Public awareness of cancer risk factors & support for prevention policies in Aotearoa New Zealand:

A focus on alcohol and diet

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EXECUTIVE SUMMARY

Background: It is estimated that 30-50% of cancer cases in Aotearoa New Zealand (Aotearoa) are preventable. Yet, cancer causes a substantial loss of health and lives in Aotearoa. Alcohol consumption and what food we eat contribute to this substantially. In 2019 it was estimated that alcohol caused 6% of all cancer deaths, dietary risks caused almost 8% of cancer deaths, and excess body weight caused over 6% of cancer deaths. Urgent action is needed to reduce rates of cancer by reducing our population's exposure to modifiable risk factors. It has been estimated that this could prevent substantial health loss and up to 4,400 deaths due to cancer in Aotearoa each year. Awareness of modifiable risk factors and population-based prevention efforts to promote healthy environments that support a reduction in exposure to modifiable risk factors are important pathways to achieving this. Internationally, research has assessed the public's awareness of the causal link between alcohol and cancer and dietary factors and cancer. However, in Aotearoa this information has only been collected sporadically and not since 2015. The current study was designed to address this information gap.

Methods: The current research sought to determine New Zealanders' awareness of modifiable risk factors for cancer (with a particular focus on alcohol and dietary factors) and support for evidence-based alcohol and food policies to reduce people's exposure to alcohol and dietary risk factors in their environment. A survey instrument was developed based on previous research. It was included in a self-administered online omnibus survey run by Talbot Mills Research. Data collection was completed in March-April 2023. A sample of 1425 New Zealanders aged 18 years and older were recruited by panel provider Dynata™ with boosted sampling for Māori and Pasifika people to provide equal explanatory power for these population groups.

Survey responses were weighted (through post-stratification weights) to ensure that they represented, as closely as possible, the Aotearoa adult population from the 2018 Census. Recall questions were manually coded into categories. Data analysis was conducted using Stata/SE version 18.0. Logistic regression was used to determine if significant differences were evident in responses to the recognition risk factor awareness question and the policy support questions (outcomes), based on specified independent variables.

Findings: It was found that, while there is some awareness of modifiable risk factors for cancer in Aotearoa, more still needs to be done to increase awareness. Increasing awareness of alcohol and food-related risk factors will provide the people of Aotearoa with knowledge that can be used to inform healthier choices (for those who have the means to do so) and will lead to increased support for government policies designed to create healthier environments that support people's ability to make healthy choices. Government action should start by focusing on policies that currently have the support of the majority of the Aotearoa adult population (e.g. "Banning alcohol sponsorship at sporting, community, and other events that under 18-year-olds go to", "The alcohol industry should not be involved in developing government policies (local and national) to reduce alcohol harm", "Government action to reduce the cost of healthy food", "Providing free healthy lunches at schools" and "Taxes on sugary drinks if the money is used to make healthy food more available/affordable"). These policies should be a starting point for the Government to take action on reducing the rates of preventable cancers related to alcohol and diet in Aotearoa, thus preventing unnecessary illness and deaths and reducing pressure on our struggling health system.

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BACKGROUND

It is estimated that 30-50% of cancer cases in Aotearoa New Zealand (Aotearoa) are preventable.[1] Alcohol consumption and what food we eat (via dietary risks and excess body weight) contribute to this substantially. In 2019 it was estimated that alcohol caused 6% of all cancer deaths, dietary risks* caused almost 8% of cancer deaths, and excess body weight caused over 6% of cancer deaths.[1] The International Agency for Research on Cancer (IARC) estimated that in 2020, 940 new cancers diagnosed in Aotearoa were attributable to alcohol consumption, including bowel (n=367), breast (264), oral (99), liver (95), oesophagus (56), pharynx (36), and larynx (23).[2] The food we eat is linked to increased risk for developing many types of cancer, including cancers of the oesophagus (adenocarcinoma), stomach (gastric cardia), colon and rectum, liver, pancreas, gallbladder, breast (post-menopausal), endometrium, ovary, kidney (renal cell), thyroid, blood (multiple myeloma), and brain (meningioma).[3,4] Other modifiable risk factors include tobacco smoke (20% of deaths), physical inactivity (1.5% of deaths), solar ultraviolet radiation, and chronic infections.[1] If all modifiable risk factors were addressed, the people of Aotearoa would gain over 90,000 years of life in full health (based on accumulated health loss due to cancer in one year) and almost 4,400 fewer people would die each year.[1]

Improving community understanding of the modifiable risk factors associated with cancer has been identified by The World Health Organization as a key cancer prevention strategy.[5,6] Yet, the Te Aho o Te Kahu - Cancer Control Agency (Te Aho) highlights that in Aotearoa "awareness-raising campaigns have not highlighted the link between alcohol and cancer, and there is a low level of awareness of the link with cancer in Aotearoa."[7] However, the Cancer Society of New Zealand has since undertaken a small social media campaign to raise awareness about the causal link between alcohol consumption and cancer.[8] The Te Aho report also comments that there is currently no requirement in Aotearoa for alcohol containers to include health warnings about the risk of cancer.[7] In addition, population-based cancer prevention efforts can help reduce people's exposure to cancer risk factors in their environment with policies limiting marketing, availability, and affordability of unhealthy commodities.[1]

Internationally, research has assessed the public's awareness of the causal link between alcohol and cancer and dietary factors and cancer, including some studies that have collected longitudinal data.[9-45] However, in Aotearoa this information has only been collected sporadically and not since 2015.[46,47] The current study was designed to address this information gap.

* Aggregate of diet low in whole grains, fruit, fibre, legumes, nuts and seeds, omega-3 fatty acids, polyunsaturated fats, vegetables, milk and calcium; and diet high in sodium, trans fats, red or processed meat and sugar-sweetened beverages [1]

AIMS

The current research sought to determine New Zealanders' awareness of modifiable risk factors for cancer (with a particular focus on alcohol and dietary factors) and support for evidence-based alcohol and food policies to reduce people's exposure to alcohol and dietary risk factors in their environment.

The specific aims for this project were:

- To determine New Zealanders' awareness of the causal link between modifiable risk factors (with a particular focus on alcohol and dietary factors) and cancer.
- To determine New Zealanders' support for evidence-based interventions/legislation relevant to alcohol and dietary factors.
- To determine if awareness of the causal link between modifiable risk factors (alcohol and dietary factors) differs between sub-groups of the New Zealand population (e.g. by ethnicity, gender, age-group, income).
- To determine if support for evidence-based interventions/legislation relevant to alcohol and dietary factors differs between sub-groups of the New Zealand population (e.g. by ethnicity, gender, age-group, income).
- To determine if awareness of modifiable risk factors (alcohol and dietary factors) is associated with support for evidence-based interventions/legislation relevant to alcohol and dietary factors.

METHODS

Instrument

A survey instrument was developed based on previous research. The survey instrument combined recall (unprompted) and recognition (prompted) questions to garner the best understanding of people's awareness of risk factors (see Appendix 1). The two recall questions were modified from a question in the validated Cancer Awareness Measure (CAM) that asked about what things could affect a person's chance of getting cancer.[48] The questions were modified to ask specifically about food and drink that could increase risk (question 1) and decrease risk (question 2), similar to questions in an Aotearoa survey by Richards et al in 2014/15.[46,47] The purpose of these questions was to explore New Zealanders' beliefs regarding the perceived impact of various types of food or drink on cancer risk (including awareness of evidence-based risk factors), without suggesting specific options.

The inclusion of the recognition (prompted) question aimed to determine the factors that New Zealanders are aware of that increase the risk of cancer, when explicitly asked. These recognition questions were placed after the recall questions in the survey to ensure that respondents were not influenced by the factors listed in the recognition questions while answering the recall questions. The recognition question was modified from a question developed for the CAM survey.[48] Participants were provided with a list of potential cancer risk factors and were asked to rate on a five-point Likert scale (anchored at "definitely" and "definitely not") the extent to which they think there is an association between each factor and cancer risk. The list of potential cancer risk factors was presented in randomised order. While the primary focus of this study was on alcohol and dietary risks, the list of possible risk factors also included other factors (both evidence-based and not) to provide context and

reduce the chance of people guessing based on the assumption that "if we are being asked it must be a risk factor".

The survey instrument also included questions about the level of support for policies that, if implemented, are likely to reduce the risk of cancer for New Zealanders.[1,49,50] The alcohol policy question was modified from questions previously used by Alcohol Healthwatch in a series of earlier surveys and/or by the Health Promotion Agency (HPA) in the 2019/20 "Alcohol Use in New Zealand Survey".[51,52] The food policy question was modified from questions used in the "International Food Policy Study: Australia Survey".[53] The wording of the food policy options was modified to match the alcohol policy question wording. Level of support was rated on a five-point Likert scale (anchored at "strongly support" and "strongly oppose", with an additional option "unsure"). The Cancer Society, Alcohol Healthwatch, and the Health Coalition Aotearoa provided advice on the survey and agreed on the final questions.

Socio-demographic information was collected, as outlined in **Table 1** (see Appendix 2 for further details).

Table 1. Socio-demographic information collected

	Answer categories
Age-group	18-19 years, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75+
Gender	Male, Female, Self-describe
Ethnicity	NZ European, NZ Māori, Samoan, Cook Island Māori, Tongan, Niuean, Chinese, Indian, Other Asian, Other European, Other Pasifika, Other ethnicity, Prefer not to say
Region	Northland, Auckland, Bay of Plenty, Waikato, Gisborne, Taranaki, Hawkes Bay, Manawatu/Whanganui, Wellington, Tasman/Nelson, Marlborough, West Coast, Canterbury, Otago, Southland
Type of area	Metropolitan area, Large regional centre, Medium regional centre, Small regional centre, Rural, Unsure
Employment: Weekly work hours Occupation	 Not working, Less than 30 hours, 30 hours or more Professional, Manager, Labourer, Clerical or administrative worker, Technician or trades worker, Sales worker, Community or personal service worker, Machinery operator or driver, Prefer not to say
Household income	$0 or made a loss; $20,000 or less; $20-30,000; $30-40,000; $40-50,000; $50-70,000; $70-100,000; $100-150,000; $150,000+; Prefer not to say
Housing situation	Home is owned with mortgage, Home is owned without a mortgage, Renting from a private landlord or property management company, Renting from Housing NZ or other social housing organisation, Other, Prefer not to say
Dependent children	No, Yes

Data collection and sampling

This study was approved by the University of Otago Ethics committee, approval number D23/073. The survey instrument (see Appendix 1) was included in a self-administered online omnibus survey run by Talbot Mills Research. Data collection was completed in March-April 2023. A sample of 1425 New Zealanders aged 18 years and older were recruited by panel provider Dynata™, who recruit participants from a variety of online panels (>300,000 Dynata panel members in Aotearoa) as well as recruiting non-panel participants from across a variety of websites, mobile apps, and social networks. This consisted of an initial sample of 1000 participants that was selected to provide diversity and representativeness across the Aotearoa population. The sample was stratified by age-group, region, and gender. Boosted sampling was then undertaken for Māori and Pasifika people to provide equal explanatory power for these population groups, resulting in a total sample size of 1425.

Data analysis

Survey responses were weighted (through post-stratification weights) to ensure that they represented, as closely as possible, the Aotearoa adult population from the 2018 Census. Weighted responses adjust grouped estimates for population characteristics that are under- or over-represented in the survey sample which is particularly important given recruitment was stratified to achieve equal explanatory power for Māori and Pasifika people. The weight calculation was made using the RIM weighting method which was set to match Statistics New Zealand 2018 Census data on age-group (18-29 years, 30-44, 45-59, 60+), gender (male, female), region, and ethnicity (Māori, Pasifika, Asian, and NZ European/other).[54]

Data analysis was conducted using Stata/SE version 18.0[55] and incorporated the RIM weights factor as sampling weight using the svy suite of functions in Stata. Descriptive statistics for the weighted population for each of the variables collected is reported. For socio-demographic characteristics both weighted and unweighted percentages are presented, along with comparative data from the 2018 Census (see Appendix 3).[54] The unweighted socio-demographic data gives an indication of the characteristics of the survey sample and how much data was able to be collected for different groups within the population of Aotearoa. The weighted percentages and comparative population data from the 2018 Census show how the data was weighted to represent the Aotearoa population.

The data from the two recall questions was manually coded into categories according to:

- Groupings/categories used in the recognition questions (increase risk: processed/junk food, alcohol, red meat, processed meat; decrease risk: fruit and vegetables, dietary fibre/wholegrains)
- Other food/drink types that were mentioned by multiple respondents (e.g. nuts/seeds, caffeine/caffeinated, milk/dairy, seafood/fish, tea, water)
- Categories grouped by common characteristics mentioned (e.g. high sugar food/drinks, soft drinks/fizzy/carbonated, containing artificial additives, fat/fatty foods)
- Initial coding was completed by RP, followed by a discussion with co-authors BM and LS to consider responses/groupings before final categories were decided.

Logistic regression was used to determine if significant differences were evident in responses to the recognition risk factor awareness question and the policy support questions (outcomes), based on specified independent variables. As the main focus of this report is on alcohol and evidence-based

food-related risk factors, logistic regression analyses of other factors was not included. Models were run for alcohol and each evidence-based food-related risk factor included in the recognition risk factor awareness question, and in the policy support questions for each alcohol policy option and each food policy option. To identify if there were differences in risk factor awareness and policy support in relation to socio-demographic factors, independent variables included in the models were ethnicity (prioritised in order of Māori, Pasifika, NZ European + other), gender (Male, Female), age-group (18-29 years, 30-44 years, 45-59 years, 60+ years), household income (low income: $70,000 or less[†], or not low income: > $70,001). Additional independent variables were included for the analyses of determinants of support for and opposition to alcohol policy options (alcohol awareness: those who selected definitely or probably for alcohol as a risk factor) and food policy options (food risk factor awareness: those who selected definitely or probably for one or more food-related risk factors) to investigate if risk factor awareness was associated with policy support/opposition. The logistic regression results are presented as adjusted odds ratios (OR) which indicate the odds that a given category of an independent variable would have the given outcome divided by the odds that the reference category for that independent variable would have that outcome. Confidence intervals (95% CI) are also presented to aid the interpretation of differences between groups.

