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# Enhanced Alcohol Container Labels: A Systematic Review

March 2022

# **Enhanced Alcohol Container Labels: A Systematic Review**

This document was published by the Canadian Centre on Substance Use and Addiction (CCSA).

Suggested citation: Hobin, E., Jansen, R., Vanderlee, L., & Berenbaum, E. (2022). *Enhanced alcohol container labels: A systematic review*. Ottawa, Ont.: Canadian Centre on Substance Use and Addiction.

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Production of this document has been made possible through a financial contribution from Health Canada. The views expressed herein do not necessarily represent the views of Health Canada.

This document can also be downloaded as a PDF at [www\(ccsa.ca](http://www(ccsa.ca)

Ce document est également disponible en français sous le titre :

*Un étiquetage amélioré des contenants de boissons alcoolisées : une revue systématique*

ISBN 978-1-77178-855-7



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All authors contributed substantially to this manuscript. Erin Hobin and Rachel Jansen contributed to the study idea and design. Erin Hobin, Rachel Jansen, Erin Berenbaum and the research team conducted article screening and data extraction. Erin Hobin, Rachel Jansen, Erin Berenbaum, and Lana Vanderlee wrote the report. Drs David Hammond and Francois Gagnon served as reviewers providing input into interpretation and revising the article. All authors approved the final version.

## Funding and Acknowledgements

Funding was provided by the Canadian Centre on Substance Use and Addiction (CCSA), through a financial contribution from Health Canada. The views expressed herein do not necessarily represent the views of Health Canada. Resources were provided by Public Health Ontario.

The authors and research team would like to acknowledge Public Health Ontario, Library Services, specifically Allison McArthur, for their assistance in planning and executing the systematic review. They would also like to thank Mia Miller and Alexandra Jones at the George Institute of Global Health for providing valued context and insight related to international alcohol container labelling policy proposals and discussions.



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# Executive Summary

## Key Messages

- Most countries, including Canada, exempt alcohol from the standards of container labelling required for either regulated psychoactive substances or packaged food, and in most cases do not require any nutrition information be present on the label.
- Available evidence indicates nutrition labels can improve consumers' ability to estimate the calorie content of alcoholic beverages and there is strong public support for mandatory alcohol container nutrition labels.
- There is inconsistent evidence for the effects of nutrition labels on intentions to purchase or consume alcohol and insufficient evidence to determine the impact of nutrition labels on levels of alcohol consumption.
- Alcohol container labels with health messages, standard drink information and drink limit guidelines are found to improve consumer knowledge of alcohol-related health and safety risks, are overall well supported by the public, and in some studies were shown to decrease intentions to purchase or consume alcohol and actual alcohol consumption.
- Implementation of enhanced alcohol container nutrition labels should be accompanied by high-quality, real-world evaluations to improve and inform future alcohol container labelling standards and policies.

## Background

Alcohol is a psychoactive substance that is widely consumed globally. It is a leading cause of premature death and disability, and an often overlooked and poorly understood source of calories among people who consume alcohol. Currently, most countries, including Canada, do not subject alcohol to the standards of container labelling required for either regulated psychoactive substances or packaged food, leaving consumers without basic product information. International public health organizations are recommending enhanced alcohol container labels, including labels with nutrition information, as a way to support more informed alcohol choices.

The Canadian Centre on Substance Use and Addiction (CCSA) commissioned a systematic review to investigate the impacts of alcohol container labels on consumer outcomes. Authors considered outcomes along an expected causal pathway, starting with exposure to alcohol container labels through to changes in alcohol consumption. This report primarily focuses on the findings from examining the impact of alcohol container labels with nutrition information on label attention and noticing; comprehension, perceived effectiveness and acceptance of nutrition label information; intentions to purchase or consume alcohol; and consumption behaviour. Systematic review findings of studies examining the impacts of alcohol container labels with health messages, standard drink information and drink limit guidelines are presented as secondary results.

This report is intended for a broad audience including professionals, policy makers, students, educators and researchers in the fields of public health, substance use and addiction, nutrition and obesity, alcohol regulation, and food and drink regulation, as well as members of the general public interested in the health impacts of alcohol use and alcohol control policies.



