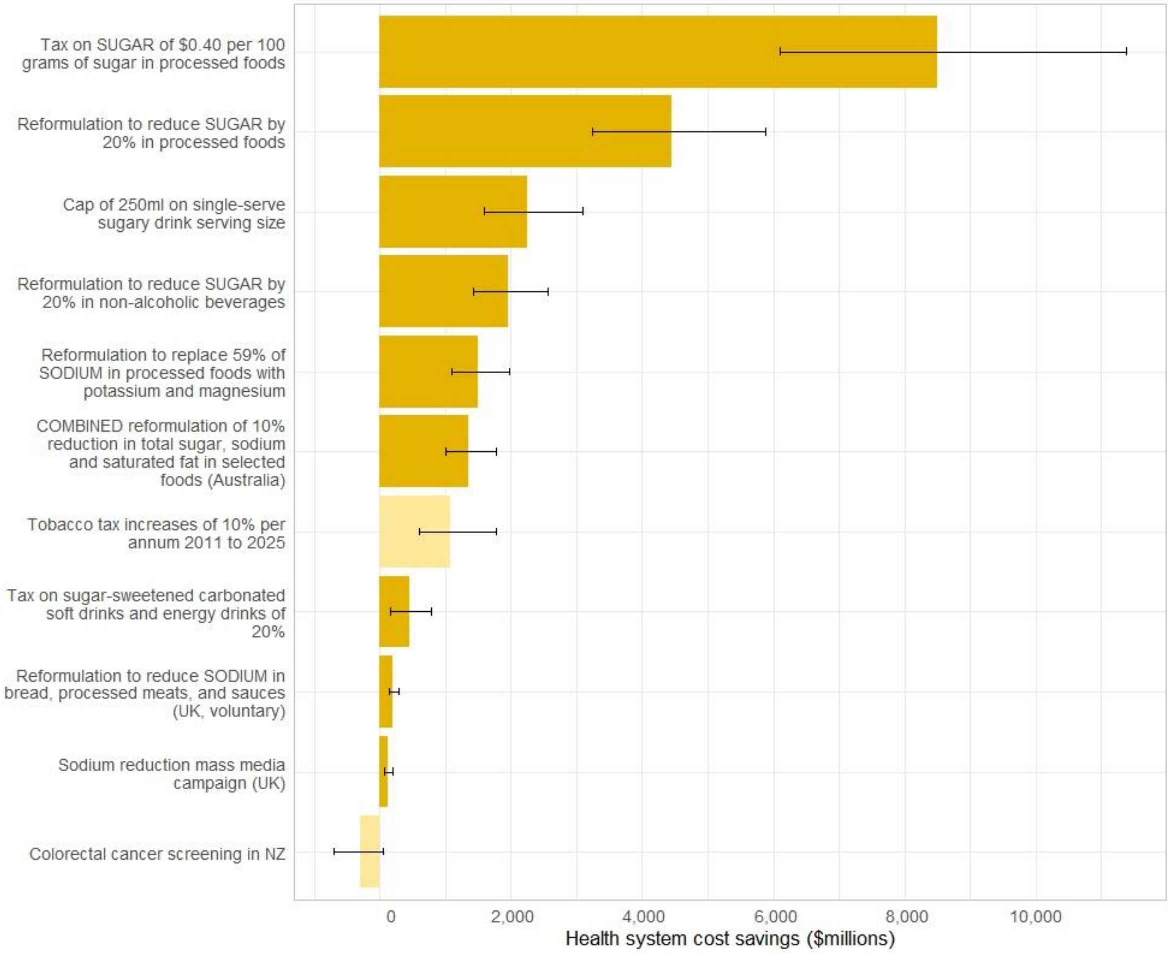
**Figure 1. Health gains (QALYs) for health interventions with 3% discounting (bars show 95% uncertainty intervals)**



**HEALTH SYSTEM COSTS**

When accounting for the intervention costs and the costs associated with additional years of life, all nine diet interventions showed net health care cost savings for the NZ population (Figure 2). The greatest health system savings results from 1) a tax on sugar in processed foods, 2) reformulation to reduce sugar in processed foods, and 3) a cap on single-serve sugary drink serving size. For a given intervention there are similarities in the magnitude QALYs and cost savings—lower disease incidence produces more health gain and more health system cost savings.

