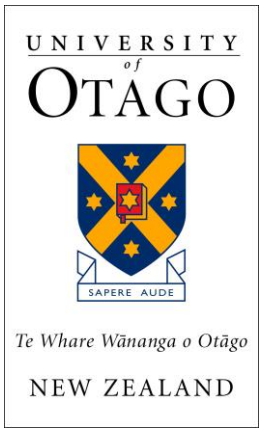
# “WHAT’S ON THE BOTTLE?”

## Study of Health Warning Labels on Alcoholic Beverages on the New Zealand Market

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# Study of Health Warning Labels on Alcoholic Beverages on the New Zealand Market


## Abstract

**Aim:** The health, social, and economic burden of alcohol requires that increased effort be made to identify effective harm reduction strategies. Labelling alcoholic beverages with health warnings is one such intervention that has received international attention. This study aimed to identify and document the current status of voluntary health warning labels on alcoholic beverages sold in New Zealand (including a comparison with imported beverages).

**Methods:** We obtained a sample of 59 alcoholic beverages available in New Zealand, typically at the lower end of the price range. These comprised 10 New Zealand-produced beers, 24 imported beers, 10 wines (three imported), and 15 Ready-to-Drink (RTD) beverages (two imported). We documented the occurrence, content, appearance and position of messages concerning drinking during pregnancy, drink-driving, other health effects, and industry-led initiatives. We also collected data about alcohol content, standard drinks, and nutritional information.

**Results:** 80% of the beverage containers had pregnancy-related warnings, 73% had industry-led initiatives (advising responsible consumption), and 19% had drink-driving/heavy machinery warnings. There were typically similar features of the warnings across beverage types, although some statistically significant differences were apparent. The average area of pregnancy-related pictograms was less than half a square centimetre (45mm$^2$) and the average height of pregnancy-related text was 1.6mm. The average area of drink-driving/heavy machinery pictograms was 36mm$^2$ and the average height of drink-driving text (only found on imported beers) was 2.2mm. Pregnancy-related pictograms occupied between 0.13% and 0.21% of the available surface area of the beverage container. Similarly, drink-driving pictograms occupied between 0.12% and 0.13% of the available surface area. Generally, labelling of New Zealand beers did not differ significantly when compared to imported beers, except with regards to industry led initiatives. New Zealand beers were more likely to display industry led initiatives compared to imported beer ($p=0.0049$).

**Conclusions:** Alcoholic beverages sold in New Zealand are inconsistently labelled in terms of health warnings and, where present, these are relatively small in size. There has been inadequate uptake in New Zealand of voluntary recommendations regarding health information. Mandatory standardised labelling that outlines alcohol-related harm and provides specific guidelines for low risk drinking is required, as part of a larger multifaceted approach. This intervention could raise awareness of the risks from hazardous drinking behaviour, better empower individuals to make safe decisions, and contribute to a more moderate drinking culture in New Zealand.


## Objective

To document the current status of voluntary health warnings on local and imported alcoholic beverages in New Zealand as a base for informing future policy development.

## Study aims

1. Document the occurrence, content, appearance and position of health warnings on samples of beer, wine and ready-to-drink (RTD) containers sold in New Zealand. That is for both local and imported beverages.
2. Identify and document differences between health warnings found on New Zealand-produced alcoholic beverages as well as making comparisons to those on imported alcoholic beverages.
3. Describe possible options for the type of information that may be legally required to appear on alcoholic beverages in New Zealand in order to inform future policy decisions.

# Introduction

## Impact of alcohol on health

It is widely recognised that alcohol-related harm is a prevailing global health issue. In 2011, the World Health Organization issued an international agreement calling for action in response to the increasing global burden of disease caused by alcohol related harm (1). In 2013, a New Zealand Ministry of Health (MoH) report placed alcohol in the top ten risk factors for disability-adjusted life-years (DALYs) lost, accounting for just under 4% of the total health loss (2). Of the top ten risk factors identified by the MoH, alcohol has the biggest proportional effect on injury (2). Alcohol use has been identified as a risk factor for a range of acute injuries; road traffic incidents, falls, fires, sports injuries, self-harm and interpersonal violence, including violence against women and children (3)**.** Furthermore, the burden of alcohol-related harm extends to that of long-term health consequences. Long-term heavy alcohol use is the leading cause of death from liver disease, via alcoholic fatty liver, alcoholic hepatitis and cirrhosis (4). In recent decades, alcohol use has been identified as a cause of immunodeficiency, causing an "increase in incidence and severity of diseases such as pneumonia, tuberculosis, hepatitis, HIV, gastroenteritis and septicaemia" (4). Alcohol use has also been implicated as a cause of cancers of the oral cavity, pharynx, larynx, oesophagus, colon, rectum and female breast (3,5,6).

Additionally, alcohol consumption presents a significant danger to people other than the primary consumer. For example, in 2012, driver alcohol use was a contributing factor in 73 fatal crashes and 331 serious injury crashes in New Zealand, which resulted in 93 deaths, 454 serious injuries and 1,331 minor injuries (7). Around one fifth (18%) of the New Zealand Police budget is spent annually responding to alcohol-related crime (8). One third of all police apprehensions, including half of serious violent crimes, involve alcohol (7).

Alcohol consumption during pregnancy can threaten fetal development in utero, as well as precipitate miscarriage and stillbirth (9). Fetal alcohol spectrum disorder (FASD) describes a collection of conditions associated with confirmed alcohol exposure in utero, the most serious of which is fetal alcohol syndrome (FAS). The range of consequences associated with maternal alcohol consumption include cardiac, skeletal, auditory, ocular and renal defects, central nervous system and developmental abnormalities, and behavioural and cognitive abnormalities (9). Due to the heterogeneity of the disorder, often more subtle presentations are overlooked. Furthermore, these effects are completely preventable if alcohol is avoided during pregnancy (10). Globally, a meta-analysis (11) has reported the prevalence of FAS (the most serious outcome) at 15/10,000 live births. The study also found that 1 in 67 children, of women who consumed alcohol during their pregnancy, are born with FAS (11). No research has confirmed the prevalence or profile of all alcohol related outcome for babies in New Zealand due in part to the problematic variations in phenotype. However, one estimate is approximately 1% of live births, which is substantial and exceeds the prevalence of both autism spectrum disorder and Down syndrome (SAMHSA cited in (12)). An analytical report has provided an estimate that 71% of New Zealand women report drinking alcohol prior to being aware of their pregnancy, which reduces to 23% in the first trimester (13). When asked about heavier drinking (four or more drinks per week), 29% of women reported drinking at these levels prior to awareness of their pregnancy. Māori women were more likely to drink at these levels (41%) and reduced their alcohol intake at the slowest rates throughout pregnancy (13).

It is reasonable to infer that alcohol consumption during pregnancy can lead to unnecessary harm to children, such that they suffer preventable disadvantage in the earliest stages of life. Consequences of fetal alcohol exposure pose a challenge to the child's mother and family, as well as to society due to the potential lifelong requirement for assistance, particularly in health and education. As with many other preventable diseases, this corresponds to a substantial economic burden on society. Specifically, it was estimated in 2016 that the cost to New Zealand is $49 to $200 million annually due to loss of productivity in the labour force, attributable morbidity and premature mortality (12).