RESULTS

Survey participants

A total of 1425 participants aged 18+ years completed the survey. Prior to weighting, the survey population were 65.7% female and represented all regions in Aotearoa. Ethnicities included European (61.8%), New Zealand Māori (22.8%), Pasifika people (24.6%), Asian (9.7%), and Other ethnicity (2.2%). Detailed socio-demographic information for the survey sample is presented in Appendix 3 (**Tables 2-11**). The tables in the appendix present both unweighted and weighted percentages, along with NZ Census (2018) statistics to show how the weighted percentages align with the Aotearoa population. All subsequent analyses report weighted percentages for the study responses.

Awareness of risk factors for cancer

The percentage of the population who spontaneously named (recall questions) particular food or beverages as a) increasing the risk of cancer, and b) decreasing the risk of cancer are presented in **Figure 1**. Fifty-one percent stated they were unsure or didn't know of any specific food or drink that could increase cancer risk, while 50% stated they were unsure or didn't know of any food or drink that could potentially decrease cancer risk. **Figure 2** outlines the percentage of the population who, when asked directly about specific factors (recognition questions), thought they would definitely or probably increase a person's risk of developing cancer (see also **Table 12** in Appendix 3 for detailed data on percentages and 95% CI). Detailed results on each risk factor grouping: alcohol, food-related, sun exposure, physical inactivity, and other factors (vaping, stress, mobile phones, food/drink in plastic packaging, microwaved food) are outlined in sub-sections below.

[†] 60% of the median NZ household income is commonly used as the (relative) poverty threshold in NZ. The closest cut-off point to 60% of the NZ median household income, based on income brackets used in survey, was $70,000.[56,57]

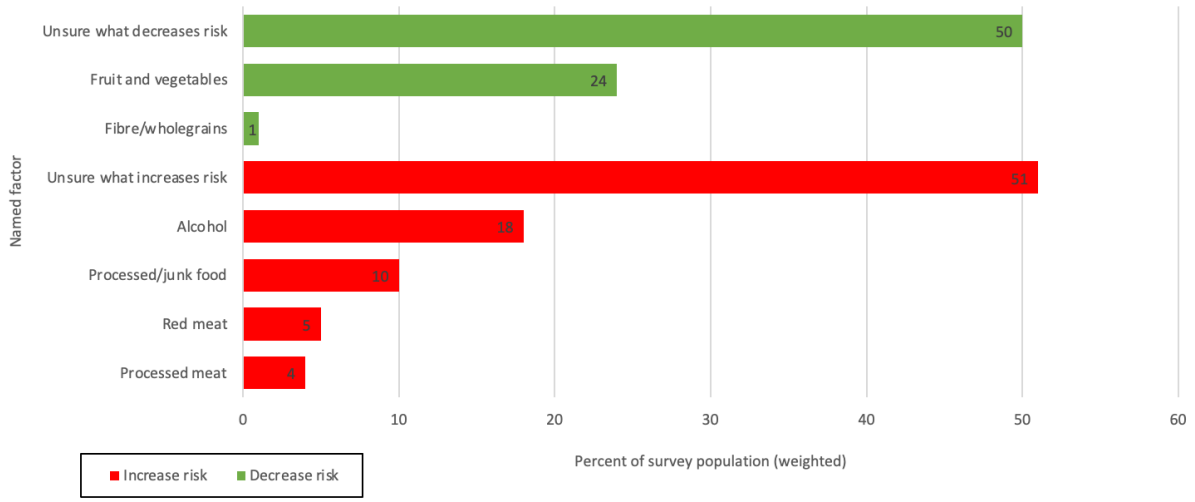

Figure 1. Percentage of population (weighted) who named food/drink factors that can increase risk or decrease risk for cancer (recall questions)

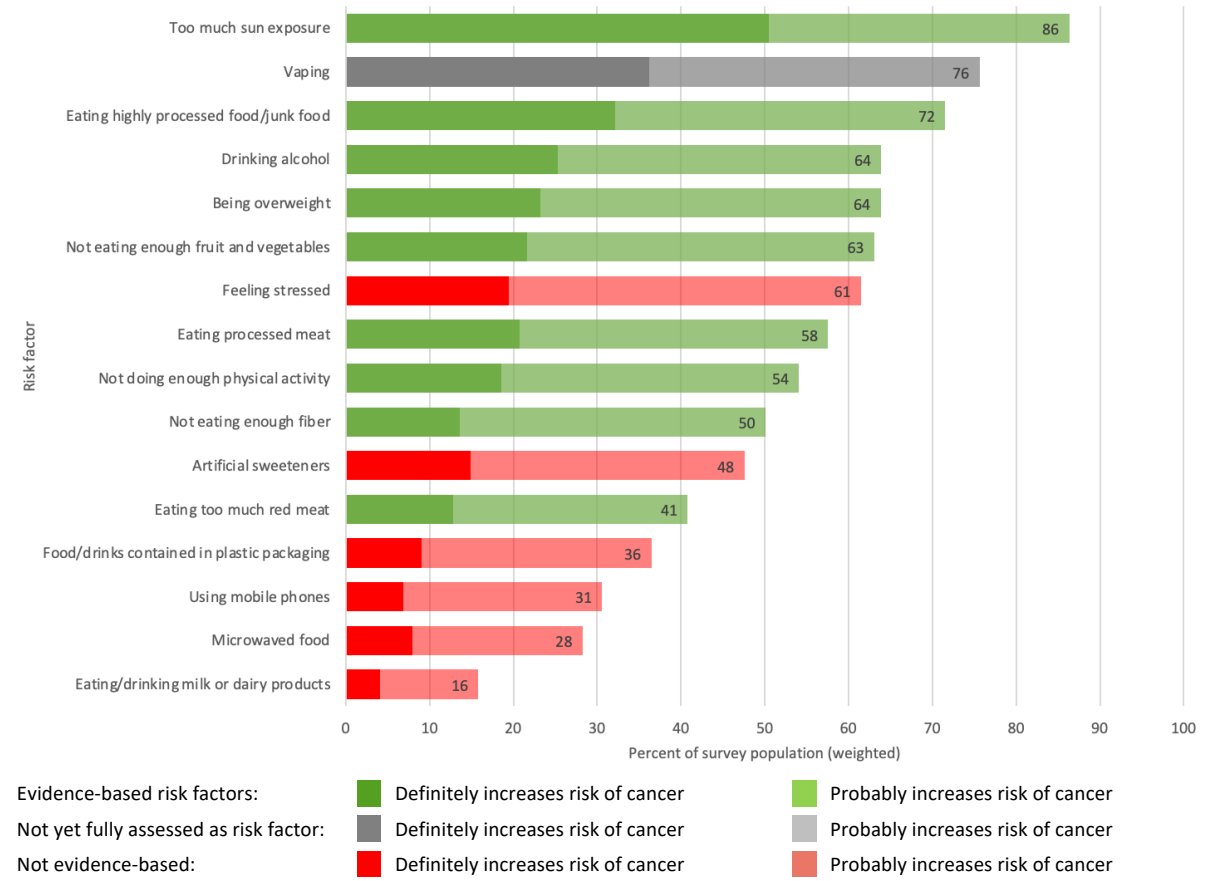

Figure 2. Percentage of population (weighted) who recognise/believe listed factors definitely or probably increase the risk of cancer (recognition question)

Alcohol

When asked about what food or drink could ***increase*** a person's risk of cancer (recall question), 18% were able to correctly identify alcohol as a risk factor (**Figure 1**). When questioned directly about the likelihood that alcohol consumption increases a person's risk of developing cancer (recognition question), 64% stated that it definitely or probably does (**Figure 2**, **Table 12**).

Food-related

When asked about what food or drink could ***increase*** a person's risk of cancer (recall question), 10% identified processed food/junk food, 5% identified red meat, and 4% identified processed meat (**Figure 1**). When asked about what food or drink could ***decrease*** a person's risk of cancer (recall question), 24% identified fruit and vegetables (either as individual named fruit/vegetables or as a group) as a protective factor, and 1% identified dietary fibre or wholegrains (**Figure 1**). Overall, 34% of the weighted survey population identified at least one dietary risk or protective factor (increase risk: processed food/junk food, red meat, processed meat; decrease risk: fruit/vegetables, fibre/wholegrains). Other factors reported to ***increase*** risk included sugary food/drinks (7%) and fat/fatty foods (3%), while natural/unprocessed food (8%), organic/chemical-free food (4%), and water (7%) were reported to ***decrease*** risk.

Participants were presented with a range of potential dietary risk factors for cancer (recognition question), including evidence-based risk factors (drinking alcohol, not eating enough fruit and vegetables, being overweight, eating highly processed/junk food, not eating enough fibre, eating processed meat, eating too much red meat)[4](**Figure 2**, **Table 12**). Nearly three-quarters (72%) recognised that consuming highly processed or junk foods definitely or probably increases the risk of developing cancer. Approximately two-thirds recognised that being overweight (64%) or consuming insufficient quantities of fruits and vegetables (63%) could increase the risk of cancer. More than half recognised that eating processed meat (58%) and not eating enough fibre (50%) could increase the likelihood of getting cancer. A slight minority (40%) recognised that consuming too much red meat increases the risk of developing cancer. Nearly half (48%) thought that artificial sweeteners increase the risk of developing cancer and 16% thought that eating or drinking milk or dairy products increases the risk of cancer, despite a lack of supporting evidence.

Sun exposure

When directly asked about the likelihood that sun exposure increases the risk of cancer development (recognition question), almost everyone (86%) responded that it definitely or probably does (**Figure 2**, **Table 12**).

Physical activity

Just over half (54%) of the population recognised that not doing enough physical activity is a risk factor for cancer (**Figure 2**, **Table 12**).

Other factors

The recognition question also asked about a number of other factors that are commonly suggested to cause cancer, despite insufficient supporting evidence (**Figure 2**, **Table 12**). Of those, vaping was considered by most (76%) to definitely or probably cause cancer. Other factors asked about included feeling stressed (61%), foods and drink contained in plastic packaging (36%), using mobile phones (31%), and microwaved food (28%).

Opinions on potential alcohol policies

Views on potential alcohol policies are displayed in **Figure 3** (see also weighted percentages and 95% CI in **Table 13**, Appendix 3). Support for alcohol policies ranged from 34-58% and opposition ranged from 17-41% (22-34% were neutral: neither support nor oppose, 1.7-4.5% were unsure/undecided). The highest level of support (and relatively low opposition) was for policies banning alcohol

sponsorship at sporting, community, and other events attended by under 18-year-olds (58% support/strongly support, 19% oppose/strongly oppose, 22% neutral); that the alcohol industry should not be involved in developing government policies to reduce alcohol harm (51% support/strongly support, 16% oppose/strongly oppose, 29% neutral); that the Government should increase the excise tax on alcohol if the additional money is used for treatment/harm prevention efforts (46% support/strongly support, 29% oppose/strongly oppose, 23% neutral); and that the price of very cheap alcohol should be raised (42% support/strongly support, 31% oppose/strongly oppose, 24% neutral). Lower levels of support were demonstrated for the other policies (banning all alcohol marketing and sponsorship: 34% support/strongly support, 31% oppose/strongly oppose, 34% neutral; and increasing excise tax on alcohol without committing to spending the money raised on treatment/prevention: 34% support/strongly support, 40% oppose/strongly oppose, 24% neutral).