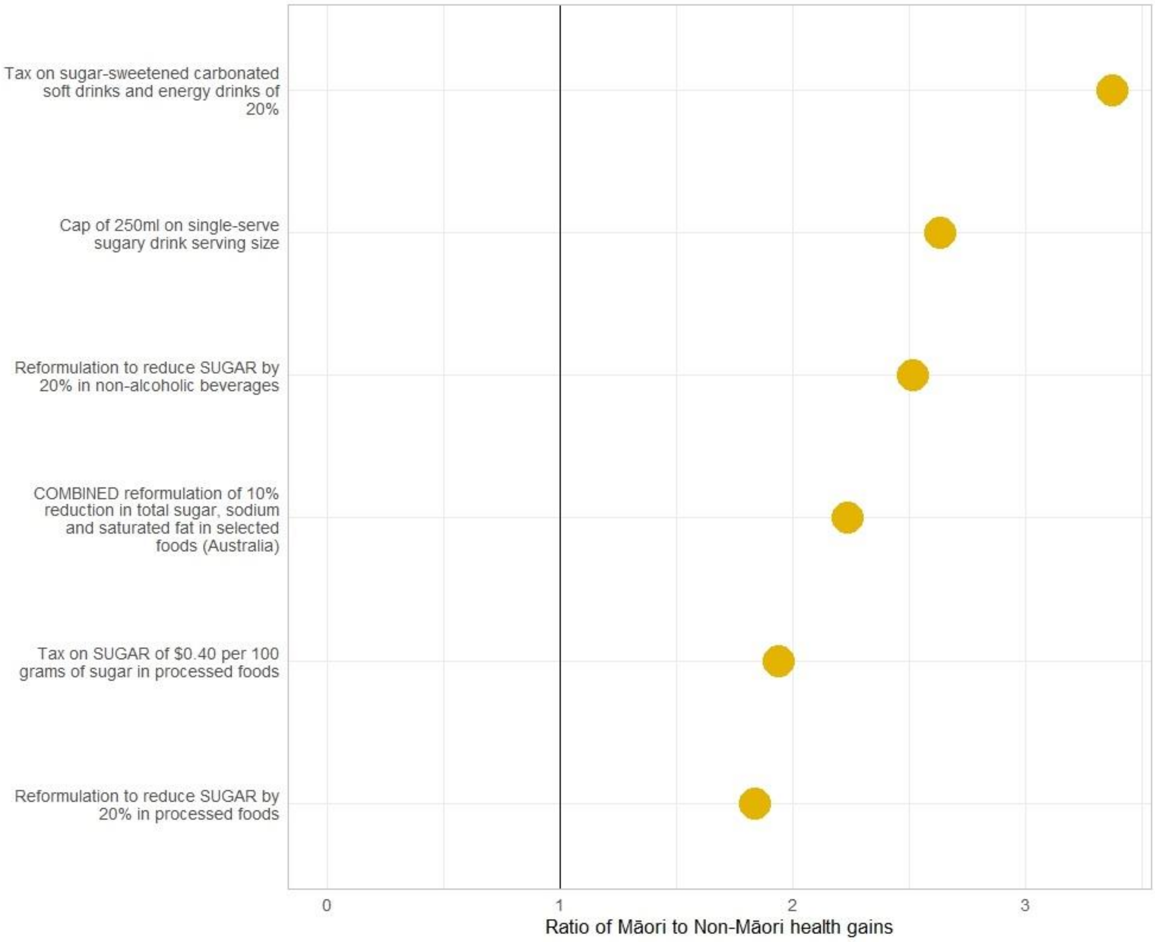
**Figure 2. Net cost savings to the health system from health interventions with 3% discounting (bars show 95% uncertainty intervals)**