### Nutritional information

There can be a significant caloric burden associated with alcohol consumption. Studies have estimated that adults can obtain up to 16% of their recommended daily energy intake from alcohol (14,15) and tend not to make dietary adjustments to accommodate the extra calorie load, thus increasing their overall energy intake (16). Given the rising burden that obesity represents in countries like New Zealand, alcoholic beverages should be considered in the context of contributing to an obesogenic environment. Current guidelines in New Zealand permit, but do not require, energy content information, as well as a statement of carbohydrate content on alcoholic beverage containers (17).

### Hazardous drinking behaviours

Alcohol-related harm is influenced both by volume of alcohol consumed and by pattern of drinking (3,18). Irregular heavy alcohol consumption (binge drinking) is one such pattern that is particular problematic in New Zealand, posing a substantial risk to both consumer and society (18). According to results of the 2015/2016 New Zealand Health Survey (NZHS) (19), 20.8% of drinkers in New Zealand were identified to have hazardous drinking behaviours (19). Hazardous drinking behaviour corresponds with a score of 8 or more on the Alcohol Use Disorders Identification Test (AUDIT), an international test that quantifies an individual's pattern of drinking (frequency, amount), dependency symptoms, and experience of alcohol-related harms (guilt, injury etc.) (20). Men were 2.1 times as likely as women to drink hazardously, while Māori were 1.5 times as likely as non-Māori (19). Those in the most deprived areas were 1.4 times as likely as those in least deprived areas to be in the hazardous category (19). Results from the "International Alcohol Control" study adjusted for New Zealand guidelines, estimated that 65% of the total alcohol purchased in New Zealand is attributed to heavy drinking occasions (21,22). Furthermore, the NZHS identified that the greatest percentage of hazardous drinkers were in the 18-24 year age group (19). Research on the purchasing patterns of New Zealand consumers (23) found that occasions of heavier drinking were more common in younger age groups, with an approximate peak at age 25.

Overall, the evidence identifies particularly vulnerable groups – those who disproportionately bear the burden of alcohol-related harm. These vulnerable groups include pregnant women, young adults and those who regularly consume amounts of alcohol that exceed recommended limits. In addition, many people who do not choose to consume alcohol are nevertheless at risk of its secondary harms. Specifically, this group includes developing fetuses, road users and those harmed by crime and violence associated with alcohol consumption.

### Public health implications for New Zealand

Alcohol has a complex relationship with New Zealand culture and is embedded in the framework of how we socialise (24). Due to the heterogeneity of vulnerable populations and ubiquity of alcohol use, a multifaceted approach is appropriate for tackling our hazardous drinking culture (25). According to the WHO, "policy interventions are the most effective strategies available to governments to reduce the burden of disease and injury associated with alcohol use" (1). In a recent study, New Zealand, was ranked 11$^{th}$ on the strength of alcohol policies when compared to 30 other OECD countries (26). The same study suggested that stronger policy is associated with lower levels of consumption (26).

In New Zealand, the alcohol industry is permitted to market their products to a wide variety of consumers in a way that can be both persuasive and potentially misleading. Given alcohol's established harms, there is a case for regulating bodies to balance the marketing of alcohol by ensure that key health and safety information is available and accessible. Food Standards Australia and New Zealand (FSANZ) is the regulatory body responsible for the content and labelling of food and it is considering mandating warning labels on alcoholic beverage containers (24). A review of research into the impacts of alcohol warning labels on attitudes and behaviour summarised that "warning labels have the potential to contribute to positive outcomes as part of a larger range of more proven strategies, and especially if they are enhanced so as to be more noticeable, impactful and varied." (27)

## Effectiveness of warning labels

In the context of limited specific research, the full potential of health warning labels on alcoholic beverages is yet to be realised. It has been suggested that current voluntary labels are lacking, at least in part because "they tend to be text based, indirect, vague, and hardly visible" (28). While there is a general consensus that warning labels change perceptions of alcohol products (28), some studies "have questioned the abilities of warnings to effectively influence drinking behaviours" (29). Given that effectiveness is a "necessary (if not sufficient) criterion for any public health intervention to be ethically justifiable" (30), careful consideration for all elements of a warning label is required.

The effectiveness of warning labels is dependent on the appearance of the label itself (attention, noticeability, and comprehension) and the response it elicits (recall, judgement of risk, and behavioural compliance) (31). It follows that, the more effective a label is at gaining attention and enhancing recall, the more likely it is to change behaviour. Collective evidence regarding effectiveness of warning labels on alcoholic beverages and other commodities provide some direction about specific features of warning labels.

Larger fonts have been found to receive more attention and provide a greater sense of urgency (32). Existing research on packing inserts for pharmaceutical products suggests that "a font size of 10 to 11 point is optimal for legibility" (33,34). Font size and colour appear to work synergistically to enhance the degree of impact; with red found to be the most effective colour (followed by orange, yellow, white, black, green and blue (32,35)). As a demonstration of this effect, there is evidence that black text needs to be six times larger than red text to have the same degree of impact (32,35). Up to a certain size, borders appear to increase noticeability of the message they contain (32). Additionally, larger labels have been found to enhance attention (32).

The positioning of the label itself also seems to influence overall effectiveness. Warnings are most likely to be noticed when on the front of a container with as little clutter as possible (36) i.e. separated from the main product information and branding.

Signal words appear to enhance awareness of warning messages, with "danger" being perceived as the most urgent followed by "notice", "warning" and "caution" (35). Research suggests that an effective message is one that contains four unique pieces of information; a signal word followed by the description of hazard, list of relevant effects, and how to avoid them (37). Following these requirements produces lengthy warnings hence, creating a label that is both adequate in communicating the message yet effective in gaining the attention of the consumer is challenging. Further to these objectives, the information about specific harms of alcohol consumption should be able to be recalled. A combination of short memorable phrases ("don't drink and drive") and more comprehensive statements ("drinking alcohol during pregnancy increases the risk of birth defects"), may be the best approach.

Pictograms and graphic warnings appear to induce greater recall than text warnings alone (38), but also that they need to be readily visible to be noticed (36,39). The association of a pictogram with a text warning possibly increases the overall effectiveness of the label. Like text, pictograms should be specific and non-abstract, and hence able to be interpreted in similar ways by a wide variety of consumers (36). The efficacy of graphic picture warning is based on their success in tobacco control. Graphic picture warnings have been effective in "altering smoker's perception and tobacco related intentions and behaviours" (40). Several focus group studies using graphic warnings on alcohol products have demonstrated that they are effective in increasing consumer awareness and enhancing recall of warning messages due to their ability to illicit a fear response (40–42).

While research has not suggest a *minimum* absolute size for alcohol warning labels to be effective, multiple studies recently published have found a positive relationship between increased size and efficacy (28,43). These suggest that alcohol warning labels attract greater attention when they are "larger in size and less complex" (43). One study found that warning labels occupying 50% of the front of a bottle decrease "positive association with alcohol" (28).