## Methods

A search for peer-reviewed literature was conducted in 10 electronic databases: MEDLINE, Embase, CINAHL, PsycINFO, Cochrane Central Register of Controlled Trials, Communication Abstracts, Scopus, Google Scholar, ProQuest Dissertation and Theses, and Northern Light Life Sciences Conference Abstracts. The original search was conducted in December 2019, then updated in May 2020 and again in December 2020. Inclusion criteria were published empirical studies available in English examining alcohol container labels with health messages, standard drink information, drink limit guidelines or nutrition information, including calorie, energy, nutrient and ingredients information. For this report, results focus on the studies examining alcohol container labels with nutrition information. The literature search also retrieved studies examining the other three label types and an overview of these results is provided as secondary results. Two authors independently screened titles and abstracts, screened full texts, conducted data extraction and conducted quality appraisals. Study quality was assessed using quality appraisal tools corresponding to the study design. Conflicts were resolved through discussion. Results were synthesized narratively.

## Results

Of the 62 articles (54 primary studies) included in the final sample of the full systematic review of alcohol container labels, 15 articles (14 studies) investigated labels with nutrition information, 45 articles (39 studies) investigated labels with health messages, 18 articles (15 studies) investigated labels with standard drink information, and 12 articles (eight studies) investigated labels with drink limit guidelines on alcohol containers. The number of articles by label type exceeds 62 because multiple studies assessed more than one label type, individually or in combination. Studies investigating labels with nutrition information examined label impact on outcomes along an expected causal pathway: two studies investigated label noticing and attention; two investigated label comprehension; five investigated preferences for and perceived effectiveness of labels; eight investigated support for, interest in and acceptance of labels; six investigated intentions to purchase or consume alcohol; and one study investigated consumption behaviour (eight studies reported on more than one outcome).

Methods used in these studies included online surveys, focus groups, lab-based shopping tasks using eye tracking technology, choice experiments and an *ad libitum* experiment where participants were invited to drink as much or little as they preferred from served alcohol in a limited time period. No real-world evaluations examining the impact of alcohol container nutrition labels have been published. Studies were conducted in a range of countries, including two studies in Canada assessing public support for mandatory alcohol container nutrition labels.

Results suggest alcohol container nutrition labels support individuals' awareness of and ability to estimate calorie content in alcoholic drinks. Results also show strong public support for mandatory alcohol container nutrition labels, with high levels of support for labels providing calorie information and ingredient lists. However, studies indicate alcohol container nutrition labels were associated with no difference or increases in purchase and consumption intentions for lower-calorie alcohol options. Only one study tested the provision of calorie information labels on alcohol consumption and it found no evidence of an effect.

Studies investigating alcohol labels with health messages, standard drink information and drink limit guidelines were also conducted in a range of countries and used a wide variety of study designs, including real-world quasi-experiments. They examined label impact on multiple outcomes including label noticing and attention, knowledge of label information, support for labels, intentions to



purchase or consume alcohol, and consumption behaviour. A key finding from studies examining the impact of health message labels is these labels can increase participants' knowledge and awareness of alcohol-related health risks, including cancer. Studies investigating labels with standard drink information indicate these labels support consumers' ability to accurately estimate the number of standard drinks in a container. Studies investigating alcohol labels with drink limit guidelines show consistent increases in consumer knowledge and awareness of national drink limit guidelines. Results across studies investigating the impact of labels with health messages, standard drink information and drink limit guidelines on participants' intentions to consume alcohol and actual consumption behaviour suggest labels had either a null effect or decreased intentions or consumption. Overall, studies investigating support for any of the four label types included in this review found participants' support for enhanced labelling was consistently strong.

## Conclusions

Although only a small number of studies examining alcohol container nutrition labels have been published in the empirical literature, the evidence consistently indicates that the public supports requiring nutrition information labels on alcohol containers. Results also suggest these labels can improve consumers' ability to estimate the calories in alcoholic beverages and increase transparency by ensuring consumers have access to complete information on the content of alcohol products they consume. The impact of nutrition labels on intentions to purchase or consume alcohol are inconsistent, and there is insufficient evidence to determine the impact on actual alcohol consumption.

Alcohol container labels with health messages, standard drink information and drink limit guidelines have been found to improve consumer knowledge of alcohol-related health and safety risks, are overall well supported by the public, have shown potential to decrease intentions to purchase or consume alcohol and actual alcohol consumption, and could be considered as complements to alcohol container nutrition labels. Implementation of enhanced alcohol container labels should be accompanied by high-quality, real-world evaluations to continue to improve and inform alcohol container labelling standards and policies.