**MĀORI VERSUS NON-MĀORI HEALTH GAINS**

For six interventions modelled recently specifically for this report, we analysed the ratio of Māori to non-Māori age-standardised QALYs gained per capita. All six interventions produced greater health gains for the Māori population compared to the non-Māori population (Figure 3). Age-standardisation adjusts for the younger Māori population. The greatest Māori:non-Māori ratio of benefit was for a tax on SSBs at nearly 3.5 times the health gain per capita. The least, but still an important contribution to reducing health inequality, was a ratio of nearly 2 for reformulation of sugar in processed foods. The ratio variations are due to how food intake is distributed by ethnicity: soft drinks are consumed more by Māori than non-Māori, whereas the whole population is exposed to sugar in processed foods.

**Figure 3. Ratio of Māori to non-Māori age standardised QALYs gained per capita with 3% discounting**



# Discussion

Based on simulation modelling, there are numerous feasible dietary interventions that are expected to have a meaningful health benefit on the NZ population, as well as reduce health system costs and health inequalities between Māori and non-Māori. Several diet interventions are even more beneficial when comparing the health gains to existing health interventions such as colorectal cancer screening and annual tobacco tax increases.

A number of modelled interventions provide co-benefits that are not quantified here, such as extra tax revenue for potentially funding school sports programmes (as in the UK), reduced dental caries from lower sugary drink consumption. Savings to health system costs can be redeployed to other health priorities, such as dementia care, thereby yielding further health gains. In addition to reducing inequalities between Māori and non-Māori, modelled interventions are expected to reduce deprivation inequalities. While these reductions may not appear large in relative terms, when considering the whole population, the benefits would be substantial in absolute terms. Finally, we model results for the NZ adult population only and do not quantify the impact to children and adolescents, thus underestimating the magnitude of benefits for the NZ population.

Importantly, population-wide interventions such as these tend to generate larger health gains than individually-oriented interventions. Moreover, there is much evidence that targeted interventions (eg, dietary counselling) will be preferentially taken up by advantaged groups (eg, high-income). Reductions in inequalities from targeted programmes will be less certain, unless individually-oriented interventions are strongly targeted to those with the highest need.

Given the inherent uncertainty around modelling parameters such as intervention effect size, all results were presented with uncertainty. In the following sections we discuss each group of interventions, and the limitations specific to them.

**FOOD REFORMULATION TO IMPROVE NUTRIENT PROFILE**

Food reformulation can be a powerful tool for improving a population's food supply. Sodium reduction has potentially large health gains and cost-savings. However, the exact size of the health gains is uncertain due to uncertainty about the exact level of sodium intake at which harms begin. Our two models—one focused on only sodium and another examines sodium and other nutrients—differ in their estimates of when this harm begins. The older former 'sodium model' (consistent with evidence at the time) assumed an adverse dose-response to sodium from low levels. The latter 'diet model' includes a more recent interpretation from the Global Burden Disease study of harms occurring anywhere at a level of 1 to 5 grams per day of sodium. Our current view is the truth probably lies somewhere in between the two models. We used the diet model to estimate the impacts of the combined reformulation package, and the sodium model to estimate the sodium reformulation and mass media interventions. We estimate that if the reformulation package intervention was also analysed as per the sodium model, it would produce up to three times the health gains from the sodium reduction component. Regardless, population-wide sodium interventions have large health gains.

We expect the sodium interventions to be highly feasible for industry and acceptable to consumers, as they are based on an intervention that has been successfully implemented in the UK, largely uncontroversial, and adopted by other countries. For an intervention such as setting maximum levels for sodium in very salty foods (eg, some sauces), it is likely that reductions in sodium content will not be noticed by consumers given that sodium levels are already extremely high. Additionally, if manufacturers respond to regulations by replacing sodium chloride with potassium chloride (a healthier salt that actually *lowers* blood pressure), reformulation will be even less likely to be noticed by consumers. While sodium reduction achieves health benefits through direct reductions of blood pressure (and in turn, stroke and heart attack rates are reduced), it does not address the obesity problem in NZ.