## Current New Zealand policy towards warning labels

While a mandatory warning label on alcoholic beverages has been in use in the United States for almost 30 years, the concept of warning labels for alcohol in New Zealand has only recently been considered among public health workers and health agencies. In 2011, a Labelling Logic Review of Food Labelling Law and Policy was released recommending, among other things, having a mandatory warning label advising of the risks of consuming alcohol while pregnant. Later that year, the Australian and New Zealand Legislative and Governance Forum on Food Regulation (Forum) recommended a specific warning regarding alcohol consumption for pregnant women to be mandated on individual containers and at the point-of-sale (44). The forum stated its intention to provide the alcohol industry with a two year period to voluntarily adopt pregnancy-related warning labelling on its products before reconsidering regulation (45). Furthermore, they recommended that alcohol producers include energy content and general nutrition information on the labels of alcoholic products (44). New Zealand's current laws regarding alcohol labelling require alcohol producers to include alcohol content (either ml/100g, ml/100ml or % alcohol) and standard drinks (with one standard drink = 10g of pure ethanol). There is no requirement to have alcohol %, an ingredient list, or nutritional information on the label of the bottle (17).

In 2014, alcohol producers were asked to complete an online survey to determine the uptake of the voluntary pregnancy-related warning recommendations of the Governance Forum on Food Regulation (45). The survey found that approximately 50% of main producers had adopted voluntary labelling (45). A majority (90-100%) of alcohol producers stated they would do so by 2015/2016 (45).

Our study is not attempting to directly address the uptake of the Forum's recommendations, however, our objective was to document the current status of health warnings on local and imported alcoholic beverages in New Zealand as a base for informing future policy development.

## Methods

### Sample of alcoholic beverages

To identify an appropriate sample of New Zealand-produced beers, we used packaging size as a proxy for beer sales volume. This was done due to a lack of published data regarding sales volume by brand. Our rationale was that beer available in larger packaging (20 or 24 bottles or cans) was indicative of greater sales volumes than beer only available in smaller packages. We purchased all branded beers in packages containing 20 or 24 bottles/cans sold by a large online supermarket in New Zealand (Countdown) on 2 October 2016. This process resulted in 10 different brands being selected (see Table A1 in the Appendix).

To make a comparison to imported alcohol beverages, we obtained a sample of internationally imported beers. We identified imported beers by examining beverages in four supermarkets and four liquor stores in the Wellington region during October and November 2016. Furthermore, products held by a large beer importer (The Beer Cellar) were considered and from their website, additional beers were identified from two additional countries – Canada and Iceland. All these beers were then purchased, resulting in 24 different brands being selected from Europe, America, Asia and Oceania (see Table A2 in the Appendix). Again, as a proxy for largest sales, we identified the largest packs of multi-packaged beers from each country. Failing the beer being available in multi-packaged containers, we used single bottles of the first beer brand identified from each country.

To identify an appropriate sample of wines, we examined products listed on the Countdown online supermarket store on 17 May 2017. We ranked the options available by price and identified the five cheapest red wines of different brands and five cheapest white wines of different brands. We only included standard 750ml bottles. This process resulted in 10 wines being selected (5 red, 5 white, Table A3 in the Appendix). Of these, seven were New Zealand-produced wines and three were imported from Australia. We used price ranking as a proxy for wine sale volumes, as we could not access commercially sensitive data regarding sales volume by brand. The rationale behind this selection process was that, in New Zealand, the heaviest and most intense drinkers have a preference for the cheapest alcohol (23). It may be also reasonable to postulate that young drinkers, a large proportion of whom are students, have a tendency to purchase the cheaper alcohol given their limited income.

To identify our sample of RTDs, we used the LiquorLand New Zealand online store (Wellington Central location) as our initial sampling frame. Given the variety of packaging, bottle sizes and alcohol content that RTDs are available in, we limited our sample to only RTDs available in four packs. We then identified the cheapest four pack RTDs available on 17 May 2016 (using the ranking system on the LiquorLand website). By this process we identified and purchased 15 different brands of RTDs (Table A4 in the Appendix). Once again, this methodology was a proxy to having published market sales data. Of the 15 RTDS, 13 were produced locally and two were imported from Australia.

All alcoholic containers and their warning labels were photographed, with the photos being uploaded to an online database (and available on request). This was important for quality assurance (when resolving differences between the data collection teams) and also to potentially help future researchers. Links to the photograph databases are as follows:

- All beer: https://drive.google.com/drive/folders/0B1dtsO8irog-cEd5T21EdkpUQ28?usp=sharing
- Wine: https://drive.google.com/drive/folders/0B1dtsO8irog-TDJ0bnppNzVleEk?usp=sharing
- RTDs: https://drive.google.com/drive/folders/0B1dtsO8irog-dmJ2YS1leGRXZms?usp=sharing

### Data collection framework and process

We were not able to identify any established alcohol warning label data collection framework in published literature. We therefore devised a coding framework for documenting the occurrence, content, appearance and position of health warnings displayed on alcoholic beverages. The coding framework was tested on all 24 imported beer containers, prior to the formal data collection process beginning. This allowed us to adjust our framework and correct any faults or ambiguity identified at that point.

We identified early on that there was potential to introduce bias into our study, due to inter-observer variation, when collecting data. To minimise this, we developed a standardised method for data collection involving two groups of two people, each measuring the data items independently from each other. These were recorded on a paper copy of the coding framework. Double data entry was done when transferring the paper records into two separate Excel files (with standardised formats) to further reduce errors. Major differences between the results of the two data collection groups were then identified, discussed and re-measured if necessary. Final data collection results were agreed upon collectively to create the final data set.

### Measuring data

We collected information about four different categories of health warnings: drinking during pregnancy-related warnings, drink-driving/heavy machinery warnings, industry-led initiatives and those fitting into the 'other health warnings' category. Pregnancy-related warnings were defined as those that displayed information pertaining to drinking alcohol during pregnancy or the effects of alcohol on a developing fetus. Drink-driving/heavy machinery warnings were defined as those displaying information about drink-driving, vehicular injury, operating heavy machinery or another similar warning.

Industry-led initiatives were messages printed on labels by the alcohol companies advising responsible drinking or referencing a website. These included *Enjoy Responsibly* and *cheers.co.nz*. Other industry-led initiatives were noted if present. Other health warnings were defined as other pictogram or text warnings, not fitting into the above categories, that inform the consumer about the effects of alcohol on their health.

Warning labels were classified as pictograms and/or text warnings. Pictograms were defined as any symbol, diagram or picture used to communicate a warning message. The height and width of the pictogram were measured in millimetres. These measurements in the x and y plane were done regardless of the shape of the pictogram. Text warnings were those that contained words. The exact words used in the warning text were recorded in the data collecting framework. The area that a particular text warning occupied was difficult to measure as often these warnings were buried amongst other text. Therefore, the largest font height of text used in the warning was measured in millimetres.