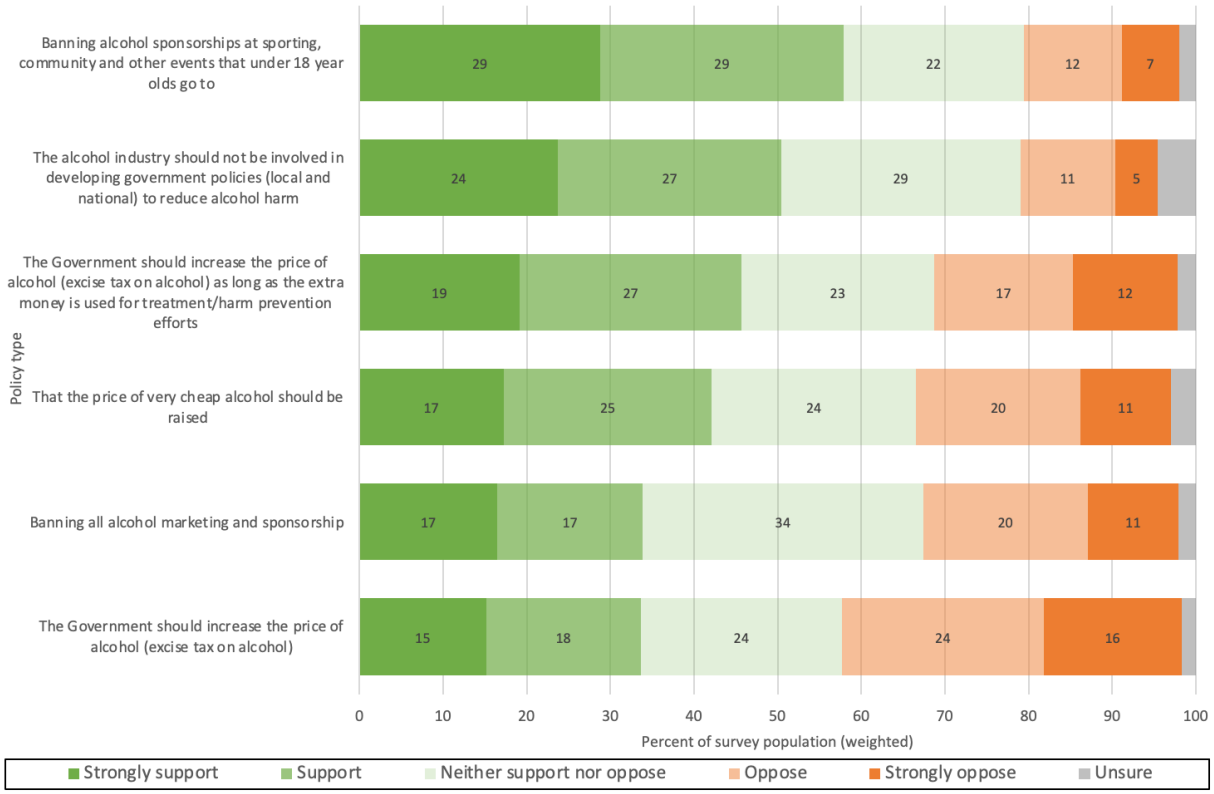

Figure 3. Views on evidence-based alcohol policies (weighted)

Figure 4 shows the percentage of New Zealanders who support or are neutral (strongly support, support, and neither support nor oppose combined) towards the alcohol policies asked about in the survey and the percentage of those who oppose (strongly oppose and oppose combined) the policies ("unsure" responses were excluded). This comparison was made to gauge potential political acceptability of each alcohol policy option by comparing the proportion of the population likely to oppose each policy to the proportion who will not oppose. This comparison shows that the majority of the population (59-83%) either supports or feels neutral towards the evidence-based alcohol policies while those in opposition are a minority (17-41%) of the population.

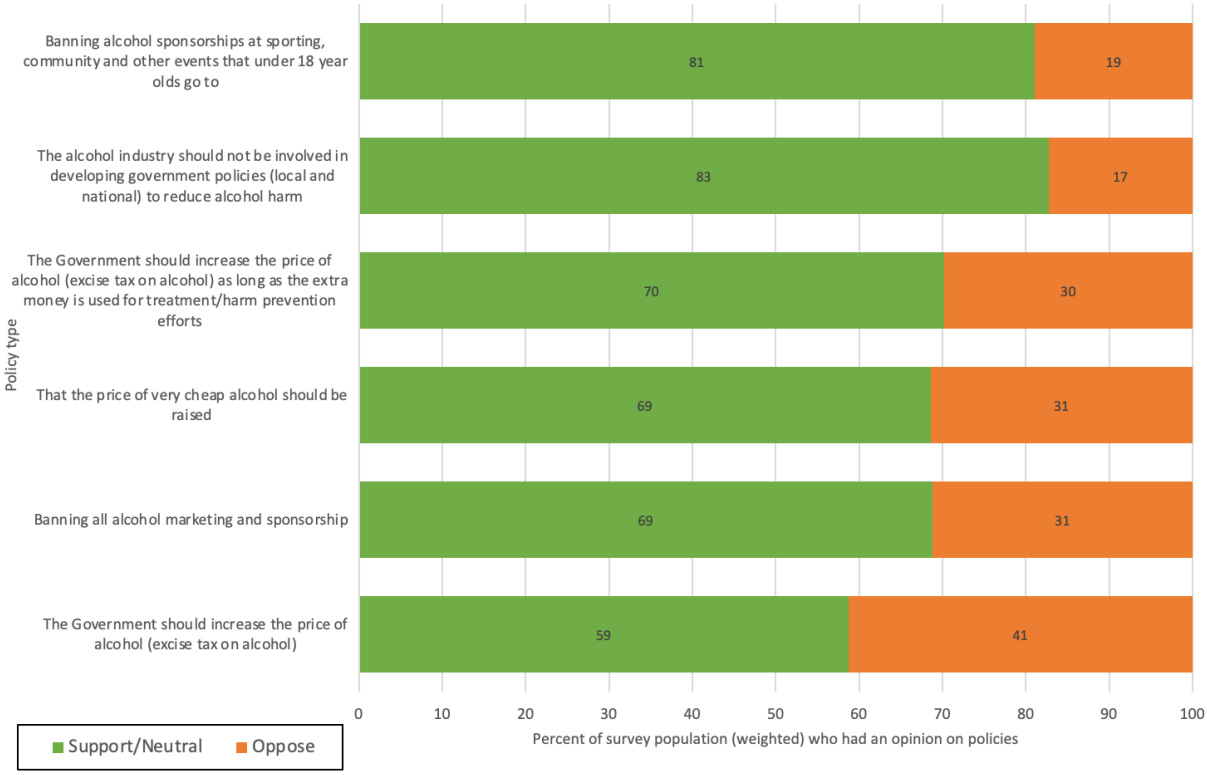

Figure 4. Political acceptability of evidence-based alcohol policies (% support/neutral compared with % oppose, weighted)

Opinions on potential food policies

Support for potential food related policies is displayed in **Figure 5** (see also weighted percentages and 95% CI in **Table 13**, Appendix 3). The highest level of support (and relatively low opposition) was for government action to reduce the cost of healthy food (84% support/strongly support, 5% oppose/strongly oppose, 9% neutral), providing free healthy lunches at schools (73% support/strongly support, 10% oppose/strongly oppose, 16% neutral), and taxes on sugary drinks (with or without commitment to use the money to make healthy food more available/affordable, 64% support/strongly support, 17% oppose/strongly oppose, 18% neutral; and 52% support/strongly support, 25% oppose/strongly oppose, 22% neutral, respectively). Slightly less than half of the population supported banning unhealthy food/beverages at sporting, community, and other events that under 18-year-olds attend (49% support/strongly support, 22% oppose/strongly oppose, 27% neutral) or a ban on marketing of unhealthy food and beverages (42% support/strongly support, 24% oppose/strongly oppose, 32% neutral).

Figure 6 shows the percentage of New Zealanders who support or are neutral (strongly support, support, and neither support nor oppose combined) towards the evidence-based food policies asked about in the survey and the percentage of those who oppose (strongly oppose and oppose combined) the policies ("unsure" responses were excluded). This comparison was made to gauge potential political acceptability of each food policy option by comparing the proportion likely to oppose each policy to the proportion who will not oppose. This comparison shows that a large majority of the population (75-95%) either supports or feels neutral towards the evidence-based food policies while those in opposition are a small minority (5-25%) of the population.

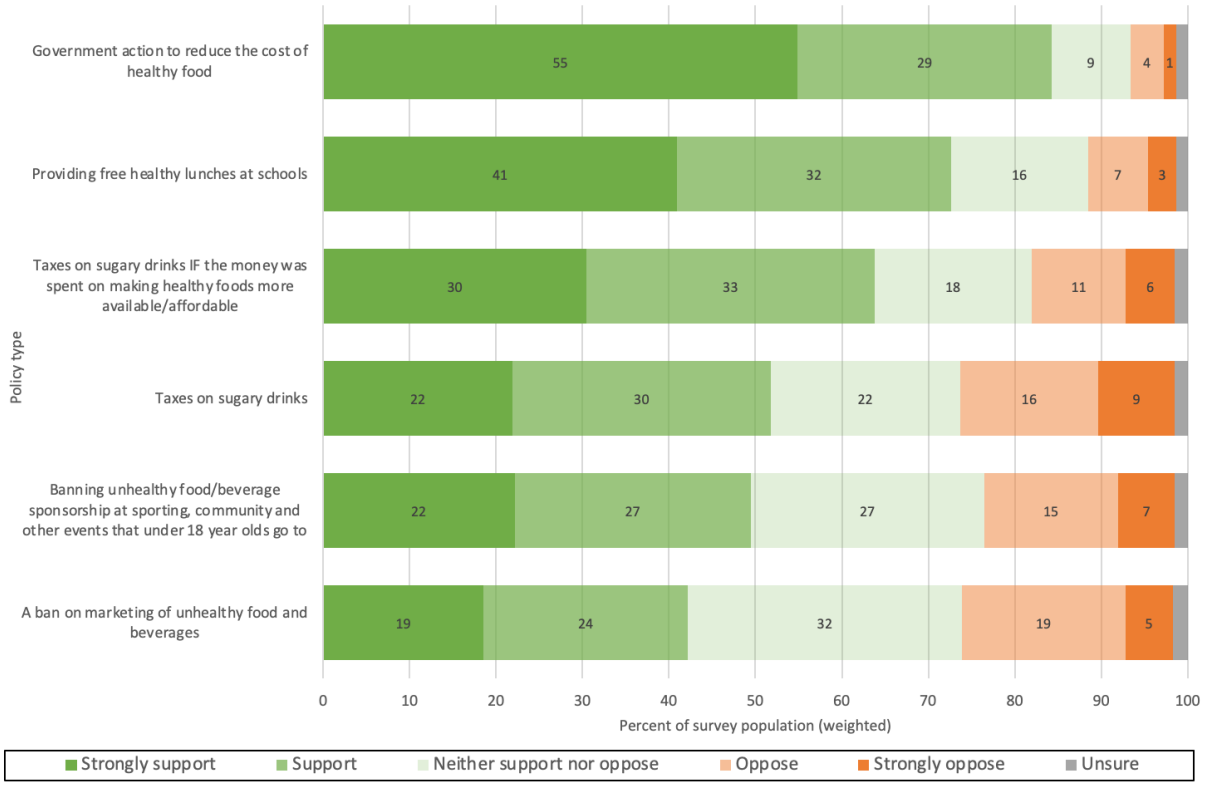

Figure 5. Views on evidence-based food policies (weighted)

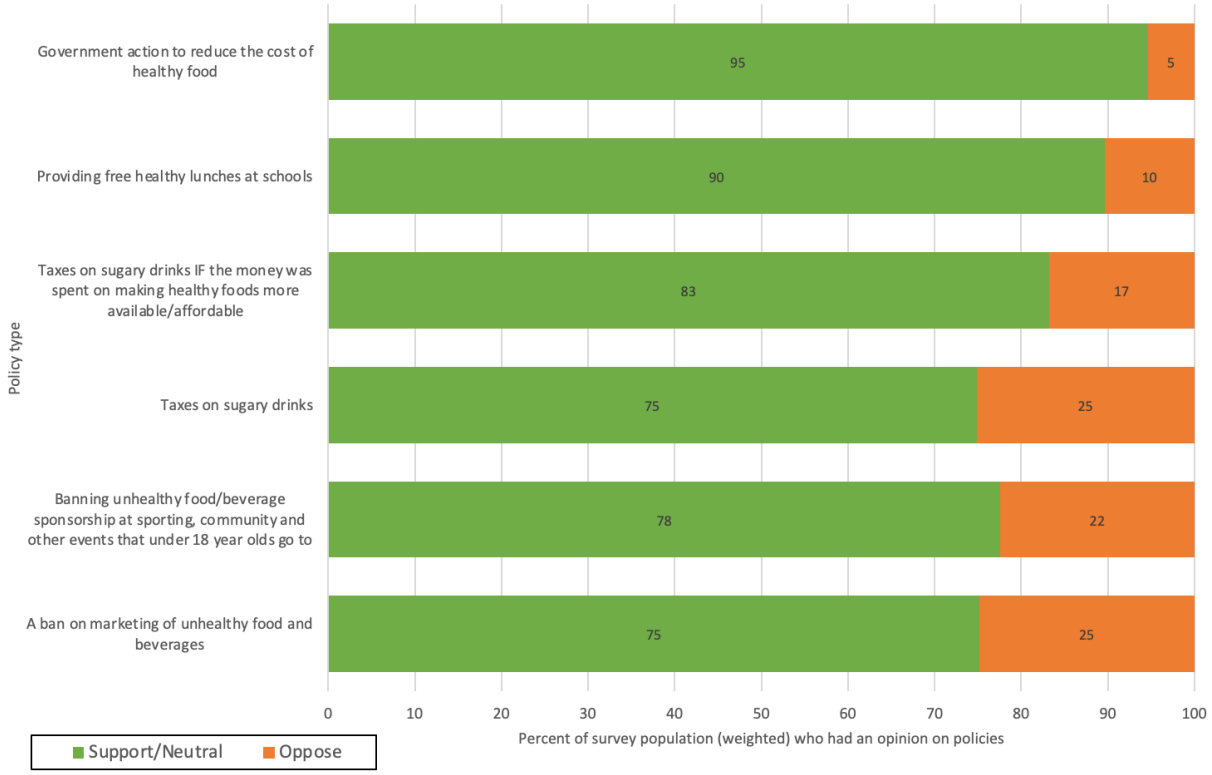

Figure 6. Political acceptability of evidence-based food policies (% support/neutral compared with % oppose, weighted)

Effect of socio-demographic characteristics on risk factor awareness

Figure 7 displays the odds ratios and 95% CI for risk factor awareness among the independent variables included in the logistic regression models (see also **Table 14** in Appendix 3). An odds ratio of 1 indicates that socio-demographic category had equal awareness as the reference category for that variable. Values less than 1 indicate a lower awareness (relative to the reference category) and values greater than 1 indicate a higher awareness. The 95% CI indicate the margin of error for the odds ratio and suggest the range within which we can be 95% confident the population odds ratio sits.[‡] If the confidence interval excludes 1, you can be 95% confident that the population odds ratio for the given category is different from the comparison category. The results indicate a number of differences in risk factor awareness by ethnicity, age-group, and income.