Reformulation to reduce the sugar content of processed foods will have an impact on the energy available within foods, and can potentially yield reductions in obesity for the NZ population. The large health gains and health care cost savings seen within the modelled sugar reformulation interventions reflect the very high levels of sugar content within foods and the very high volumes at which these foods are consumed. With reformulation comes the risk of industry (or sometimes consumers) substituting one unhealthy ingredient with another that is equally or nearly as unhealthy (eg, substituting sugar with saturated fat) or which has the same energy content per gram. Within our modelling, we assume that these substitutions do not occur. If substitutions do occur, the health gains and health system savings would decrease, but would still be sizable.

Fundamentally, to avoid unintended consequences, NZ needs a reformulation programme that set targets for sugar, sodium, and saturated fat for all key processed categories, just as Australia has proposed. Compared to the sugar-only and sodium-only reformulation interventions, the benefits from the modelled 'combined reformulation' intervention appear small, mainly due to lower reductions of 10% and the limited number of processed foods the intervention targets. This is because the combined reformulation intervention reflects the proposed Australian reformulation programme, which does not include targets for all processed food groups and is not yet finalized. For carefully designed food reformulation standards, we recommend preferentially that sugar is reduced in processed foods and beverages. For some foods high in sugar, removed sugar may need to be replaced with other constituents. Such constituents should be water, protein, complex carbohydrates or poly-unsaturated fats, and not saturated fat. If sugar is replaced gram for gram with a carbohydrate containing no fibre, then the food's energy content will remain the same and there will be no benefit to body mass index (BMI). If sugar is replaced gram for gram with poly-unsaturated fat (ie, 'good' fats), there will be some health benefit from this healthier fat, but the energy content of the product will increase, thereby potentially leading to weight gain if not offset by increased satiety. Consideration must also be given to how reformulation will affect the ingredient volume of a packaged product (eg, less sugar equates to a slightly smaller food) and, where possible, reformulation should be accompanied by a calorie reduction.

A reformulation intervention should be designed to reduce the risk of consumers switching to different (unhealthier) products or buying more products to make up for any smaller package sizes. It is unknown what this level of substitution may be, but we expect it will vary depending on the strategy, how the food industry implements the strategy, and how the interventions are 'rolled out'. A disadvantage of a voluntary reformulation programme is that it does not create 'an even playing field' for food manufacturers. Companies that voluntarily choose to reduce sodium or sugar content may experience reduced sales from consumers switching to brands that other companies have chosen to not reformulate.[19] Examining the existing research from international comparator countries with reformulation programmes will provide insight into potential consumer and industry responses. Food reformulation programmes are not created equal. While the government-led UK sodium reduction strategy was highly successful, the Canadian voluntary sodium reduction strategy (2012-2016) achieved targeted reductions in only 14% of food categories; there was no improvement in nearly half (48%) of categories and some of these categories actually increased in sodium content.[20] A recent evaluation by Health Canada concluded, 'The limited success of the voluntary targets demonstrates that stronger efforts are needed to reduce sodium' (p11).[20] These two examples illustrate the importance of having government-led or mandatory food reformulation over voluntary approaches. In addition to our main recommendations at the beginning of this report, we also strongly recommend that the Ministry of Health is requested to provide policy options and analysis about best regulatory packages internationally that might work best in NZ.

**HEALTH-PROMOTING TAXES/LEVIES**

The UK tiered soft drinks industry levy provides a standout example of how a well-designed tax intervention can stimulate changes in consumer and industry behaviour through multiple pathways. The tax works by setting three bands of sugar content: low (no tax), medium (moderate tax), and high (high tax). The beverage industry has responded to the tax by reformulating a reported 50% of products to a lower sugar content. The tax also works as the price encourages consumes to shift away from sugary drinks. The tax has raised revenue for the UK Government to fund sports programmes in schools and appears to be widely accepted and supported by the public.