For each health warning identified, the colour(s) used in the warning were recorded. This also included the colour of the background the health warning label was set against. If there was no coloured background (warning was printed directly against on the glass/metal of the container) this was noted as "transparent" or the colour of the metal.

With all health warnings, we noted if there was a definitive border enclosing the warning(s). A border was defined as a distinct line surrounding the text or a distinct coloured box (containing the health warning) that was different to the remaining background colour of the container. All borders also had to meet the criteria that they did not include information unrelated to the health warning. This was to discount large bordered sections of text containing a buried health warning that was not easily identifiable. The positions of health warnings labels were recorded as being on the front or back of the container. The front of the container was defined as the surface displaying the largest brand name text.

We also collected a standardised set of general information displayed on the alcoholic beverages (if present); volume of container (ml), nutritional data (any statement of energy (kJ) content or % of recommended daily intake (RDI), carbohydrate and sugar content if stated), ingredients list, and alcohol content (grams, millilitres, percentage or number of standard drinks). We also noted if the number of standard drinks were clearly visible (if present) and if the alcohol percentage was visible from the front of the container. To calculate the average standard drinks by beverage type we only included those that reported this information.

Due to the variable shape of some bottles (e.g. differing stem dimensions), we took a simplified approach to determining the surface area of the containers upon which warnings could theoretically be placed. We estimated the ratio of the area occupied by the pregnancy-related and drink-driving pictograms in relation to the estimated available surface area on the outside of the container (excluding the top and bottom). Estimated surface area (SA) was calculated from the average volume (V) of containers in each category using the formulae relevant to cylinders ($V= \pi r^2 h$ and $SA = 2\pi rh$; where r= radius, h = height of the cylindrical portion of the container).

After data collection, price per standard drink was calculated for each alcoholic beverage (except for imported beers and beverages not displaying standard drinks (n=3 wines, n=2 RTDs). This was calculated as price per individual beverage divided by reported number of standard drinks, using sale prices from the Countdown and LiquorLand online databases.

### Statistical analysis

We used OpenEpi (www.openepi.com/TwobyTwo/TwobyTwo.htm) to determine whether differences between data collected about the alcoholic beverages were statistically significant. All p-values presented are mid-p exact (2 tailed) unless stated otherwise.

# Results

The average number of standard drinks per container was 1.6, 1.8, 7.9 and 1.4 drinks for New Zealand-produced beer, imported beer, wine and RTDs respectively (Table 1). Standard drinks information was clearly visible for all (100%) New Zealand beer, compared to 54% of imported beer and this was a statistically significant difference (p=0.0087). Standard drinks information was clearly visible on 80% of wine, and 80% of RTDs (Table 1). As per the selection method, the average prices per standard drink were relatively low. Wine was the cheapest per standard drink, at an average of $1.04 (with the lowest in the range being $0.77) (Table 1).

Nutritional data (% of recommended daily intake or calorie information) was present on 4% of imported beers and 13% of RTDs (Table 1). No nutritional information was found on wines or New Zealand beer. All RTDs displayed an ingredients list, compared to New Zealand beer (20%) and imported beer (54%) (Table 1). These differences were statistically significant, at $p<0.0001$ and $p=0.0001$ respectively. About half (53%) of RTDs displayed caffeine as an ingredient (Table 1).

Approximately 50% of all containers had a border surrounding the health warning(s) (Table 1). One fifth (20%) of New Zealand beer had a warning label present on the same aspect as the brand logo i.e., on the front of the container (Table 1). In comparison, 4% of imported beers and none of the wines or RTDs displayed their warning labels on the front (Table 1).

**Table 1: Comparison of general characteristics across beverage type**

| Characteristic | NZ beer (n=10) | Imported beer (n=24) | Wine (n=10) | RTDs (n=15) |
|---|---|---|---|---|
| Produced (or at least bottled) in New Zealand (%) | 10 (100%) | 0 (0%) | 7 (70%) | 13 (87%) |
| Average volume of beverage container (ml) | 414ml | 470ml | 750ml | 303ml |
| Average number of standard drinks (StD) per beverage container | 1.6 | Not calculated* | 7.9 | 1.4 |
| Standard drinks clearly visible (%) | 10 (100%) | 13 (54%) | 8 (80%) | 12 (80%) |
| Average price per standard drink (NZ$)* | $1.43 | Not calculated** | $1.04 | $2.35 |
| Range of prices per standard drink (NZ$) | $1.20 to $2.00 | Not calculated** | $0.77 to $1.17 | $1.47 to $3.61 |
| ***Nutrients and ingredients*** | | | | |
| Nutritional data | 0 (0%) | 1 (4%) | 0 (0%) | 2 (13%) |
| Ingredients list | 2 (20%) | 13 (54%) | 0 (0%) | 15 (100%) |
| Ingredients include caffeine | 0 (0%) | 0 (0%) | 0 (0%) | 8 (53%) |
| ***Warning label borders and positioning*** | | | | |
| Border around the largest health warning | 5 (50%) | 10 (42%) | 5 (50%) | 10 (67%) |
| Any one warning label on front | 2 (20%) | 10 (4%) | 0 (0%) | 0 (0%) |

*Average number of standard drinks was not calculated for imported beverages. Standard drinks are not internationally implemented. Only 54% of the sample had this printed, generally upon importation.

** The price data on the imported beers was not calculated as some of these were niche products (e.g., a few involved delivery costs following online purchasing).

Most (85%) of the alcoholic beverages had at least one warning label (Table 2). All New Zealand beers, compared to 79% of imported beers, had a warning label present (Table 2). Similarly, 80% of wines and 87% of RTDs had any warning labels present (Table 2). Pregnancy-related warning labels were present on 80% of all containers and industry-led initiative were present on 73% (Table 2). A minority (19%) of beverage containers had drink-driving/heavy machinery warning labels present (Table 2).

All New Zealand beers had a pregnancy-related warning label, of which 50% were pictograms and 50% were text (Table 2). Around a third (30%) of New Zealand beers had a drink-driving/heavy machinery warning present, all of which were displayed as pictograms (Table 2). All New Zealand beers had an industry-led initiative, all of which were displayed as text. All but one (90%), were "cheers.org.nz", with the exception being Heineken® (EnjoyHeinekenResponsibly.com).

Three quarters (75%) of the imported beers had a pregnancy-related warning, of which 72% were pictograms and 28% were text (Table 2). Drink-driving/heavy machinery warnings were present on 33% of imported beers, most of which (63%) were pictograms (Table 2). There was an industry-led initiative on half (50%) of imported beers; three were "cheers.org.nz", six had the Australian "drinkwise.org.au" while the remaining two displayed the equivalent French and UK websites. Three imported beers (12.5%) displayed warnings that we defined as "other" (Table 2); two were the UK Chief Medical Officer's recommendations regarding safe drinking limits, and one was "consumption of alcohol is injurious to health".