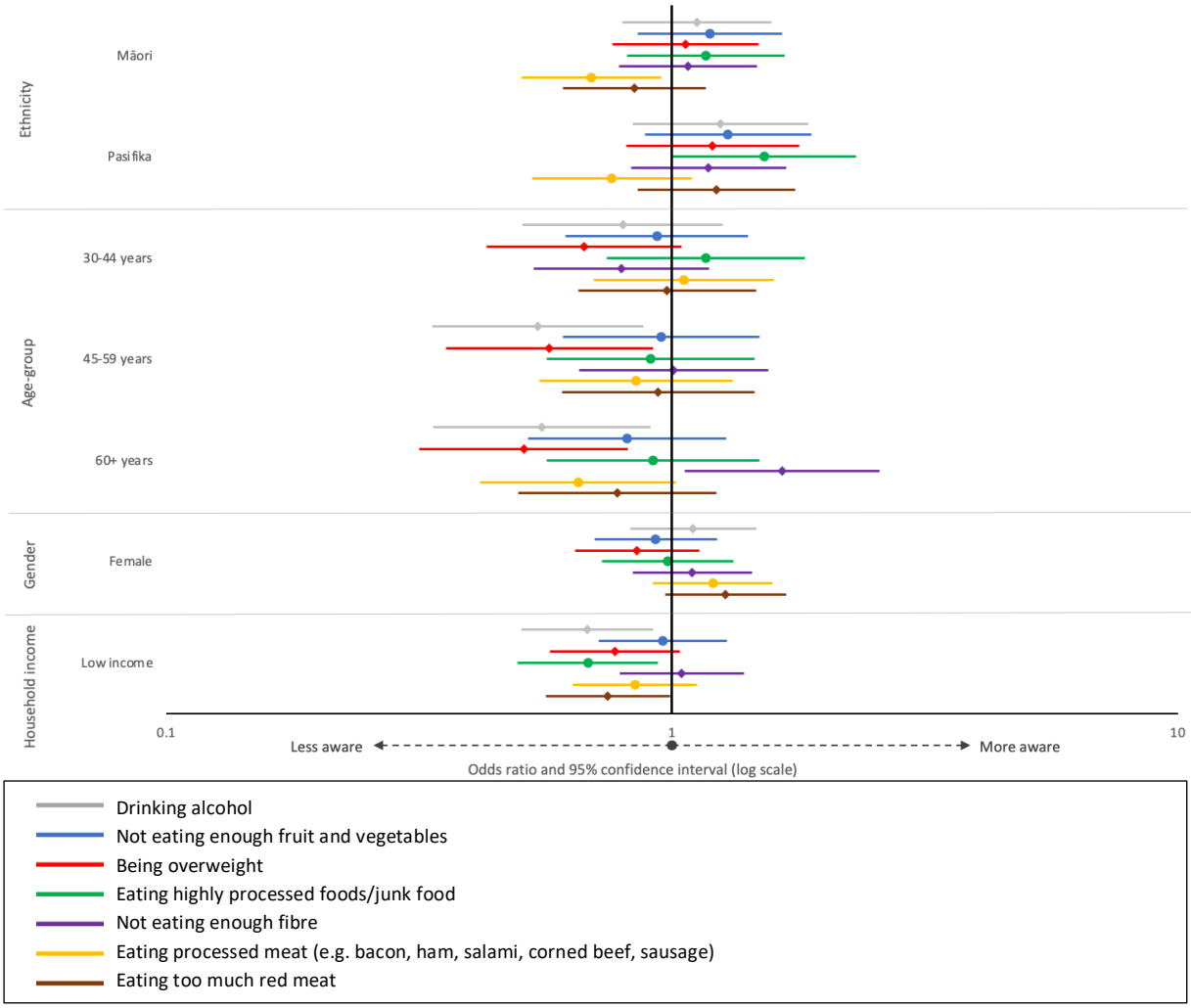

Figure 7. Comparison of risk factor awareness by ethnicity, age-group, gender, and income

Note: Results shown are adjusted odds ratios from logistic regression models that included all the independent variables shown. Reference categories were: 1. New Zealand European & other ethnicity; 2. 18-29 years age-group; 3. Male gender; 4. Not low household income.

Compared to the ethnicity grouping "New Zealand European and other", Pasifika people were more likely to recognise that eating highly processed or junk food was definitely or probably a risk factor for

[‡] 95% of the time this calculation method will capture the population odds ratio within the bounds of the confidence interval, other methods being valid.

cancer (OR = 1.52, 95% CI = 1.01-2.32), and Māori were less likely to recognise that eating processed meat was a risk factor for cancer (OR = 0.69, 95% CI = 0.50-0.95). No other effects were found for ethnicity in terms of food-related risk factor awareness as odds ratios for other risk factors had wide confidence intervals overlapping 1.

The results indicate that there are differences in risk factor awareness by age-group. Compared to the youngest age-group (18-29 years), older age-groups (45-59 years and 60+ years) were less likely to recognise alcohol was definitely or probably a risk factor for cancer (OR = 0.54, 95% CI = 0.34-0.88 and OR = 0.55, 95% CI = 0.34-0.91, respectively). A similar result was found for the food-related risk factor "being overweight". Compared to the youngest age-group (18-29 years), older age-groups (45-59 years and 60+ years) were less likely to recognise being overweight was definitely or probably a risk factor for cancer (OR = 0.57, 95% CI = 0.36-0.92 and OR = 0.51, 95% CI = 0.32-0.82, respectively). In contrast, older adults (60+ years) were more likely to recognise that not eating enough fibre was definitely or probably a risk factor for cancer (OR = 1.65, 95% CI = 1.06-2.57).

Low income (household income of $70,000 or less) was also associated with some differences in awareness of risk factors. When compared with people not living in low income households, people living in low income households were less likely to recognise alcohol was definitely or probably a risk factor for cancer (OR = 0.68, 95% CI = 0.50-0.92). People living in low income households were also less likely to recognise that consuming highly processed food/junk food (OR = 0.68, 95% CI = 0.49-0.94) and eating too much red meat (OR = 0.75, 95% CI = 0.56-0.99) were risk factors for cancer.

Key differences in risk factor awareness

Compared to the New Zealand European and other ethnicity grouping:

- *Pasifika people are **more** aware of highly processed/junk food as a risk factor*
- *Māori are **less** aware of processed meat as a risk factor*

Compared to the youngest age-group (18-29 years):

- *Older age-groups (45+ years) are **less** aware of alcohol and being overweight as risk factors*
- *Older adults (65+ years) are **more** aware of not eating enough fibre as a risk factor*

Compared to people not living in low-income households:

- *People living in low-income households are **less** aware of alcohol, highly processed/junk food, and eating too much red meat as risk factors*

Effect of alcohol awareness and socio-demographic factors on alcohol policy support

Figure 8 illustrates the odds ratios and 95% CI for (A) opposition to and (B) support for alcohol policies among the independent variables included in the logistic regression models (see also **Table 15** and **Table 16** in Appendix 3). The results indicate a number of differences in support for/opposition to alcohol policies by awareness of alcohol as a risk factor, ethnicity, age-group, gender, and income.

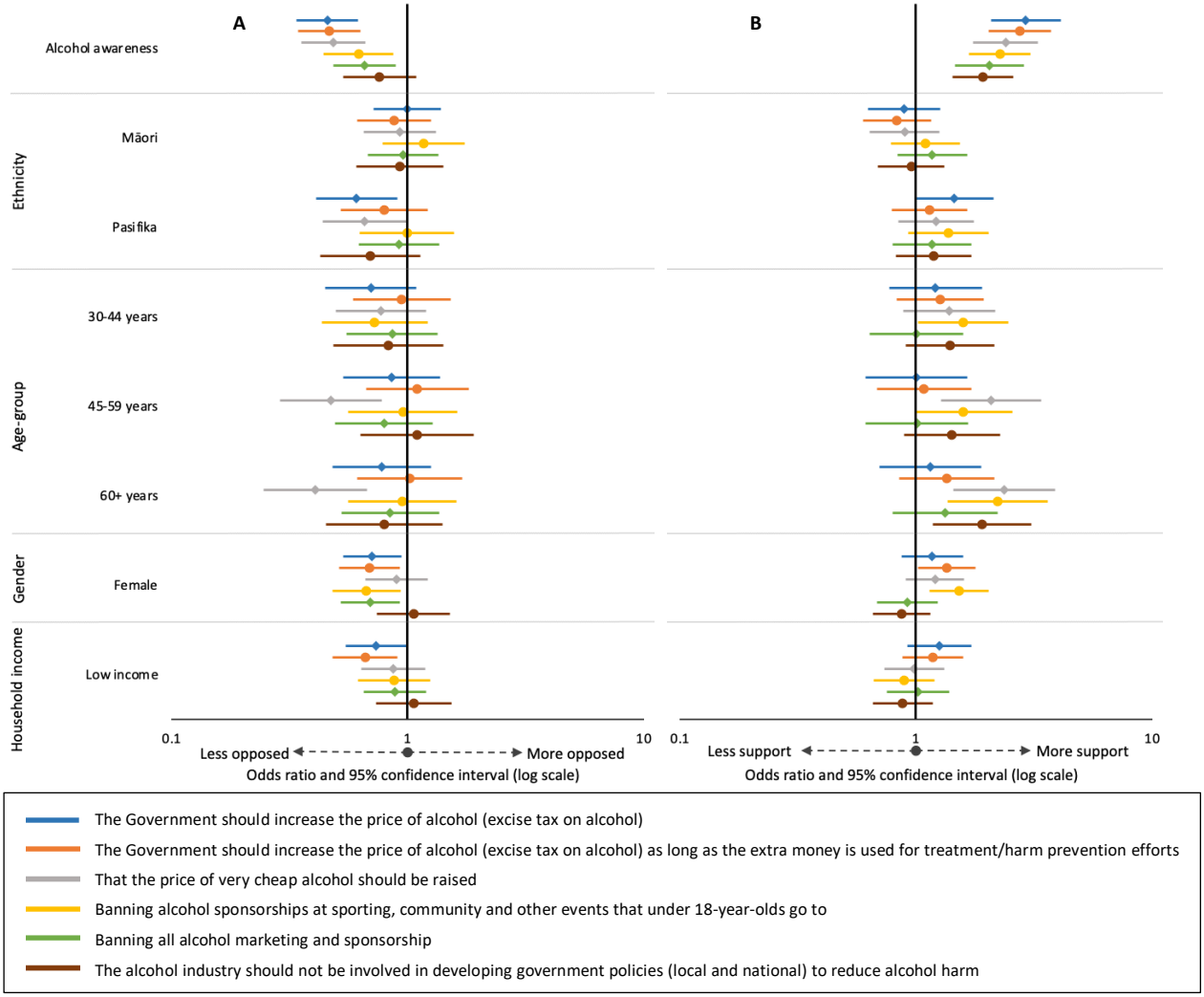

Figure 8. Comparison of alcohol policy (A) opposition and (B) support by alcohol risk awareness, ethnicity, age-group, gender, and income

Note: Results shown are adjusted odds ratios from logistic regression models that included all the independent variables shown. Reference categories were: 1. No awareness of alcohol as risk factor; 2. New Zealand European & other ethnicity; 3. 18-29 years age-group; 4. Male gender; 5. Not low household income.

Awareness of alcohol as a risk factor for cancer was strongly associated with more support for and less opposition to alcohol policies, with one exception (no statistically significant difference found for opposition to "The alcohol industry should not be involved in developing government policies (local and national) to reduce alcohol harm"). People that were aware of alcohol as a risk factor for cancer were more than twice as likely to support or strongly support increasing excise tax on alcohol (OR = 2.92, 95% CI = 2.07-4.11), increasing excise tax on alcohol as long as the money is used for treatment/harm prevention (OR = 2.75, 95% CI = 2.03-3.72), increasing the price of very cheap alcohol (OR = 2.40, 95% CI = 1.75-3.30), banning alcohol sponsorship at sporting and other events that under 18-year-olds go to (OR = 2.27, 95% CI = 1.68-3.07), and banning all alcohol marketing and sponsorship (OR = 2.05, 95% CI = 1.47-2.87). In addition, people that were aware of alcohol as a risk factor for cancer were almost twice as likely to support or strongly support "the alcohol industry should not be involved in developing government policies (local and national) to reduce alcohol harm". With regard to policy opposition, people that were aware of alcohol as a risk factor for cancer were less than half as likely to oppose or strongly oppose increasing excise tax on alcohol (OR = 0.46, 95% CI = 0.34-0.62),

increasing excise tax on alcohol as long as the money is used for treatment/harm prevention (OR = 0.46, 95% CI = 0.34-0.63), and increasing the price of very cheap alcohol (OR = 0.49, 95% CI = 0.36-0.66). People that were aware of alcohol as a risk factor were also about a third less likely to oppose or strongly oppose banning alcohol sponsorship at sporting and other events that under 18-year-olds go to (OR = 0.62, 95% CI = 0.44-0.87) and banning all alcohol marketing and sponsorship (OR = 0.66, 95% CI = 0.49-0.89).