There also appear to have been positive knock-on effects, such as all major UK supermarkets deciding to no longer sell energy drinks to those under 16 year of age (with strong public approval). A critical component of a beverage tax is identifying which beverage types should be subject to tax. This decision should be informed by examining average consumption (especially among children) and products' energy and sugar content. Given the continued introduction of novel beverage types, definitions of taxable products should be broad enough to include new sugary drinks.

**OTHER INTERVENTIONS**

As for other diet-related health interventions, the serving size cap analyses have a number of limitations. Firstly, we have not been able to incorporate substitution behaviours. For example, as a result of a restriction on the size of cans/bottles of SSBs consumers could buy multiple smaller cans/bottles instead of just limiting themselves to the one single serve of 250ml, so for some individuals an intervention like this one would not actually result in a decrease in consumption. The level of likely substitution for an intervention like this is not known but this effect could reduce the QALY gains seen. Secondly, modelling is carried out in adults but this intervention would likely have health benefits for children too. Taking all these limitations into consideration it is likely that the true health benefit and cost saving falls somewhere within the uncertainty intervals shown on the graphs.

There are other limitations to the diet intervention results. For some interventions we were unable to distinguish applicable food and beverage categories at a more granular level (eg, by presence or absence of different types of sugar, not just total sugar), and therefore could not produce more nuanced estimates. We were limited by model structure and the variables found within the NZ Adult Nutrition Survey. Current dietary intake in NZ is not precisely known since the most recent national nutrition data is nearly 10 years old. Altogether, these limitations underscore NZ's need for a new national nutrition survey to better understand current dietary patterns and the prevalence of dietary risk factors such as added sugar intake.

For each modelled intervention, the results presented here reflect best estimates of the likely impact of the intervention. Further analyses of the sensitivity of results to specific model parameters are ongoing. BODE3 is able to conduct specific bespoke analyses on request with appropriate funding.

**CONCLUSION**

There is strong NZ and international evidence to support the implementation of a government-led food reformulation programme in NZ, and other key diet interventions, such as a tax on sugary drinks. When led by government, these policies work to improve the food environment and make healthier food choices easier for the entire NZ population. Implementing the modelled interventions is expected to yield substantial health gains, health care cost savings, and reduce health inequalities for the NZ population—improvements that are long overdue given the alarmingly high rates of obesity and type 2 diabetes in NZ. We welcome opportunities to provide further details on any of the issues covered by this Report.

# References

1. OECD. Health at a Glance 2017: OECD Indicators [Internet]. Paris: OECD Publishing; 2017. Available from: https://doi.org/10.1787/health_glance-2017-en

2. Public Health England. Salt reduction: targets for 2017 [Internet]. 2017 Mar [cited 2018 Nov 22]. Available from: https://www.gov.uk/government/publications/salt-reduction-targets-for-2017

3. GOV.UK. Sugar reduction and wider reformulation [Internet]. 2018 [cited 2018 Nov 22]. Available from: https://www.gov.uk/government/collections/sugar-reduction

4. Australian Government Department of Public Health. Healthy Food Partnership Voluntary Food Reformulation Targets - Public Consultation [Internet]. 2018 [cited 2018 Nov 22]. Available from: https://consultations.health.gov.au/population-health-and-sport-division-1/hfp-reformulation/

5. WCRF. NOURISHING database [Internet]. World Cancer Research Fund. 2018 [cited 2018 Nov 22]. Available from: https://www.wcrf.org/int/policy/nourishing-database

6. Blakely T, Cobiac LJ, Cleghorn CL, Pearson AL, van der Deen FS, Kvizhinadze G, et al. Health, Health Inequality, and Cost Impacts of Annual Increases in Tobacco Tax: Multistate Life Table Modeling in New Zealand. PLoS Med. 2015 Jul;12(7):e1001856.