Most wines (80%) wines had a pregnancy-related label present, of which 50% were pictograms and 50% were text warnings (Table 2). There were no drink-driving or heavy machinery labels on any of the wines. There was an industry-led initiative on 80% of wines; the majority were a combination of "cheers.org.nz" and/or "drinkwise.org.au".

Nearly three-quarters (73%) of RTDs had a pregnancy-related warning label present, of which 45% were pictograms and 55% were text. There were no drink-driving/ heavy machinery labels on any of the RTDs. Industry-led initiatives were on 87% of RTDs, all of which were text warnings. One of the RTDs displayed a warning that we defined as "other". This read, "Not recommended for children, pregnant or lactating women, and individuals sensitive to caffeine".

New Zealand and imported beers were significantly more likely to display a drink-driving/heavy machinery warning compared with wines ($p=0.0373$). New Zealand beers and RTDs were significantly more likely than imported beers to display industry led initiatives ($p=0.0049$, $p=0.0205$ respectively).

In general, warning labels tended to be small and designed to blend with the other elements of the bottle, such as the product description or barcode. In many cases, the pictogram or text was not only the same colour as all other text information, but was also not printed against an opaque background. In our opinion, this made some warnings much harder to read.

**Table 2: Presence and type (pictogram/text) of warning labels across beverage type**

| Label type/characteristic | NZ Beer (n=10) | Imported Beer (n=24) | Wine (n=10) | RTD (n=15) | Total (n=59) |
|---|---|---|---|---|---|
| **Any warning label present** | 10 (100%) | 19 (79%) | 8 (80%) | 13 (87%) | 50 (85%) |
| **Pregnancy-related warning** | 10 (100%) | 18 (75%) | 8 (80%) | 11 (73%) | 47 (80%) |
| Pictogram | 5 (50%) | 13 (72%) | 4 (50%) | 5 (45%) | 27 (57%) |
| Text | 5 (50%) | 5 (28%) | 4 (50%) | 6 (55%) | 20 (43%) |
| **Drink-driving/heavy machinery** | 3 (30%) | 8 (33%) | 0 (0%) | 0 (0%) | 11 (19%) |
| Pictogram | 3 (100%) | 5 (63%) | 0 (0%) | 0 (0%) | 8 (73%) |
| Text | 0 (0%) | 3 (37%) | 0 (0%) | 0 (0%) | 3 (23%) |
| **Industry-led initiatives*** | 10 (100%) | 12 (50%) | 8 (80%) | 13 (87%) | 43 (73%) |
| Pictogram | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| Text | 10 (100%) | 12 (100%) | 8 (100%) | 13 (100%) | 43 (73%) |
| **Other warnings**** | 0 (0%) | 3 (12.5%) | 0 (0%) | 1 (7%) | 4 (7%) |
| Pictogram | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| Text | 0 (0%) | 3 (12.5%) | 0 (0%) | 1 (7%) | 4 (7%) |

* Examples include information on "responsible drinking" e.g., at the *Enjoy Responsibly* and *cheers.co.nz* websites.

** Examples include the UK Chief Medical Health Officer 'recommendations regarding safe limits, and "Consumption of alcohol is injurious to health".

The average area of pregnancy-related pictograms across all alcoholic beverages was 45mm$^2$ (Table 3), which is roughly equivalent to the cross-sectional area of a green pea. Imported beers had the smallest average area for pregnancy-related pictograms (41mm$^2$) while wines had the largest (57mm$^2$) (Table 3), albeit on a much larger container. Imported beer had the largest range of areas for pregnancy-related pictograms, varying from a very small 9mm$^2$ to comparatively large 100mm$^2$ (i.e. one square centimetre) (Table 3). By comparison, pregnancy-related pictogram areas had much narrower ranges for New Zealand beer, wines and RTDs.

The average area of drink-driving/heavy machinery pictograms was 36mm$^2$ (Table 3). Imported beers had a larger range of areas (25-81mm$^2$) compared with New Zealand beers (25-49mm$^2$) (Table 3).

The average height of pregnancy-related warning text was 1.6mm (Table 3). This was similar to the average heights of industry-led initiatives and "other warning" texts (only found on imported beers) of 1.6mm and 1.7mm respectively (Table 3). In comparison, the average height of drink-driving/heavy machinery warning text (which was only found on imported beers) was 2.2mm (Table 3).

Pictograms occupied less than 1% of the available surface area of the container across the range of beverages. Pregnancy related pictograms (present across the range of alcoholic beverages), occupied on average between 0.13% and 0.21% (Table 4). Drink-driving pictograms (only present on beer) were equally conservative, occupying on average 0.12% and 0.13% of the available surface area (Table 4).

**Table 3: Comparison of pictogram area and font height size of health warning labels on the different beverages**

| Size/area measurements (where present) | NZ beer (n=10) | Imported beer (n=24) | Wine (n=10) | RTDs (n=15) | Total (n=59) |
|---|---|---|---|---|---|
| ***Pregnancy-related warnings*** | | | | | |
| **Average area of pregnancy pictogram ($mm^2$)** | **42** | **41** | **57** | **49** | **45** |
| Standard deviation ($mm^2$) | 15 | 25 | 14 | 22 | - |
| Range ($mm^2$) | 25-64 | 9-100 | 36-64 | 16-64 | - |
| **Average height of pregnancy text (mm)** | **1.5** | **2.1** | **1.4** | **1.3** | **1.6** |
| Standard deviation ($mm^2$) | 0.5 | 0.7 | 0.3 | 0.4 | - |
| Range ($mm^2$) | 1.0-2.0 | 1.0-3.0 | 1.0-1.5 | 1.0-2.0 | - |
| ***Drink-driving/heavy machinery warnings*** | | | | | |
| **Average area of drink-driving/heavy machinery pictogram ($mm^2$)** | **37** | **36** | **-** | **-** | **36** |
| Standard deviation ($mm^2$) | 12 | 22 | - | - | - |
| Range ($mm^2$) | 25-49 | 25-81 | - | - | - |
| **Average height of drink-driving/heavy machinery text (mm)** | **-** | **2.2** | **-** | **-** | **2.2** |
| Standard deviation ($mm^2$) | - | 0.3 | - | - | - |
| Range ($mm^2$) | - | 2.0-2.5 | - | - | - |
| ***Industry-led initiatives*** | | | | | |
| **Average height of industry-led initiative text (mm)** | **1.7** | **1.8** | **1.4** | **1.5** | **1.6** |
| Standard deviation ($mm^2$) | 0.4 | 1.4 | 0.4 | 0.7 | - |
| Range ($mm^2$) | 1.0-2.0 | 1.0-6.0 | 1.0-1.5 | 1.0-3.0 | - |
| ***Other warnings (see Table 2 footnotes)*** | | | | | |
| **Average height of 'other-warning-label' text (mm)** | **-** | **1.7** | **-** | **-** | **1.7** |
| Standard deviation ($mm^2$) | - | 1.1 | - | - | - |
| Range ($mm^2$) | - | 1.0-3.0 | - | - | - |