Socio-demographic characteristics (older age-groups and female gender) were associated with more support for some alcohol policies. Compared to the youngest age-group (18-29 years), older age-groups (45-59 years and 60+ years) were twice as likely to support increasing the price of very cheap alcohol (OR = 2.08, 95% CI = 1.28-3.39 and OR = 2.36, 95% CI = 1.44-3.88, respectively). In addition, adults aged 30-44 years and 60+ years were more likely to support banning alcohol sponsorship at sporting and other events that under 18-year-olds go to (OR = 1.58, 95% CI = 1.02-2.46 and OR = 2.22, 95% CI = 1.36-3.62, and the oldest age-group (60+ years) were more likely to support "the alcohol industry should not be involved in developing government policies (local and national) to reduce alcohol harm" (OR = 1.91, 95% CI = 1.18-3.08). Compared to males, females were more likely to support increasing excise tax on alcohol as long as the money is used for treatment/harm prevention (OR = 1.35, 95% CI = 1.02-1.79) and banning alcohol sponsorship at sporting and other events that under 18-year-olds go to (OR = 1.52, 95% CI = 1.14-2.03).

Socio-demographic characteristics (Pasifika ethnicity, older age-groups, female gender, and low income) were associated with less opposition to some alcohol policies. Compared to the ethnicity grouping "New Zealand European and other", Pasifika people were less likely to oppose or strongly oppose increasing excise tax on alcohol (OR = 0.61, 95% CI = 0.41-0.90) and increasing the price of very cheap alcohol (OR = 0.66, 95% CI = 0.44-0.99). Compared to the youngest age-group (18-29 years), older age-groups (45-59 years and 60+ years) were less than half as likely to oppose increasing the price of very cheap alcohol (OR = 0.47, 95% CI = 0.29-0.77 and OR = 0.41, 95% CI = 0.24-0.67, respectively). Compared to males, females were less likely to oppose or strongly oppose increasing excise tax on alcohol (OR = 0.71, 95% CI = 0.53-0.94), increasing excise tax on alcohol as long as the money is used for treatment/harm prevention (OR = 0.69, 95% CI = 0.51-0.93), banning alcohol sponsorship at sporting and other events that under 18-year-olds go to (OR = 0.67, 95% CI = 0.48-0.93), and banning all alcohol marketing and sponsorship (OR = 0.70, 95% CI = 0.52-0.93). Low income (household income $70,000 or less) was associated with less opposition to increasing excise tax on alcohol. When compared to people not living in low income households, people living in low income households were less likely to oppose or strongly oppose increasing excise tax on alcohol (OR = 0.73, 95% CI = 0.55-0.99) and increasing excise tax on alcohol as long as the money is used for treatment/harm prevention (OR = 0.66, 95% CI = 0.48-0.91).

Key differences in alcohol policy support/opposition

- *Awareness of alcohol as a risk factor is associated with **increased support** and **decreased opposition** for alcohol policies*

Compared to the youngest age-group (18-29 years):

- *Older age-groups are **more likely to support** and **less likely to oppose** some alcohol policies*

Compared to males:

- *Females are **more likely to support** and **less likely to oppose** some alcohol policies*

Compared to the New Zealand European and other ethnicity grouping:

- *Pasifika people are **less likely to oppose** alcohol pricing policies*

Compared to people not living in low-income households:

- *People living in low-income households are **less likely to oppose** policies to increase excise tax on alcohol*

Effect of risk factor awareness and socio-demographic factors on food policy support

Figure 9 illustrates the odds ratios and 95% CI for support for and opposition to food policies by risk factor awareness and socio-demographic factors included in the logistic regression models (see also **Table 17** and **Table 18** in Appendix 3). The results indicate a number of differences in opposition to food policies by awareness of food-related risk factors, ethnicity, age-group, and gender.

Awareness of evidence-based food-related risk factors was strongly associated with more support for and less opposition to most food policies. People who were aware of one or more food-related risk factor were more than three times as likely to support taxes on sugary drinks (OR = 3.46, 95% CI = 2.14-5.63) and taxes on sugary drinks if the money is used to make healthy food more available/affordable (OR = 3.80, 95% CI = 2.38-6.06), and more than twice as likely to support banning marketing of unhealthy food and beverages (OR = 2.23, 95% CI = 1.37-3.60), banning unhealthy food/ beverage sponsorship at events under 18-year-olds go to (OR = 2.65, 95% CI = 1.64-4.27), and government action to reduce the cost of healthy food (OR = 2.08, 95% CI = 1.17-3.69). People who were aware of one or more food-related risk factor were less than half as likely to oppose or strongly oppose taxes on sugary drinks (OR = 0.39, 95% CI = 0.25-0.61) and taxes on sugary drinks if the money is used to make healthy food more available/affordable (OR = 0.37, 95% CI = 0.23-0.61). People who were aware of one or more food-related risk factor were around half as likely to oppose or strongly oppose banning marketing of unhealthy food and beverages (OR = 0.53, 95% CI = 0.33-0.86) and banning unhealthy food/ beverage sponsorship at events under 18-year-olds go to (OR = 0.52, 95% CI = 0.32-0.85).

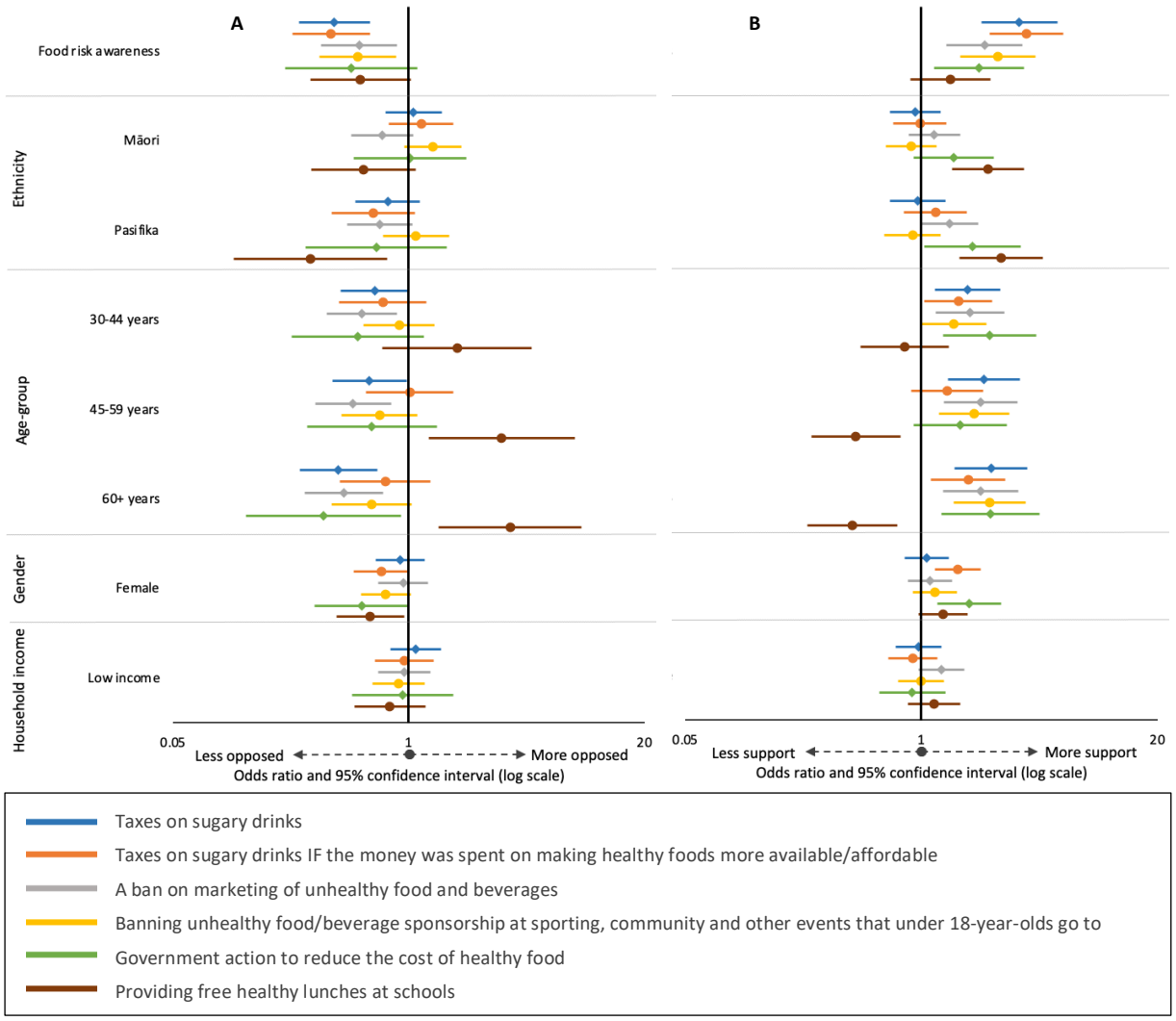

Figure 9. Comparison of food policy (A) opposition and (B) support by food risk awareness, ethnicity, age-group, gender, and income

Note: Results shown are adjusted odds ratios from logistic regression models that included all the independent variables shown. Reference categories were: 1. No awareness of food risk factors; 2. New Zealand European & other ethnicity; 3. 18-29 years age-group; 4. Male gender; 5. Not low income household.

Socio-demographic characteristics (Māori and Pasifika ethnicity, older age-groups, and female gender) were associated with differences in support for some food policies. Compared to the ethnicity grouping "New Zealand European and other", both Māori and Pasifika people were more than twice as likely to support providing free healthy lunches at schools (OR = 2.33, 95% CI = 1.48-3.67 and OR = 2.75, 95% CI = 1.62-4.67, respectively) and Pasifika people were more likely to support government action to reduce the cost of healthy food (OR = 1.92, 95% CI = 1.04-3.55). Compared to the youngest age-group (18-29 years), older age-groups were more likely to support taxes on sugary drinks (30-44 years: OR = 1.80, 95% CI = 1.19-2.74; 45-59 years: OR = 2.21, 95% CI = 1.41-3.48; and 60+ years: OR = 2.42, 95% CI = 1.53-3.84), taxes on sugary drinks if the money is used to make healthy food more available/affordable (30-44 years: OR = 1.60, 95% CI = 1.04-2.46; and 60+ years: OR = 1.80, 95% CI = 1.13-2.89), banning marketing of unhealthy food and beverages (30-44 years: OR = 1.86, 95% CI = 1.20-2.88; 45-59 years: OR = 2.13, 95% CI = 1.33-3.39; and 60+ years: OR = 2.12, 95% CI = 1.32-3.41), banning unhealthy food/ beverage sponsorship at events under 18-year-olds go to (45-59 years: OR = 1.95, 95% CI = 1.25-3.05; and 60+ years: OR = 2.37, 95% CI = 1.50-3.74), and government action to

reduce the cost of healthy food (30-44 years: OR = 2.38, 95% CI = 1.31-4.30; and 60+ years: OR = 2.40, 95% CI = 1.28-4.47). In contrast, older adults (45-59 years and 60+ years) were less than half as likely to support providing free healthy lunches at schools (OR = 0.44, 95% CI = 0.25-0.77; and OR = 0.42, 95% CI = 0.24-0.73, respectively). Compared to males, females were more likely to support taxes on sugary drinks if the money is used to make healthy food more available/affordable (OR = 1.59, 95% CI = 1.19-2.13) and government action to reduce the cost of healthy food (OR = 1.84, 95% CI = 1.23-2.74).

Socio-demographic characteristics (Pasifika ethnicity, older age-groups, and female gender) were associated with differences in opposition to some food policies. Compared to the ethnicity grouping "New Zealand European and other", Pasifika people were less likely to oppose or strongly oppose providing free healthy lunches at schools (OR = 0.29, 95% CI = 0.11-0.76). Compared to the youngest age-group (18-29 years), older age-groups were less likely to oppose or strongly oppose taxes on sugary drinks (45-59 years: OR = 0.61, 95% CI = 0.38-0.97; and 60+ years: OR = 0.41, 95% CI = 0.25-0.67) and banning marketing of unhealthy food and beverages (30-44 years: OR = 0.55, 95% CI = 0.35-0.86; 45-59 years: OR = 0.49, 95% CI = 0.30-0.80; and 60+ years: OR = 0.44, 95% CI = 0.27-0.72). In addition, the oldest age-group (60+ years) were less likely to oppose or strongly oppose government action to reduce the cost of healthy food (OR = 0.34, 95% CI = 0.13-0.91). In contrast, older age-groups (45-59 years and 60+ years) were more than three times as likely to oppose or strongly oppose providing free healthy lunches at schools (OR = 3.26, 95% CI = 1.29-8.24; and OR = 3.64, 95% CI = 1.47-9.01, respectively). Compared to males, females were less likely to oppose or strongly oppose providing free healthy lunches at schools (OR = 0.61, 95% CI = 0.40-0.94), and government action to reduce the cost of healthy food (OR = 0.55, 95% CI = 0.30-0.99). There was no evidence to suggest any differences in food policy support among people living in low income households compared to people not living in low income households.

Key differences in food policy support/opposition

- *Awareness of food-related risk factors is associated with **increased support** and **decreased opposition** for food policies*

Compared to the New Zealand European and other ethnicity grouping:

- *Māori and Pasifika people are **more likely to support** a policy to provide free healthy lunches at schools*
- *Pasifika people are **more likely to support** government action to reduce the cost of healthy food*

Compared to the youngest age-group (18-29 years):

- *Older age-groups are **more likely to support** most food policies, but are **less likely to support/more likely to oppose** a policy to provide free healthy lunches at schools*

Compared to males:

- *Females are **more likely to support** and **less likely to oppose** policies related to making healthy food more affordable/available*

DISCUSSION

The results show that there is some awareness of alcohol and food-related risk factors for cancer among adults in Aotearoa but that more work still needs to be done to increase risk factor awareness. Despite this, it was also found that there was more support than opposition for most of the alcohol and food-related policies, with increased support (and decreased opposition) evident with greater risk factor awareness.