# Introduction

## Impact of Alcohol on Health

Globally, alcohol is regularly consumed by 2.4 billion people and the overall health burden related to alcohol consumption is considerable.<sup>1,2</sup> Alcohol is the leading risk factor for premature death and disability among those ages 15 to 49, and the seventh leading risk factor for premature death and disability across all age groups.<sup>1</sup> Consumption of alcohol is causally associated with over 200 acute and chronic health conditions including liver disease, cardiovascular disease, at least seven types of cancers, injuries, violence and mental illness.<sup>1-3</sup>

Alcohol is also commonly overlooked as a source of calories by those who consume it. One gram of alcohol contains seven calories; of the dietary macronutrients, this is less than the nine calories in a gram of fat, but greater than the four calories per gram in both carbohydrates and proteins.<sup>4</sup> Nationally representative data indicate alcohol is among the top five contributors to total calorie intake among Canadian adults and contributes more than 10 percent of daily total calorie intake among adults who consume alcohol in Canada, the United Kingdom and the United States.<sup>5-8</sup> The specific mechanistic relationships between alcohol consumption and weight status are complicated and many contributing factors remain unclear; however, some evidence suggests higher alcohol consumption may be associated with increased risk for overweight and obesity.<sup>7,9,10</sup>

Dietary guidance in Canada and other countries including Australia and New Zealand recommends limiting alcohol consumption as an approach to balance energy intake and expenditure, thereby promoting healthy weight and reducing risk for chronic diseases related to overweight and obesity.<sup>11-13</sup> However, regulations in Canada and in most countries internationally do not mandate calorie or nutrition information to be disclosed on alcohol container labels.<sup>3,14-17</sup> Evidence suggests people who consume alcohol are largely unaware of the calorie content of alcoholic beverages, may pay less attention to liquid calories compared to food calories and typically consume alcohol in addition to rather than instead of other dietary sources of calories. This lack of knowledge and awareness can result in overall increased caloric intake and may contribute to unhealthy weight gain.<sup>18-23</sup> Alcohol represents a calorie-dense and nutrient-deficient product that is widely consumed and contributes to substantial morbidity and mortality.<sup>1-4</sup>

## Alcohol Container Labels in Canada

The debate about the categorization of alcohol as a food or as an addictive psychoactive substance continues. Pragmatically, it is a dual-purpose product that functions as both, but in Canada and in most countries alcohol is not subject to the rigorous labelling requirements for either packaged foods or regulated psychoactive substances, such as tobacco and cannabis.<sup>3,14-17,24</sup> The current lack of information on alcohol container labels leaves those who consume alcohol without basic product information about its composition or the potential health risks of consuming it. Insufficient and inconsistent information on alcohol container labels limits consumers' ability to make informed decisions about their alcohol consumption and contributes to low levels of alcohol health literacy. Some public health experts argue for requiring enhanced alcohol labels based on the consumers' right to know the composition of and risks associated with regulated products they consume and that this type of information is not adequately provided to people who consume alcohol.<sup>3,17,24,25</sup>

The Government of Canada's alcoholic beverage labelling requirements, most recently modified in January 2020, require alcohol container labels to include an alcohol-by-volume declaration and a



declaration of specific additives, if applicable.<sup>14</sup> Alcohol container labels are not required to display health messages, standard drink information, national drink limit guidelines or, except in few specific scenarios, nutrition information. While nutrition facts labels and ingredient lists are required on nearly all packaged food and non-alcoholic beverages, alcoholic beverage labels are generally exempt. The exceptions are when alcohol is mixed with other ingredients such as juice, milk or cream, in which case ingredients must be listed, or when an alcohol product contains artificial sweeteners or when the packaging or advertising specifically refers to the nutrition or calorie content of an alcoholic beverage (e.g., “0 sugar”, “80 calories”), in which case a nutrition facts label must be displayed.<sup>14</sup>

There are no regulations preventing alcohol labels from carrying nutrition information or other health information, and Canadian provincial and territorial authorities can impose additional alcohol container label requirements or restrictions.<sup>14,26</sup> For example, Yukon and the Northwest Territories require post-manufacturer warning labels about the risks of drinking during pregnancy and caution against drinking when driving or operating machinery.<sup>27</sup> However, the 10 provinces and Nunavut do not require labelling beyond the national mandates.<sup>27</sup>