**Table 4: Comparison of pictogram sizes relative to estimated available surface area of containers in that category, across beverage type (excluding the top and bottom of the containers, see *Methods* for the formulae used)**

| Characteristic | NZ beer (n=10) | Imported beer (n=24) | Wine (n=10) | RTDs (n=15) |
|---|---|---|---|---|
| ***Pregnancy-related pictogram*** | | | | |
| Average area of pregnancy-related pictogram (see Table 3) converted to $cm^2$ | 0.42 | 0.41 | 0.57 | 0.49 |
| Average volume of the containers (mls) (see Table 1) | 414 | 470 | 750 | 303 |
| Average surface area ($cm^2$) of the outside of a cylinder with volume as above | 279 | 298 | 434 | 239 |
| **Percentage coverage (%, pictogram area relative to available surface area)** | **0.15** | **0.14** | **0.13** | **0.21** |
| ***Drink-driving/heavy machinery pictogram*** | | | | |
| Average area of drink-driving pictogram (see Table 3) converted to $cm^2$ | 0.37 | 0.36 | - | - |
| Average volume of the containers (mls) (see Table 1) | 414 | 470 | - | - |
| Average surface area ($cm^2$) of the outside of a cylinder with volume as above | 279 | 298 | - | - |
| **Percentage coverage (%, pictogram area relative to available surface area)** | **0.13** | **0.12** | - | - |

# Discussion

## Results

While there have been a limited number of similar studies (34) this is the first study of its kind to quantitatively assess and compare the specific characteristics of the warning labels across a range of alcoholic beverages available in New Zealand.

Generally, the presence of warning labels across alcoholic beverages varied, and when present, warnings were very small. Despite the Forum's recommendation regarding pregnancy-related warnings in 2011, our sample showed incomplete uptake of voluntary guidelines.

Wines and RTDs had fewer pregnancy-related warnings than New Zealand beer. Drink-driving warnings were very uncommon across our sample, only being found on a third of New Zealand and imported beer, while none of the wine or RTDs displayed drink-driving warnings. The lack of drink-driving warnings across the majority of beverages sold in New Zealand is concerning, given the persisting role of alcohol in road accidents.

Industry-led messages, like "please drink responsibly", were found across the range of New Zealand products and were, in most cases, present in the absence of other warning labels. Industry-led initiatives were present on 73% of our sample (and 100% of the New Zealand beers), while only 19% of the total sample had drink-driving warnings. Further to this, the wording and intention of these industry-led initiatives was ambiguous from a public health perspective. For example, "please drink responsibly" includes the words "please drink", while "cheers!" brings to mind a group of people drinking and celebrating. It has been commented on by Martin-Moreno et al. that such industry led initiatives "have been repeatedly criticised as quite cynical attempts to placate public health advocates without actually hurting sales" (46).

When warning labels were present on New Zealand beverages, they were either displayed as pictograms or as text, but not both (Table 2). Regardless of the type used, these warning labels tended to be small and designed to blend with the other elements of the bottle, such as the product description or barcode. In many cases, the pictogram or text was not only the same colour as all other information, but also was not printed against an opaque background. For example, Corona ® uses white print set against colourless glass (see figure A1 in the Appendix). Further to this, the vast majority of labels when present were not on the front. This suggests that aesthetics or marketing goals are prioritised over the effectiveness of labels.

The average letter height for text warnings ranged between 1.6mm and 2.2mm, which is equivalent a font size of 4.5 to 6.2pt. In our opinion, this font size is unsuitable for displaying information to that is intended to be noticed and read by adults of all ages.

Pregnancy-related and drink-driving pictograms on New Zealand beverages ranged from 16-64mm$^2$ in surface area (Table 3). On average across all beverage types, these occupied ≤0.21% of the available surface area on the cylindrical portion of the beverage containers. The largest pictogram, on an imported beer, was 100mm$^2$, less than 0.35% of the area available. In contrast, the 2007 regulations for New Zealand tobacco warnings require health warnings to occupy 30% of the front and 90% of the back of each packet (47). For alcohol, this suggests that even if warning labels were mandated to be larger, there is ample room for them on the containers. For example, increasing average pictogram size by a factor of five would still only represent 1% of available surface area.

While evidence regarding tobacco packages suggests that warnings are most effective when displayed on the front (48), this is yet to be confirmed with regards to alcoholic beverages. It seems logical that placing the warning label near the main logo would enhance noticeability (both on the shelf and at consumption.) however, a compromise between size and location may be necessary, as there is often more "free" space on other aspects of the container.

Nutrition information, such as energy content, was very uncommon across our sample, while it was completely absent on wine and New Zealand beer. Alcoholic beverages represent a significant caloric burden for some people, and it has been suggested that consumers tend to underestimate the energy content of alcoholic beverages (49). It is possible that if nutrition information was provided on all alcoholic beverages, consumer awareness would increase. For some individuals, this may deter heavy drinking and strengthen the incentive for moderation, acting in synergy with explicit health warnings.

### Rationale for mandatory standardised labelling

Health warnings on all alcoholic beverages is a population-based intervention aimed at improving public awareness of established alcohol-related harms and safe drinking behaviour. One of the principles behind this intervention is that consumers have a right to be informed about the products they purchase and consume. A Lancet review of the effectiveness and cost-effectiveness of alcohol control policies (50) discusses the increasingly recogised value of warning labels in "providing information and education". The public health objective is that health warnings may discourage hazardous drinking , thus reducing rates of alcohol-related harms such as FASD, road traffic injuries, violence, dependency and chronic disease.

Evidence about alcohol's role in causing physical and social harm is not currently reflected in what is presented on products themselves. Existing international labelling initiatives "rely largely on voluntary action by industry" (50). Introducing mandatory warning labels would acknowledge the government's responsibility to treat alcohol as a potentially harmful commodity that is distinct from the majority of food products. Making warning labels mandatory could avoid commercially driven non-compliance with recommendations, while specifying a standardised message and design would aim to circumvent industry manipulation of how the information is displayed.

### Recommendations

We recommend that health warnings be mandatory and standardised as labels on all alcoholic beverages sold in New Zealand. Using the available evidence we make the following recommendations regarding specific elements of these labels. Warning labels should:

- be easily identifiable on the container, ideally on the front.
- occupy half the available space of at least one visible aspect of the cylindrical portion of the container.
- be separate from the main body of information, enclosed by a distinct border.
- include a signal word, picture or symbol, description of possible harm, and an instruction or request.
- address drink-driving, drinking during pregnancy, injury and chronic health effects.
- include guidelines regarding safe alcohol intake e.g., Health Promotion Agency guidelines (51).
- be clear and non-ambiguous.
- offer a source of reliable further information about alcohol and health, such as a website.
- not include ambiguous industry initiatives that encourage drinking e.g. "cheers.org.nz".

Complementary product-dependent information such as the number of standard drinks, % alcohol, ingredients list and energy content should also be mandatory on all alcoholic beverages.

We recommend that standardised labels will occupy a minimum total area (either as a proportion of available surface area or as an absolute measurement per volume), with a minimum font size for each of the text components. Symbols and text need to be large enough that they can be easily read. As a rough estimate we recommend the label should occupy half of the available space on any one side of the container.