About two-thirds of adults (64%) recognised that alcohol definitely or probably increases risk for cancer. However, only 25% recognised that alcohol "definitely" increases the risk for cancer, and only 18% were able to report alcohol as a risk factor for cancer without prompting. The lower number of participants able to recall and report alcohol as a risk factor is likely to be largely due to the effect of prompting with the recognition questions. Discrepancy between knowledge data collected via recall compared to recognition questions is a known phenomenon related to the way information is retrieved from memory, with the recognition questions (aided by prompting) making retrieval of knowledge easier.[58] Published research has, however, shown the effect of prompting is significantly smaller for well-known/familiar information.[58] These results therefore show that there is still some level of uncertainty among adults in Aotearoa about the link between alcohol consumption and risk of developing cancer. Based on the results of logistic regression models, awareness of alcohol as a risk factor for cancer is lower among older age-groups (aged above 45 years) and people living in low income households. Therefore, any future awareness campaigns may need to address how to better reach these population groups.

Awareness of food-related risk factors varied between the different evidence-based factors. Almost three-quarters of adults (72%) recognised highly processed food/junk food as definitely or probably increasing cancer risk, and more than half of adults recognised being overweight (64%), not eating enough fruit and vegetables (63%), eating processed meat (58%), and not eating enough fibre (50%) as risk factors for cancer. However, only 41% recognised eating too much red meat as definitely or probably increasing risk for cancer. While these results are encouraging, they also indicate there is still room for improvement in awareness of food-related risk factors among the Aotearoa population. Especially when considering the lower proportions (12.8-32.2%) that recognised these risk factors "definitely" increase cancer risk and low proportions that were able to recall and report evidence-based food/drink factors without prompting (fruit and vegetables 24%, processed/junk food 10%, red meat 5%, processed meat 4%, and dietary fibre/wholegrains 1%).

The lower awareness of eating processed meat and eating too much red meat as risk factors for cancer is of concern, especially when considered alongside the fact that awareness of these risk factors is lower among some population groups (lower awareness of processed meat among Māori, lower awareness of eating too much red meat among people living in low-income households). The relatively low awareness of the cancer risk associated with not eating enough fibre is also of concern. While awareness of not eating enough fibre as a risk factor was found to be higher among older adults (60+ years, the age-group where bowel cancer is more commonly diagnosed[59]), it would be beneficial for bowel cancer prevention efforts to boost awareness among younger age-groups where dietary changes may be expected to improve cancer incidence outcomes more.

Other evidence-based risk factors of note include too much sun exposure and not enough physical activity. Too much sun exposure was the most well-known risk factor, with 86% of adults recognising

that too much sun exposure definitely or probably increases risk for cancer. This indicates that past campaigns to raise awareness of the risk of too much sun exposure have been successful and that knowledge has been retained among the current population. More than half (54%) of adults recognised that not enough physical activity will definitely or probably increase cancer risk.

A large proportion of the survey population (76%) also believed that vaping increases cancer risk even though there is currently insufficient evidence to show that it does. That said, there is scientific evidence pointing to oncogenicity of compounds commonly found in vaping products, therefore caution and further research to monitor the effects of vaping are warranted, especially given the potentially long lag time between exposure and tumour development.[60]

Some adults in Aotearoa reported that other factors will increase their risk for cancer, even though cancer risk from those factors is not backed up by evidence (e.g. mobile phone use). However, it was reassuring to see that evidence-based risk factors were generally selected more often as definitely or probably increasing cancer risk compared to factors that were not evidence-based. In the current study, about two-thirds of adults believed that feeling stressed definitely or probably increases cancer risk even though there is no consensus for strong evidence to support that belief. Almost half (48%) believed that artificial sweeteners definitely or probably increase cancer risk. While some research has indicated a possible link between artificial sweeteners and cancer risk, there is currently no strong evidence to suggest that artificial sweeteners cause cancer.[61] Similar beliefs were held for food/drinks in plastic packaging (36%), using mobile phones (31%), eating microwaved food (28%), and milk/dairy products (16%), despite a lack of scientific evidence to support these beliefs. In the case of milk/dairy products, there is even strong evidence to suggest a protective effect for bowel cancer.[4]

Awareness of risk factors for cancer is, however, only one contributing factor to prevention of cancers. It is well known that "lifestyle choices" (e.g. alcohol consumption and food habits) are strongly influenced by a complex range of personal, environmental and socio-economic factors.[62] For example, availability, affordability, social, and cultural factors will influence whether a person is able to act on knowledge about cancer risk factors and alter their purchase and consumption behaviours.[1] An important way to empower the people of Aotearoa to follow cancer-prevention recommendations is by improving their environment (e.g. reduce exposure to marketing/promotion of alcohol and unhealthy food/beverages, reduce alcohol accessibility, and improve access to healthy food/drinks).[1] Evidence-based policies to promote access to healthy options, reduce exposure to the marketing/promotion of unhealthy options, and reduce access to unhealthy options have the potential to make a significant contribution to cancer prevention efforts. The results of the current study showed that, while successive governments have been reluctant to introduce evidence-based alcohol and food policies, public support for the use of policies is relatively high.

While support for food policies (43-84% support) was generally higher than for alcohol policies (34-58% support), opposition to all policies was relatively low (5-25% for food policies, 17-41% for alcohol policies). This suggests that political acceptability of these policies could be good, with several of the policies providing high potential benefits at a low political risk (in terms of voter support). The results also showed that support for most policies was significantly higher and opposition to most policies was significantly lower among adults who were aware of the cancer risk associated with alcohol and diet. People who were aware of alcohol as a risk factor were more than twice as likely to support the alcohol price-related policies and the marketing and sponsorship-related policies, and were less than half as likely to oppose the alcohol price-related policies and around a third less likely to oppose the

marketing and sponsorship-related policies. People who were aware of alcohol as a risk factor were also almost twice as likely to support not allowing alcohol industry involvement in the development of government policies (local and national) to reduce alcohol harm. People who were aware of evidence-based food risk factors were more than three times as likely to support and less than half as likely to oppose a sugary drinks tax (with or without commitment to use funds to make healthy food more available/affordable). In addition, people who were aware of evidence-based food risk factors were more than twice as likely to support and around half as likely to oppose the marketing and sponsorship-related food policies. A similar association between risk factor awareness and policy support was found in England and in Australia, where knowledge of alcohol as a risk factor for cancer was found to be a significant predictor of support for alcohol-related policies.[37,63,64] This suggests that improving risk awareness will likely increase support/reduce opposition for government policies to reduce population rates of preventable cancers in Aotearoa.

Two alcohol policies received more than 50% support (and less than 20% opposition). These policies, "Banning alcohol sponsorship at sporting, community, and other events that under 18-year-olds go to" and "The alcohol industry should not be involved in developing government policies (local and national) to reduce alcohol harm" would be a good starting point for the Government to take action. Introducing a policy to keep the alcohol industry out of decision-making regarding alcohol harm prevention would not only be highly acceptable among voters, but would also clear the path for an easier process (both at national and local government levels) to develop other policies and pathways to reduce alcohol harm in Aotearoa. In addition, logistic regression models showed no differences in opposition to this alcohol policy option among population sub-groups tested, which further supports the notion of this being a politically palatable option that is likely to gain voter support.

Support for increasing the excise tax on alcohol (the only alcohol policy with higher opposition than support) was greatly increased if a commitment was made to use the funds for treatment and harm prevention efforts (support increasing from 34% to 46% and opposition reducing from 40% to 29%). Interestingly, logistic regression models showed that people living in low income households were less likely to oppose both policy options to increase excise tax on alcohol, when compared to people not living in low income households.

Support outweighed opposition for each of the food policy options asked about in the survey. There was overwhelming support (84%) and very little opposition (5%) for government action to reduce the cost of healthy food. This is probably not surprising in the current climate of high food prices and it would make sense for the Government to implement policies that support the people of Aotearoa to eat healthy food, and reduce the incidence of preventable cancers as well as other non-communicable diseases (NCDs) such as heart disease and diabetes. In the long-term, this would also likely create economic benefits for Aotearoa as declining rates of cancer and other NCDs reduce the pressure on the health system. There was also a high level of support (73%) for providing free healthy lunches at schools, such as what is currently being implemented in a number of schools via the Ka Ora, Ka Ako (healthy school lunches programme). Interestingly, older adults (45+ years) were less likely to support and more likely to oppose this policy option. In contrast, Māori and Pasifika people were more likely to support this policy and Pasifika people and females were less likely to oppose.

Similar to what was seen with the alcohol excise tax policies, a policy to have taxes on sugary drinks was more appealing if a commitment was made to using the funds to improve availability/affordability of healthy foods (support increasing from 52% to 64% and reducing opposition from 24% to 17%). This

fits with the strong support seen for government action to reduce the cost of healthy food. Given the very high level of support and very low opposition to these policies, the current results suggest there is strong support for the Government to continue providing healthy lunches at schools (and possibly even extend the current programme), and to introduce a sugary drinks tax and use the increased revenue to fund action to make healthy food more accessible and affordable. Banning unhealthy food/beverage sponsorship at sporting, community, and other events that under 18-year-olds go to, while less popular than some of the other policies, still had the support of almost half of the population (49%). In addition, the proportion of people that supported this policy option was more than double the proportion that opposed it, suggesting this is another politically palatable policy option with strong voter support and low political risk.

Study strengths and limitations

This survey study had several strengths. The awareness questions used in this study were modified from a standardised, validated survey instrument (Cancer Awareness Measure – CAM), which has been in use since 2008.[48,65] In addition, the large survey sample contributed to a smaller margin of error and improved confidence that the results reflect the overall adult population of Aotearoa. Boosted sampling for Māori and Pasifika participants allowed better explanatory power for those groups. Limitations included potential bias, such as participation bias and selection bias. Potential participation bias was, however, minimised by the questions being part of an omnibus survey. There may have been some selection bias if people who agree to take part in this sort of survey have different knowledge about risk factors and support for policies. Selection bias was minimised by the panel provider Dynata™ including participants from a wide range of sample sources and stratifying the sample by age, gender, and region. Weighting cannot overcome bias introduced by the non-inclusion of specific subgroups (e.g. people without internet access), so caution is required when extrapolating results to the whole population.

CONCLUSIONS

While there is some awareness of modifiable risk factors for cancer in Aotearoa, there is more work to be done to increase awareness. Increasing awareness of alcohol and food-related risk factors will not only provide the people of Aotearoa with knowledge that can be used to inform healthier choices for those who have the means to do so, but will also lead to increased support for government policies designed to create healthier environments that support people's ability to make healthy lifestyle choices. Some policies already have the support of the majority of the Aotearoa adult population (e.g. "Banning alcohol sponsorship at sporting, community, and other events that under 18-year-olds go to", "The alcohol industry should not be involved in developing government policies (local and national) to reduce alcohol harm", "Government action to reduce the cost of healthy food", "Providing free healthy lunches at schools" and "Taxes on sugary drinks if the money is used to make healthy food more available/affordable"). These policies should be a starting point for the Government to take action on reducing the rates of preventable cancers in Aotearoa, thus preventing unnecessary illness and deaths and reducing pressure on our struggling health system.

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APPENDICES

Appendix 1: Survey instrument

1. What food or drink could increase a person's chance of getting cancer?
2. What food or drink could reduce a person's risk of getting cancer?
3. How likely do you think it is that the following things could increase a person's chance of developing cancer? *(randomised order of options below so that order differs between participants)*

	Definitely	Probably	Not Sure	Probably not	Definitely not
Drinking alcohol					
Not eating enough fruit and vegetables					
Being overweight					
Not doing enough physical activity					
Eating highly processed foods/junk food					
Not eating enough fibre					
Eating processed meat (e.g. bacon, ham, salami, corned beef, sausage)					
Vaping					
Eating too much red meat					
Too much sun exposure					
Using mobile phones					
Feeling stressed					
Microwaved food					
Food/drinks contained in plastic packaging					
Artificial sweeteners					
Eating/drinking milk or dairy products					

4. We are interested in your opinion about **alcohol policies**. For each statement, please indicate whether you would support or oppose the policy. *(randomised order of options)*

	Strongly oppose	Oppose	Neither support nor oppose	Support	Strongly support	Unsure
The Government should increase the price of alcohol (excise tax on alcohol)						
The Government should increase the price of alcohol (excise tax on alcohol), as long as the extra money is used for treatment services and harm prevention efforts						
That the price of very cheap alcohol should be raised						
Banning alcohol sponsorship at sporting, community, and other events that under 18-year-olds go to						
Banning all alcohol marketing and sponsorship						
The alcohol industry should not be involved in developing government policies (local and national) to reduce alcohol harm						

5. We are interested in your opinion about **food policies**. For each statement, please indicate whether you would support or oppose the policy. (randomised order of options)

	Strongly oppose	Oppose	Neither support nor oppose	Support	Strongly support	Unsure
Taxes on sugary drinks						
Taxes on sugary drinks IF the money was spent on making healthy foods more available/affordable						
A ban on marketing of unhealthy food and beverages						
Banning unhealthy food/beverage sponsorship at sporting, community, and other events that under 18-year-olds go to						
Government action to reduce the cost of healthy food						
Providing free healthy lunches at schools						