Providing nutrition information on alcohol containers is one strategy to ensure consumers have access to consistent and complete information on the content and composition of alcohol products they consume.<sup>17,24,28</sup> Nutrition information is required on packaged foods in many countries including Canada to assist consumers in comparing the nutrient value of foods and to make more informed food choices.<sup>29</sup> Review evidence indicates consumers view nutrition facts labels as a credible source of nutrition information, and reading the nutrition facts label is associated with healthier diets, including lower calorie intake.<sup>29,30</sup> Most Canadians (60%) report reading the nutrition facts label on a regular basis to compare and select foods, with use being particularly high among women, people who identify as White, people with higher income and education levels, and people with health or weight concerns.<sup>31</sup> There is also evidence to suggest that some consumers have limited knowledge of daily calorie requirements and find understanding and using nutrition labels on food packages challenging; education campaigns running alongside nutrition labels can mitigate these challenges.<sup>29,32,33</sup>

## International Alcohol Container Label Practices and Guidance

Minimal alcohol container label requirements are not unique to Canada. There are currently no international standards for alcohol container labels, and mandatory nutrition labelling on alcohol containers is rare internationally. Of the 194 World Health Organization (WHO) member states, 43 countries require some type of nutrition information (e.g., calories, additives, vitamins, micro elements) on alcohol container labels, but the requirements often vary by beverage type.<sup>25</sup> The current Codex Alimentarius (Codex) food labelling standards, which include global recommendations for nutrition labelling, exclude recommendations for alcohol labelling. However, this gap was recently addressed in a 2019 Codex discussion paper on labelling alcoholic beverages.<sup>34</sup> The discussion paper recommended new work to provide clarity on if and how existing international food labelling guidelines apply to alcoholic beverages and to consider labelling alcoholic beverages with standardized nutrition information, including energy values.<sup>34</sup>

Since the publication of the discussion paper, national and international health and consumer organizations have released recommendations for enhanced alcohol container labels. For example, the WHO European Regional Office published reports encouraging policies mandating alcohol container labels with health messages plus a list of ingredients and nutrition information (e.g., calorie content).<sup>3,17</sup> Most recently, the European Commission proposed mandatory ingredient



lists and nutrition declarations on all alcoholic beverages by the end of 2022 and mandatory health warning labels on all alcoholic beverages by the end of 2023.<sup>35</sup> As of 2021, federal governments in the United Kingdom, Australia and New Zealand have planned or launched consultations to discuss mandatory alcohol labels with calorie information. In 2018 a bill was passed (but not yet implemented as of March 2021 due to industry opposition) in Ireland requiring alcohol container labels to include health warnings and energy content.<sup>36-38</sup>

Voluntary commitments to label alcohol with nutrition information have been made by stakeholders in the alcohol industry.<sup>39-41</sup> Evidence from the United Kingdom suggests voluntary commitments by the alcohol industry have not led to meaningful changes to calorie information for alcohol products sold to consumers.<sup>39,42</sup> It is prudent and realistic to anticipate that industry-controlled voluntary commitments will be strategically implemented to align with marketing aims, and will not consistently or sufficiently communicate information to consumers about calories and nutrition or any negative health consequences of alcohol products.<sup>43-46</sup> This concern is highlighted by the WHO Health Evidence Network policy considerations to address barriers to the development and implementation of alcohol labelling, which favour mandatory regulations over voluntary commitments to ensure more consistent label messaging and implementation.<sup>17</sup>

The 2020 WHO *Working Document for Development of an Action Plan to Strengthen Implementation of the Global Strategy to Reduce the Harmful Use of Alcohol* describes specific targets, indicators and proposed actions to be implemented during the period 2022 to 2030, including actions related to alcohol container labels.<sup>47</sup> The action plan proposes that member states “ensure appropriate consumer protection measures through the development and implementation of labelling requirements for alcoholic beverages which display essential information on ingredients, caloric value and health warnings.”<sup>47</sup> The plan also proposes that the WHO Secretariat “develop the international standards for labelling of alcoholic beverages to inform consumers about the content of the products and the health risks associated with their consumption.”<sup>47</sup> Overall, increased motivation is evident among national and international organizations to address the lack of clear and consistent consumer information on alcohol container labels.