One practical application of these recommendations might be a standardised, independently designed and produced sticker that is provided to producers and importers to place on their products. This approach minimises variation between products, avoids industry manipulation of legislation and may could expedite implementation of legislation.

Alternatively, a standardised warning could be incorporated into existing labels by producers. This option would allow for considerable variation in application and, in turn, varying degrees of effectiveness i.e. beer warnings are printed directly onto glass whereas wine bottles have opaque sticker labels. This also places the burden of cost on the industry, which might make introducing this policy more difficult.

### Public health implications and policy

While the obvious aim of mandatory warnings is to discourage hazardous drinking behaviours , the intervention can be expected to have an indirect effect by increasing awareness of alcohol's harm in the general population. Widespread acknowledgment of alcohol's potential harms would empower individuals to lighten their drinking without feeling ashamed about departing from existing social norms. Over time, this may eventually shift the New Zealand drinking culture towards moderation. Further to this, by bringing the idea of alcohol harm reduction into the national psyche, mandatory labelling facilitates the creation of an environment within which policy can continue to shape a healthy New Zealand.

It has been recognised that tobacco and alcohol share some similar characteristics (52)**;** they lead to chronic disease, are dangerous during pregnancy and are both used by young people. Both also have implications for secondary harm to people other than the active consumer; a finding which notably caused a major shift in how society and government thought about tobacco control in the late nineties. In the next few decades, the development of appropriate public policy around alcohol may occur in various stages. Accordingly, we should expect resistance from the alcohol industry, as was evident in the evolution of tobacco control. It has been pointed out that a "vested interest" (53) in the profitability of excessive alcohol consumption makes those with industry affiliation unsuitable partners in efforts to reduce alcohol harm and makes their involvement in introducing this policy "ethically questionable" (54).

The alcohol industry has proactively self-regulated, possibly in an attempt to pre-empt eventual government regulation (22). Through a range of activities, the industry appears to try to "legitimate a role for [itself] as a partner in developing policy responses to the expanding alcohol-related harms" (2). It has tried to be a "potential collaborator in reducing alcohol harm" (22) thus seemingly successfully delaying strict government interventions. It appears difficult for consumers to distinguish industry-lead initiatives like 'cheers.co.nz' from government interventions such as standard drink labelling (22).

The industry is sensitive to having the labels on the product itself, as this could result in damage to brand reputation and loss of profit. In responding to proposed interventions that threaten the profitability of alcohol production and sale, the industry can frame alcohol harms as being confined to a *minority* of drinkers, arguing that a targeted approach is appropriate, while population interventions such as mandatory labelling should be avoided. However, international literature shows that the harms of alcohol are not confined to a 'minority'. In reality, over 20% of adults are classified as hazardous drinkers (19), up to a third of fetuses are being exposed to alcohol in utero, and all road users are at increased risk of harm. While a product based intervention may be seen as "radical" compared to other interventions, there are recognised benefits. As has been discussed, the majority of purchased alcohol in New Zealand is consumed hazardously (see *Introduction*). Mandatory labelling "has the advantage of putting the message in front of the eyes of a majority of drinkers…and the more frequent drinkers more frequently" (24), ensuring the information reaches those most at risk.

We acknowledge that expropriating alcohol containers for public health initiatives infringes on the alcohol industry's freedom to market and sell their products. A liberal standpoint would emphasise the importance of this freedom and point out that the behaviour, not the product, is responsible for harm. However, In the New Zealand economy, alcohol advertising and sponsorship is ubiquitous and depicts drinking alcohol as an net positive experience, without emphasising its harms. Within this environment, it is reasonable for regulating bodies to provide parallel information that enables consumers to make informed choices.

### Strengths and limitations of this study

As far as we could identify, this was the first study of its kind to describe the occurrence and characteristics of health warning labels on alcoholic beverages in New Zealand and to make comparisons to internationally imported beer. As such, no data collection frameworks existed for collecting standardised quantitative and qualitative information about the labels themselves. We therefore developed a new framework allowing us to collect this information in a standardised and objective manner. Clear definitions were defined for each article to be measured minimising ambiguity and inter-observer bias. This bias was further reduced by using two teams of two people to measure and record the data. By uploading the data to two separate online databases, comparisons could be made and differences identified and resolved.

The largest limitation of our study was with regards to the selection and size of our sample. Our sample size was constrained by time and resources. Specifically, without available research funds to purchase brand-specific sales data, which is commercially sensitive. We therefore used sales volume and product price as proxies for popularity. However, while our sample was relatively small (n=59 containers), we believe that aspects of it were fairly comprehensive, such as gathering imported beers from 24 different countries. By restricting our sample to contain a single brand only once, we were also able to capture a broader cross-section of the New Zealand market. Furthermore, by sampling the cheapest products (when considering wine and RTDs), we believe we captured the types of alcohol most likely to be drunk by young adults and heavy drinkers, whom studies have shown tend to purchase the cheapest alcohol (23). Our findings are not generalisable with regards to spirits, liqueurs, ciders and cask wines, all which were not sampled in this study. Furthermore, by examining only the containers, we did not capture what is currently displayed on exterior packaging (e.g., beer and RTDs sold in boxes), which is seen at point of sale. There is perhaps an argument for also requiring warning labels on outer packaging of alcoholic beverages in New Zealand.

### Implications for future research

We hope our study will inform future methods and be replicated with larger samples of products, ideally using market sales data to accurately sample the most purchased beverages. Higher price categories of alcoholic beverages should be included in order to more comprehensively assess the range of products available. Ideally, further studies will consider the information displayed on external packaging, at point of sale, and at licenced premises. This is necessary in order to frame a product-based intervention within its wider commercial and social context.

While we estimated surface area of beverage containers (see *Methods*), it would be useful for future studies to directly measure surface area available for labelling, especially given the variation in size and shape of containers. More evidence is needed regarding the font size and style that would be most effective. This might include producing several prototype labels that could be evaluated in controlled comparative trials.

Our study did not aim to assess consumer awareness of and response to health warning labels. Without introducing a labelling policy at a population level in New Zealand, research tends to be constrained to small focus groups and predictive analysis. Qualitative research suggests that informative labels impact consumer attitudes and awareness (50), however it is more difficult to extract efficacy in terms of significant behavioural change. In addition, specific focus should be placed on the aforementioned vulnerable groups that are disproportionately affected by alcohol harm.

The process for qualifying the value of warning labels on alcohol in New Zealand must involve consideration of Māori and their disproportionate negative outcomes from alcohol use. This approach might include the use of an empowering, strengthen-based message to enhance self-efficacy. An example of this distinction is “give your baby the best chance by not drinking alcohol” as opposed to “drinking alcohol is harmful to your baby”. At this point, this strategy is speculative and should be formally evaluated.

Regarding content, more research is needed looking at effects of specific wording as well as the overall tone of the warning message. The impact of making a moderate request compared with giving a direct instruction is of particular importance, for example “please drink responsibly” compared with “do not drink”. Equally, achieving a balance between clarity and comprehensiveness of the message is a particular challenge to be investigated.