Appendix 2: Socio-demographic questions

- Which gender do you identify with? (male, female, self-describe)
- Which of these age groups do you fall into? (18 to 19, 20 to 24, 25 to 29, 30 to 34, 35 to 39, 40 to 44, 45 to 49, 50 to 54, 55 to 59, 60 to 64, 65 to 69, 70 to 74, 75+)
- Which ethnic groups do you belong to? One or several groups may apply to you. (NZ European, NZ Māori, Samoan, Cook Island Māori, Tongan, Niuean, Chinese, Indian, Other Asian, Other European, Other Pasifika, Other ethnicity, Prefer not to say)
- Which of the following regions best describes where you live? (Northland, Auckland, Bay of Plenty, Waikato, Gisborne, Taranaki, Hawkes Bay, Manawatu/Whanganui, Wellington, Tasman/Nelson, Marlborough, West Coast, Canterbury, Otago, Southland)
- Additional question for those living in Auckland: Which of the following best describes which area of Auckland you live in? (North, South, Central, East, West)
- Which best describes where you live? (Large regional centre, Medium regional centre, Metropolitan area, Rural, Small regional centre, Unsure)
- Which of the following describes the home you live in? (Home is owned with mortgage, Home is owned without a mortgage, Renting from a private landlord or property management company, Renting from Housing NZ or other social housing organisation, Other, Prefer not to say)
- What is the approximate combined before tax income in your household? (0 or made a loss; 20,000 or less; 20-30,000; 30-40,000; 40-50,000; 50-70,000; 70-100,000; 100-150,000; 150,000+; Prefer not to say)
- In an average week how many hours do you usually work in paid employment? (Not working, Less than 30 hours, 30 hours or more)
- Which of the following below best describes your occupation? (Professional, Manager, Labourer, Clerical or administrative worker, Technician or trades worker, Sales worker, Community or personal service worker, Machinery operator or driver, Prefer not to say)
- Do you have any dependent children under the age of 18? (No, Yes)

Appendix 3: Survey data

Table 2. Gender of survey respondents

Gender	Survey respondents (n=1425)		% NZ Population
	% (unweighted)	% (weighted)	(sex)(Census 2018)
Male	34.1	48.4	48.8
Female	65.7	51.2	51.2
Self described	0.2	0.4	

Table 3. Age group of survey respondents

Age group (years)	Survey respondents (n=1425)		% NZ Population
	% (unweighted)	% (weighted)	(Census 2018)
18 to 29	19.8	21.8	21.8
30 to 44	34.3	25.1	25.1
45 to 59	22.0	26.0	26.0
60+	23.9	27.1	27.1

Table 4. Ethnicity of survey respondents

Ethnicity	Survey respondents (n=1425)		% NZ population
	% (unweighted)	% (weighted)	(Census 2018)
European (total)	**61.8**	**72.1**	**70.9**
- NZ European	56.7	66.3	64.2
- Other European	5.1	5.8	6.7
NZ Māori	**22.8**	**13.4**	**14***
Pasifika peoples (total)	**24.6**	**7.4**	**6.7***
- Samoan	10.6	3.3	3.2
- Cook Island Māori	4.7	1.3	1.3
- Tongan	3.4	1.0	1.3
- Niuean	2.0	0.5	0.5
- Other Pasifika	3.9	1.3	0.4
Asian (total)	**9.7**	**15.8**	**14.9***
- Chinese	2.2	2.7	5.3
- Indian	3.4	5.9	5.1
- Other Asian	4.1	7.2	4.6
Other ethnicity (total)	**2.2**	**2.8**	**2.6**
Prefer not to say	0.4	0.6	

* *Ethnicities used for weighting*

Table 5. Region in which survey respondents live

Region	Survey respondents (n=1425)		% NZ Population
	% (unweighted)	% (weighted)	(Census 2018)
Northland	2.7	3.2	3.8
Auckland	42.4	33.3	33.8
- *North*	- *7.2*	- *7.8*	
- *South*	- *13.8*	- *7.6*	
- *Central*	- *9.8*	- *9.7*	
- *East*	- *3.4*	- *2.6*	
- *West*	- *8.0*	- *5.6*	
Waikato	9.1	10.0	9.7
Bay of Plenty	6.0	6.8	6.5
Gisborne	0.8	0.7	1.0
Hawkes Bay	2.9	2.8	3.5
Taranaki	1.9	2.3	2.5
Manawatu-Whanganui	5.3	5.8	5.1
Wellington	9.5	11.0	10.7
Tasman-Nelson	1.7	2.3	2.2
Marlborough	0.6	0.6	1.0
West Coast	0.6	0.9	0.7
Canterbury	11.2	13.0	12.7
Otago	3.4	5.1	4.8
Southland	1.8	2.1	2.1

Table 6. Type of area where survey respondents live

Type of area	Survey respondents (n=1425)		% NZ Population
	% (unweighted)	% (weighted)	(Census 2018)
Metropolitan area	37.2	40.0	51.5
Large regional centre	17.8	15.9	14.0
Medium regional centre	17.2	16.8	8.3
Small regional centre	12.3	13.3	10.2
Rural	11.6	11.7	15.9
Not stated	3.9	2.2	

Table 7. Housing situation of survey respondents

Housing	Survey respondents (n=1425)		% NZ Population (Census 2018)
	% (unweighted)	% (weighted)	
Home is owned with mortgage	29.2	32.1	51.2
Home is owned without mortgage	22.6	25.6	
Renting from private landlord or property management company	35.2	32.7	35.4
Renting from Housing NZ or other social housing organisation	7.5	4.9	
Other	3.7	3.0	
Prefer not to say	1.6	1.5	

Missing = 3 (unweighted), 4 (weighted)

Table 8. Household income of survey respondents

Household income ($)	Survey respondents (n=1425)		% NZ households (Census 2018)
	% (unweighted)	% (weighted)	
0 or made a loss	0.5	0.5	8.2
20,000 or less	5.9	4.3	
20-30,000	7.2	7.3	9.1
30-40,000	7.8	7.6	13.6
40-50,000	7.1	6.7	
50-70,000	13.3	13.6	12.4
70-100,000	15.9	16.6	14.6
100-150,000	18	18.4	17.8
150,000+	12.7	14	16.5
Prefer not to say	11.6	11.1	

Table 9. Working hours of survey respondents

Working hours	Survey respondents (n=1425)		% NZ population (Census 2018)
	% (unweighted)	% (weighted)	
Not working	34.6	33.3	35.3
Less than 30 hours	17.3	16.3	14.7
30 hours or more	48.1	50.4	50.1

Table 10. Occupation of survey respondents

Occupation	Survey respondents (n=1425)		% NZ Population (Census 2018)
	% (unweighted)	% (weighted)	
Not working	34.6	33.3	35.3
Professional	18.0	19.0	14.9
Manager	8.8	9.5	11.7
Labourer	8.1	8.5	7.3
Clerical or administrative worker	9.1	7.9	7.0
Technician or trades worker	4.6	5.9	7.8
Sales worker	4.8	5.5	5.9
Community or personal service worker	5.3	4.8	6.2
Machinery operator or driver	2.8	2.6	3.9
Prefer not to say	3.8	3.0	

Table 11. Dependent children status of survey respondents

Dependent children	Survey respondents (n=1425)		% NZ households (Census 2018)*
	% (unweighted)	% (weighted)	
Yes	37.5	31.0	31.8
No	62.5	69.0	63.9

** Number of dependent children unknown in 4.3% of NZ households (Census 2018)*

Table 12. Participants' perceptions of whether specific behaviours are risk factors for cancer (weighted)

Risk factor	Definitely		Probably		Not sure		Probably not		Definitely Not	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Evidence-based risk factor										
Drinking alcohol	25.3	22.7 - 28.0	38.64	35.7 - 41.7	21.3	18.9 - 24.0	11.9	10.1 - 14.0	2.9	2.0 - 4.2
Not enough fruit and vegetables	21.6	19.2 - 24.1	41.5	38.5 - 44.6	21.1	18.7 - 23.7	11.8	10.0 - 13.8	4.1	3.0 - 5.6
Being overweight	23.2	20.7 - 25.9	40.7	37.7 - 43.7	22.7	20.2 - 25.3	11.6	9.8 - 13.7	1.9	1.2 - 3.0
Not enough physical activity	18.5	16.3 - 21.0	35.6	32.6 - 38.6	24.5	22.0 - 27.2	18.0	15.8 - 20.4	3.4	2.4 - 4.8
Highly processed food/junk food	32.2	29.4 - 35.1	39.4	36.4 - 42.2	18.2	16.0 - 20.7	8.3	6.7 - 10.1	2.0	1.2 - 3.2
Not eating enough fibre	13.6	11.7 - 15.8	36.5	33.6 - 39.5	32.0	29.2 - 35.0	14.1	12.1 - 16.3	3.8	2.8 - 5.2
Processed meat	20.7	18.3 - 23.3	36.9	34.0 - 39.9	26.1	23.5 - 28.8	13.6	11.6 - 15.8	2.8	1.9 - 4.0
Too much red meat	12.8	10.9 - 15.0	28.0	25.3 - 30.8	33.1	30.3 - 36.0	19.2	16.9 - 21.7	6.9	5.5 - 8.7
Too much sun exposure	50.5	47.4 - 53.5	35.9	33.0 - 38.9	10.0	8.2 - 12.1	2.6	1.8 - 3.7	1.1	0.6 - 1.9
No evidence it is a risk factor										
Using mobile phones	6.9	5.5 - 8.6	23.7	21.1 - 26.4	33.4	30.6 - 36.4	26.7	24.0 - 29.5	9.3	7.7 - 11.2
Feeling stressed	19.4	17.1 - 21.9	42.1	39.1 - 45.1	22.2	19.7 - 24.9	13.9	11.9 - 16.3	2.4	1.6 - 3.7
Microwaved food	8.0	6.5 - 9.7	20.3	17.9 - 22.8	37.2	34.3 - 40.2	27.5	24.8 - 30.3	7.1	5.7 - 8.8
Food/drinks in plastic packaging	9.1	7.5 - 10.9	27.4	24.8 - 30.2	39.9	36.9 - 42.9	19.1	16.8 - 21.6	4.6	3.4 - 6.2
Artificial sweeteners	14.9	12.8 - 17.2	32.7	29.9 - 35.6	35.8	32.9 - 38.8	13.7	11.8 - 16.0	2.9	2.0 - 4.2
Milk /dairy products	4.1	3.0 - 5.6	11.7	9.9 - 13.8	34.9	32.0 - 37.9	38.3	35.4 - 41.1	11.0	9.2 - 13.0
Status as risk factor to be established										
Vaping	36.2	33.3 - 39.2	39.4	36.5 - 42.5	19.0	16.7 - 21.5	3.7	2.7 - 5.1	1.7	1.0 - 2.8

Table 13. Participants' support for public policies on alcohol and nutrition

Policy type	Strongly support		Support		Neither support nor oppose		Oppose		Strongly oppose		Unsure	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Alcohol policies												
The Government should increase the price of alcohol (excise tax on alcohol)	15.2	13.1 - 17.5	18.4	16.2 - 21.0	24.1	21.6 - 26.8	24.1	21.5 - 26.8	16.5	14.3 - 18.9	1.7	1.1 - 2.6
The Government should increase the price of alcohol (excise tax on alcohol) as long as the extra money is used for treatment	19.2	16.9 - 21.6	26.6	23.9 - 29.4	23.0	20.5 - 25.7	16.7	14.5 - 19.1	12.5	10.5 - 14.7	2.2	1.5 - 3.3
That the price of very cheap alcohol should be raised	17.2	15.1 - 19.6	24.9	22.3 - 27.7	24.4	21.9 - 27.2	19.6	17.3 - 22.2	10.9	9.1 - 13.0	3.0	2.1 - 4.2
Banning alcohol sponsorships at sporting, community and other events that under 18-year-olds go to	28.8	26.2 - 31.6	29.0	26.3 - 31.9	21.6	19.1 - 24.3	11.7	9.9 - 13.8	6.9	5.4 - 8.6	2.0	1.4 - 3.0
Banning all alcohol marketing and sponsorship	16.5	14.4 - 18.9	17.4	15.1 - 19.8	33.6	30.7 - 36.5	19.7	17.3 - 22.2	10.9	9.1 - 12.9	2.1	1.4 - 3.0
The alcohol industry should not be involved in developing government policies (local and national) to reduce alcohol harm	23.8	21.2 - 26.4	26.7	24.1 - 29.6	28.5	25.9 - 31.4	11.4	9.6 - 13.5	5.1	3.9 - 6.6	4.5	3.5 - 5.9
Food policies												
Taxes on sugary drinks	21.9	19.5 - 24.6	29.8	27.1 - 32.7	22.0	19.5 - 24.6	15.9	13.8 - 18.3	8.9	7.2 - 10.8	1.5	1.0 - 2.3
Taxes on sugary drinks IF the money was spent on making healthy foods more available/affordable	30.5	27.8 - 33.3	33.3	30.5 - 36.3	18.2	15.9 - 20.7	10.9	9.1 - 13.0	5.6	4.4 - 7.2	1.5	0.9 - 2.4
A ban on marketing of unhealthy food and beverages	18.6	16.3 - 21.1	23.6	21.2 - 26.3	31.7	28.9 - 34.6	18.9	16.6 - 21.5	5.5	4.3 - 7.0	1.7	1.1 - 2.6
Banning unhealthy food/beverage sponsorship at sporting, community and other events that under 18-year-olds go to	22.2	19.7 - 24.8	27.3	24.7 - 30.2	27.0	24.3 - 29.8	15.5	13.4 - 17.8	6.6	5.2 - 8.3	1.5	1.0 - 2.3
Government action to reduce the cost of healthy food	54.9	51.8 - 58.0	29.4	26.6 - 32.3	9.1	7.4 - 11.2	3.9	2.8 - 5.3	1.5	0.9 - 2.5	1.3	0.8 - 2.3
Providing free healthy lunches at schools	40.9	38.0 - 44.0	31.7	28.9 - 34.6	15.8	13.7 - 18.3	7.0	5.6 - 8.7	3.2	2.3 - 4.6	1.3	0.8 - 2.3

Table 14. Odds ratios and 95% CI for risk factor awareness among the independent variables