7. Kypridemos C, Guzman-Castillo M, Hyseni L, Hickey GL, Bandosz P, Buchan I, et al. Estimated reductions in cardiovascular and gastric cancer disease burden through salt policies in England: an IMPACTNCD microsimulation study. BMJ Open. 2017 Jan 1;7(1):e013791.

8. Ministry of Health. Tatau Kahukura: Māori Health Chart Book 2015 [Internet]. Wellington: Ministry of Health; 2015. Report No.: (3rd edition). Available from: https://www.health.govt.nz/publication/tatau-kahukura-maori-health-chart-book-2015-3rd-edition

9. Ministry of Health. A Focus on Māori Nutrition: Findings from the 2008/09 New Zealand Adult Nutrition Survey. Wellington: Ministry of Health; 2012.

10. University of Otago, Ministry of Health. A Focus on Nutrition: Key findings of the 2008/09 New Zealand Adult Nutrition Survey. Wellington: Ministry of Health; 2011.

11. Cleghorn C, Blakely T, Nghiem N, Mizdrak A, Wilson N. Technical report for BODE$^3$ DIET intervention and Multistate Lifetable Models [Internet]. Wellington: Department of Public Health, University of Otago Wellington; 2017. Report No.: 16. Available from: https://www.otago.ac.nz/wellington/otago670797.pdf

12. Nghiem N, Wilson N, Blakely T. Technical Background to the Cardiovascular Disease Model used in the BODE3 Programme. Wellington: BODE3 Programme, University of Otago; 2015.

13. Forouzanfar MH, Afshin A, Alexander LT, Anderson HR, Bhutta ZA, Biryukov S, et al. Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. Lancet. 2016 Oct 8;388(10053):1659–724.

14. McLeod M, Kvizhinadze G, Boyd M, Barendregt J, Sarfati D, Wilson N, et al. Colorectal Cancer Screening: How Health Gains and Cost-Effectiveness Vary by Ethnic Group, the Impact on Health Inequalities, and the Optimal Age Range to Screen. Cancer Epidemiol Biomark Prev. 2017;26(9):1391–400.

15. Nghiem N, Blakely T, Cobiac LJ, Cleghorn CL, Wilson N. The health gains and cost savings of dietary salt reduction interventions, with equity and age distributional aspects. BMC Public Health. 2016;16:423.

16. Nghiem N, Blakely T, Cobiac LJ, Pearson AL, Wilson N. Health and economic impacts of eight different dietary salt reduction interventions. PLoS One. 2015;10(4):e0123915.

17. Department of Health. Healthy Food Partnership Reformulation Program: Evidence Informing the Approach, Draft Targets and Modelling Outcomes - Public consultation, July 2018 [Internet]. Canberra: Department of Health; 2018 Sep. Available from: http://www.health.gov.au/internet/main/publishing.nsf/Content/9BD46D97B65A6209CA257FAD00823957/$File/FINAL%20REFORMULATION%20RATIONALE%20PAPER%20-%20final%20for%20consultation%20v3,%20at%203%20Sept%202018.pdf

18. Cleghorn C, Blakely T, Ni Mhurchu C, Wilson N, Neal B, Eyles H. Estimating the health benefits and cost-savings of a cap on the size of single serve sugar-sweetened beverages. Preventive Medicine. 2019;120:150–56. https://doi.org/10.1016/j.ypmed.2019.01.009.

19. Watson E. The uncomfortable truth about Campbell's salt u-turn [Internet]. foodnavigator-usa.com. 2012 [cited 2018 Nov 28]. Available from: https://www.foodnavigator-usa.com/Article/2011/07/18/The-uncomfortable-truth-about-Campbell-s-salt-u-turn

20. Health Canada. Sodium Reduction in Processed Foods in Canada: An Evaluation of Progress toward Voluntary Targets from 2012 to 2016 [Internet]. Ottawa: Health Canada; 2018 Jan [cited 2018 Nov 28]. Available from: https://www.canada.ca/en/health-canada/services/food-nutrition/legislation-guidelines/guidance-documents/guidance-food-industry-reducing-sodium-processed-foods-progress-report-2017.html