We recognise the need for broad comparative trials to assess not only the ways in which a label effectively communicates a message, but also the efficacy of labels as a worthwhile public health intervention. Research indicates that the primary value of product labelling is to educate consumers and enhance choice. Furthermore, warning messages act to stimulate conversation around the important social and health issues that they raise. Whether an increased awareness about alcohol’s harms ultimately changes hazardous drinking behaviour is yet to be determined and would make the argument for mandatory standardised labelling even more compelling.

## Conclusions

New Zealand-produced alcoholic beverages are inconsistently labelled in terms of health warnings. There has been inadequate voluntary uptake of the New Zealand Legislative and Governance Forum on Food Regulation recommendations. The most common health warning displayed on New Zealand products were by far those related to pregnancy. Drink-driving warnings were found on only a third of beers and none of the wine and RTD containers, suggesting a major gap. None of the New Zealand products (apart from 2 of 15 RTDs) displayed nutritional information. Overall, when compared to international beers, New Zealand beers did not appear to differ significantly. Warning labels were small, generally not on the front of the container and only half had borders. We believe that standardised mandatory labelling that outlines alcohol related harm and provides specific guidelines for low risk drinking is required, and should be part of a larger multifaceted approach. This intervention is expected to raise awareness of hazardous drinking behaviour, empower individuals to make safe decisions, and facilitate the creation of a more moderate drinking culture in New Zealand.

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## Conflicts of Interest

None declared.

## Appendices

Table A1: Beer containers identified for 10 major brands of beers on the NZ market (see Methods).

| Country | Brand name | Bottles/cans |
|---|---|---|
| NZ | Bruer Beer Draught (DB) | Cans |
| NZ | DB – Export Gold | Bottles |
| NZ | Heineken Lager | Bottles |
| NZ | Lion Red | Bottles |
| NZ | Speights Gold Medal Ale | Bottles |
| NZ | Speights Summit Lager | Bottles |
| NZ | Steinlager Classic Lager | Bottles |
| NZ | Steinlager Pure Lager | Bottles |
| NZ | Stella Artois Lager | Bottles |
| NZ | Tui Beer (East India Pale Ale) | Bottles |

Table A2: Beer containers identified for imported beers on the NZ market (see Methods).

| Country | Brand name | Bottles/cans |
|---|---|---|
| ***European*** | | |
| 1. Austria | Zipfler | Cans |
| 2. Belgium | Hoegaarden Beer White | Bottles |
| 3. Czech Republic | Pilsner Urquell | Bottles |
| 4. Denmark | Kronenbourg 1664 | Bottles |
| 5. France | Brasserie Du Mont Blanc | Bottles |
| 6. Germany | Clausthaler Classic | Bottles |
| 7. Iceland | Einstök Icelandic White Ale | Bottles |
| 8. Ireland | Guinness | Cans |
| 9. Italy | Birra Moretti | Bottles |
| 10. Netherlands | Hollandia | Cans |
| 11. Poland | Tatra Bier | Bottles |
| 12. Russia | Baltika 7 | Cans |
| 13. Spain | Estrella Damm Barcelona | Bottles |
| 14. UK | Abbot Ale | Cans |
| 15. Ukraine | Obolon | Bottles |
| ***Americas*** | | |
| 16. Canada | Unibroue Blanche de Chambly | Bottles |
| 17. Mexico | Corona | Bottles |
| 18. USA | Budweiser lager premium | Bottles |
| ***Asia & Oceania*** | | |
| 19. Australia | Victoria Bitter (VB) | Cans |
| 20. China | Tsingtao | Bottles |
| 21. India | Godfather | Cans |
| 22. Japan | Asahi | Bottles |
| 23. Singapore | Tiger | Bottles |
| 24. Thailand | Singha | Bottles |

Table A3: Wines (both NZ and internationally imported) as found on Countdown online store, Wellington Central Location (see Methods).

| Country | Wine | Bottles |
|---|---|---|
| ***White wine*** | | |
| NZ | Cleanskin Sauvignon Blanc | 750ml |
| Australia | Banrock Station Chardonnay | 750ml |
| NZ | Longridge Pinot Gris | 750ml |
| NZ | Timara Chardonnay | 750ml |
| NZ | Corbans White Label Pinot Gris | 750ml |
| ***Red wine*** | | |
| Australia | Wolf Blass Eaglehawk Cabernet Sauvignon | 750ml |
| NZ | Corbans White Label Shiraz | 750ml |
| NZ | Gunn Estate Cabernet Merlot | 750ml |
| NZ | Saints Cabernet Merlot | 750ml |
| Australia | Hardys Merlot | 750ml |

Table A4: RTDs identified from LiquorLand New Zealand online store, Wellington Central Location (see Methods).

| Country | Brand name | 4 pack Bottles/cans |
|---|---|---|
| NZ | Black Heart and Cola 4.8% 330mL | Bottles |
| NZ | Codys and Cola 7% 300mL | Cans |
| NZ | Cruiser Ice 5% 275mL | Bottle |
| NZ | Gordons and Tonic 7% 250mL | Bottles |
| NZ | Jim Beam and Cola 4.8% 440mL | Cans |
| NZ | KGB Vodka and Lemon Ice 4.8% 275mL | Bottles |
| NZ | Long White Vodka Passionfruit 4.8% 320mL | Bottles |
| Australia | Midori Illusion 275mL | Bottles |
| NZ | Mudshake Chocolate 4% 270mL | Bottles |
| NZ | Seagers Gin and Tonic 7% 275mL | Bottles |
| NZ | Smirnoff Ice DB Guarana 7% 250mL | Cans |
| Australia | Southern Comfort and Cola 4.5% 330mL | Bottles |
| NZ | Sync Vodka Soda and Guarana 7% 250mL | Cans |
| NZ | Vault 88 Vodka Guarana 250mL | Cans |
| NZ | Woodstock and Cola 5% 440mL | Cans |

Figure A1: Corona® bottle – an example of relatively difficult to read warning label due to white text colouring set against a glass background


Figure A2: Prototype warning label combing all recommendations

# WARNING

DRINKING ALCOHOL DURING PREGNANCY INCREASES THE RISK OF BIRTH DEFECTS. PLEASE DO NOT DRINK IF YOU ARE PREGNANT OR COULD BE PREGNANT.

DRINKING ALCOHOL IMPAIRS YOUR ABILITY TO DRIVE A CAR AND OPERATE HEAVY MACHINERY. PLEASE DO NOT DRINK AND DRIVE.

DRINKING ALCOHOL CAN HAVE SERIOUS HEALTH EFFECTS INCLUDING INJURY, LIVER DISEASE AND CANCER. PLEASE DO NOT DRINK IN EXCESS.

Health Promotion Agency guidelines recommend you do not drink more than:

| | | |
|---|---|---|
| Men: | **3** standard drinks/day | **15** standard drinks/week |
| Women: | **2** standard drinks/day | **10** standard drinks/week |

www.alcoholsafety.org.nz

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