Risk factor	Odds ratios (95% CI)						
	Ethnicity (reference category: NZ European & other)		*Age group (reference category: 18-29 years)*			*Gender (reference category: male)*	*Household income (reference category: income >$70,000)*
	Māori	Pasifika	30-44 years	45-59 years	60+ years	Female	Low income ($70,000 or less)
Alcohol	1.12 (0.80 – 1.57)	1.25 (0.84 – 1.86)	0.80 (0.51 – 1.26)	**0.54 (0.34 – 0.88)**	**0.55 (0.34 – 0.91)**	1.10 (0.83 – 1.47)	**0.68 (0.50 – 0.92)**
Not enough fruit & vegetables	1.19 (0.86 – 1.65)	1.29 (0.89 – 1.88)	0.93 (0.62 – 1.42)	0.95 (0.61 – 1.49)	0.82 (0.52 – 1.28)	0.93 (0.70 – 1.23)	0.96 (0.72 – 1.28)
Being overweight	1.06 (0.76 – 1.48)	1.20 (0.81 – 1.78)	0.67 (0.43 – 1.04)	**0.57 (0.36 – 0.92)**	**0.51 (0.32 – 0.82)**	0.85 (0.64 – 1.13)	0.11 (0.57 – 1.04)
Highly processed/junk food	1.17 (0.82 – 1.67)	**1.52 (1.01 – 2.32)**	1.17 (0.74 – 1.83)	0.91 (0.57 – 1.46)	0.92 (0.57 – 1.49)	0.98 (0.73 – 1.32)	**0.68 (0.49 – 0.94)**
Not eating enough fibre	1.08 (0.79 – 1.47)	1.18 (0.83 – 1.68)	0.79 (0.53 – 1.19)	1.01 (0.65 – 1.55)	**1.65 (1.06 – 2.57)**	1.10 (0.84 – 1.44)	1.05 (0.79 – 1.39)
Processed meat	**0.69 (0.50 – 0.95)**	0.76 (0.53 – 1.10)	1.06 (0.70 – 1.59)	0.85 (0.55 – 1.32)	0.65 (0.42 – 1.02)	1.20 (0.92 – 1.58)	0.84 (0.64 – 2.74)
Red meat	0.84 (0.61 – 1.17)	1.22 (0.85 – 1.76)	0.98 (0.65 – 1.47)	0.94 (0.61 – 1.46)	0.78 (0.50 – 1.23)	1.28 (0.97 – 1.68)	**0.75 (0.56 – 0.99)**

Table 15. Odds ratios and 95% CI for alcohol policy support among the independent variables

Alcohol Policy	*Aware of alcohol as risk factor (reference category: not aware)*	*Ethnicity (reference category: NZ European & other)*		*Age group (reference category: 18-29 years)*			*Gender (reference category: male)*	*Household income (reference category: income >$70,000)*
	Odds ratios (95% CI)							
	Aware	Māori	Pasifika	30-44 years	45-59 years	60+ years	Female	Low income ($70,000 or less)
The Government should increase the price of alcohol (excise tax on alcohol)	**2.92 (2.07 – 4.11)**	0.89 (0.63 – 1.27)	1.45 (0.99 – 2.13)	1.21 (0.77 – 1.90)	1.00 (0.61 – 1.65)	1.15 (0.70 – 1.90)	1.17 (0.87 – 1.58)	1.25 (0.92 – 1.72)
The Government should increase the price of alcohol (excise tax on alcohol) as long as the extra money is used for treatment	**2.75 (2.03 – 3.72)**	0.83 (0.59 – 1.16)	1.14 (0.79 – 1.65)	1.27 (0.83 – 1.94)	1.08 (0.68 – 1.72)	1.35 (0.85 – 2.14)	**1.35 (1.02 – 1.79)**	1.18 (0.88 – 1.58)
That the price of very cheap alcohol should be raised	**2.40 (1.75 – 3.30)**	0.90 (0.64 – 1.26)	1.21 (0.84 – 1.76)	1.38 (0.88 – 2.16)	**2.08 (1.28 – 3.39)**	**2.36 (1.44 – 3.88)**	1.20 (0.91 – 1.60)	0.98 (0.73 – 1.32)
Banning alcohol sponsorships at sporting, community and other events that under 18-year-olds go to	**2.27 (1.68 – 3.07)**	1.10 (0.78 – 1.54)	1.37 (0.93 – 2.03)	**1.58 (1.02 – 2.46)**	1.59 (0.99 – 2.55)	**2.22 (1.36 – 3.62)**	**1.52 (1.14 – 2.03)**	0.89 (0.66 – 1.20)
Banning all alcohol marketing and sponsorship	**2.05 (1.47 – 2.87)**	1.17 (0.84 – 1.65)	1.17 (0.80 – 1.72)	1.00 (0.64 – 1.58)	1.01 (0.61 – 1.66)	1.33 (0.80 – 2.23)	0.92 (0.68 – 1.23)	1.02 (0.75 – 1.39)
The alcohol industry should not be involved in developing government policies (local and national) to reduce alcohol harm	**1.92 (1.42 – 2.59)**	0.96 (0.69 – 1.32)	1.19 (0.82 – 1.71)	1.39 (0.91 – 2.14)	1.42 (0.89 – 2.26)	**1.91 (1.18 – 3.08)**	0.87 (0.66 – 1.15)	0.88 (0.66 – 1.18)

Table 16. Odds ratios and 95% CI for alcohol policy <u>opposition</u> among the independent variables

Alcohol Policy	*Aware of alcohol as risk factor (reference category: not aware)*	*Ethnicity (reference category: NZ European & other)*		*Age group (reference category: 18-29 years)*			*Gender (reference category: male)*	*Household income (reference category: income >$70,000)*
	Odds ratios (95% CI)							
	Aware	Māori	Pasifika	30-44 years	45-59 years	60+ years	Female	Low income ($70,000 or less)
The Government should increase the price of alcohol (excise tax on alcohol)	**0.46 (0.34 – 0.62)**	1.00 (0.72 – 1.39)	**0.61 (0.41 – 0.90)**	0.70 (0.45 – 1.09)	0.86 (0.53 – 1.37)	0.78 (0.48 – 1.26)	**0.71 (0.53 – 0.94)**	**0.73 (0.55 – 0.99)**
The Government should increase the price of alcohol (excise tax on alcohol) as long as the extra money is used for treatment	**0.46 (0.34 – 0.63)**	0.88 (0.61 – 1.26)	0.80 (0.52 – 1.22)	0.94 (0.59 – 1.52)	1.10 (0.67 – 1.81)	1.02 (0.61 – 1.71)	**0.69 (0.51 – 0.93)**	**0.66 (0.48 – 0.91)**
That the price of very cheap alcohol should be raised	**0.49 (0.36 – 0.66)**	0.93 (0.65 – 1.32)	**0.66 (0.44 – 0.99)**	0.77 (0.50 – 1.20)	**0.47 (0.29 – 0.77)**	**0.41 (0.24 – 0.67)**	0.90 (0.66 – 1.22)	0.87 (0.64 – 1.20)
Banning alcohol sponsorships at sporting, community and other events that under 18-year-olds go to	**0.62 (0.44 – 0.87)**	1.17 (0.79 – 1.74)	0.99 (0.63 – 1.58)	0.73 (0.43 – 1.21)	0.95 (0.56 – 1.62)	0.95 (0.56 – 1.61)	**0.67 (0.48 – 0.93)**	0.88 (0.62 – 1.25)
Banning all alcohol marketing and sponsorship	**0.66 (0.49 – 0.89)**	0.96 (0.68 – 1.36)	0.92 (0.62 – 1.36)	0.86 (0.55 – 1.34)	0.80 (0.49 – 1.28)	0.84 (0.52 – 1.36)	**0.70 (0.52 – 0.93)**	0.88 (0.65 – 1.20)
The alcohol industry should not be involved in developing government policies (local and national) to reduce alcohol harm	0.76 (0.53 – 1.09)	0.93 (0.61 – 1.42)	0.69 (0.43 – 1.13)	0.83 (0.48 – 1.42)	1.09 (0.63 – 1.90)	0.79 (0.45 – 1.40)	1.06 (0.74 – 1.51)	1.06 (0.74 – 1.53)

Table 17. Odds ratios and 95% CI for food policy support among the independent variables

Food Policy	Odds ratios (95% CI)							
	Awareness of food risk factor/s (reference category: not aware)	*Ethnicity (reference category: NZ European & other)*		*Age group (reference category: 18-29 years)*			*Gender (reference category: male)*	*Household income (reference category: income >$70,000)*
	Aware	Māori	Pasifika	30-44 years	45-59 years	60+ years	Female	Low income ($70,000 or less)
Taxes on sugary drinks	**3.47 (2.14 – 5.63)**	0.92 (0.67 – 1.27)	0.95 (0.567 – 1.36)	**1.80 (1.19 – 2.74)**	**2.21 (1.41 – 3.48)**	**2.42 (1.53 – 3.84)**	1.07 (0.81 – 1.41)	0.97 (0.72 – 1.29)
Taxes on sugary drinks IF the money was spent on making healthy foods more available/affordable	**3.80 (2.38 – 6.06)**	0.98 (0.70 – 1.38)	1.20 (0.80 – 1.78)	**1.60 (1.04 – 2.46)**	1.39 (0.88 – 2.19)	**1.80 (1.13 – 2.89)**	**1.59 (1.19 – 2.13)**	0.90 (0.66 – 1.22)
A ban on marketing of unhealthy food and beverages	**2.23 (1.37 – 3.60)**	1.18 (0.85 – 1.64)	1.43 (0.99 – 2.05)	**1.86 (1.20 – 2.88)**	**2.13 (1.33 – 3.39)**	**2.12 (1.32 – 3.41)**	1.12 (0.85 – 1.48)	1.29 (0.97 – 1.73)
Banning unhealthy food/beverage sponsorship at sporting, community and other events that under 18-year-olds go to	**2.65 (1.64 – 4.27)**	0.88 (0.64 – 1.21)	0.90 (0.63 – 1.28)	1.50 (0.99 – 2.28)	**1.95 (1.25 – 3.05)**	**2.37 (1.50 – 3.74)**	1.18 (0.90 – 1.57)	1.00 (0.75 – 1.33)
Government action to reduce the cost of healthy food	**2.08 (1.17 – 3.69)**	1.51 (0.90 – 2.52)	**1.92 (1.04 – 3.55)**	**2.38 (1.31 – 4.30)**	1.64 (0.91 – 2.98)	**2.40 (1.28 – 4.47)**	**1.84 (1.23 – 2.74)**	0.89 (0.59 – 1.35)
Providing free healthy lunches at schools	1.45 (0.87 – 2.40)	**2.33 (1.48 – 3.67)**	**2.75 (1.62 – 4.67)**	0.81 (0.46 – 1.42)	**0.44 (0.25 – 0.77)**	**0.42 (0.24 – 0.73)**	1.32 (0.97- 1.81)	1.18 (0.84 – 1.64)

Table 18. Odds ratios and 95% CI for food policy opposition among the independent variables

Food Policy	Odds ratios (95% CI)							
	Awareness of food risk factor/s (reference category: not aware)	*Ethnicity (reference category: NZ European & other)*		*Age group (reference category: 18-29 years)*			*Gender (reference category: male)*	*Household income (reference category: income >$70,000)*
	Aware	Māori	Pasifika	30-44 years	45-59 years	60+ years	Female	Low income ($70,000 or less)
Taxes on sugary drinks	**0.39 (0.25 – 0.61)**	1.06 (0.74 – 1.52)	0.76 (0.51 – 1.16)	0.65 (0.42 – 1.01)	**0.61 (0.38 – 0.97)**	**0.41 (0.25 – 0.67)**	0.90 (0.66 – 1.23)	1.09 (0.79 – 1.51)
Taxes on sugary drinks IF the money was spent on making healthy foods more available/affordable	**0.37 (0.23 – 0.61)**	1.17 (0.78 – 1.77)	0.64 (0.37 – 1.08)	0.72 (0.41 – 1.25)	1.01 (0.58 – 1.76)	0.74 (0.42 – 1.32)	0.71 (0.50 – 1.01)	0.95 (0.65 – 1.38)
A ban on marketing of unhealthy food and beverages	**0.53 (0.33 – 0.86)**	0.72 (0.48 – 1.06)	0.69 (0.46 – 1.05)	**0.55 (0.35 – 0.86)**	**0.49 (0.30 – 0.80)**	**0.44 (0.27 – 0.72)**	0.93 (0.68 – 1.28)	0.95 (0.68 – 1.32)
Banning unhealthy food/beverage sponsorship at sporting, community and other events that under 18-year-olds go to	**0.52 (0.32 – 0.85)**	1.37 (0.95 – 1.96)	1.10 (0.72 – 1.67)	0.89 (0.57 – 1.39)	0.69 (0.42 – 1.12)	0.62 (0.38 – 1.03)	0.75 (0.55 – 1.02)	0.88 (0.63 – 1.22)
Government action to reduce the cost of healthy food	0.48 (0.21 – 1.11)	1.02 (0.50 – 2.08)	0.66 (0.27 – 1.63)	0.52 (0.23 – 1.22)	0.63 (0.28 – 1.43)	**0.34 (0.13 – 0.91)**	**0.55 (0.30 – 0.99)**	0.93 (0.49 – 1.76)
Providing free healthy lunches at schools	0.54 (0.29 – 1.02)	0.56 (0.29 – 1.09)	**0.29 (0.11 – 0.76)**	1.85 (0.71 – 4.78)	**3.26 (1.29 – 8.24)**	**3.63 (1.47 – 9.01)**	**0.61 (0.40- 0.94)**	0.79 (0.50 – 1.24)