## How Alcohol Container Labels Are Expected to Work

Alcohol container labels provide a unique communication channel to consumers. People who drink alcohol are exposed to label messages at key points of contact: the point-of-purchase and the time of pouring.<sup>48</sup> Labels are also a relatively cost effective and sustainable measure for governments to implement.<sup>48</sup>

Drawing from models of information processing and principles of attitude and behaviour change, several conceptual frameworks have been developed to understand how product labelling can influence consumers’ perceptions and behaviours.<sup>49-52</sup> These frameworks and models indicate an expected causal pathway in the assumed relationship between an exposure and an outcome, and include the intermediate or proximal factors that are expected to be affected in the relationship.<sup>49-52</sup>

In this report, the expected causal pathway is used to evaluate the potentially causal relationship between exposure to alcohol container nutrition labels and the various factors assumed to be influenced and that eventually lead to observed changes in alcohol consumption. If the exposure does not have the expected effect on the final outcome, examining the intermediate or proximal factors helps to understand where the breakdown in the relationship between exposure and outcome may have occurred and how potentially it can be corrected. To be effective, consumers need to be adequately exposed to and aware of labels, recall label information, understand and process label information, adjust perceptions of the product, and consider label information and

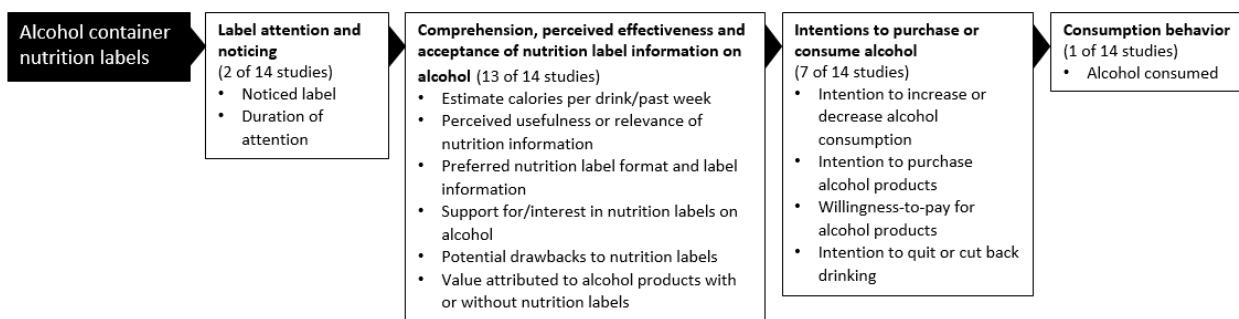


adjusted perceptions when making decisions at the time of purchase or consumption. Outcomes along the causal pathway are also influenced by factors at the individual level, such as prior health beliefs and knowledge, and the context in which products are being purchased or consumed.<sup>49-52</sup>

The body of evidence investigating the effects of alcohol container labels on consumer outcomes is growing, with several articles published in the past five years. Alcohol is a distinct dual-purpose product that operates as a food and as an addictive psychoactive substance, but is not subject to the same rigorous labelling requirements for either.<sup>3,14-17</sup> Research on front-of-package food nutrition labelling describes labels that “cut through” other packaging design elements and marketing, that are visually attended to, and that help consumers identify nutritious products and discourage the purchase of less nutritious products.<sup>50</sup> Additionally, tobacco packaging research shows labels on the front of cigarette packages, which are large in size with specific health messages that rotate and contain full colour graphic negative images, influence behaviour by gaining consumers’ attention, eliciting aversive reactions and keeping the message in consumers’ minds.<sup>53,56</sup>

Figure 1 presents a conceptual model illustrating the expected relationship between effective alcohol container nutrition labels and outcomes along the causal pathway. This report’s authors adapted the model from existing models for effective package labelling on food and tobacco products.<sup>49,50</sup>

**Figure 1: Conceptual model of expected causal pathway for effective alcohol container nutrition labels, including number of studies and outcomes within each construct**



## Existing Evidence

A growing body of research investigating enhanced labels on alcohol containers exists, including two previously conducted systematic reviews examining alcohol container labels.<sup>57,58</sup> A review conducted by Hassan et al. (2018) included studies examining alcohol container labels with health messages or warnings published between January 2000 to October 2015; and a review conducted by Wettlaufer (2018) included studies examining alcohol container labels with standard drink information published from January 1990 to January 2016. Both reviews concluded that more research evidence was needed to determine the impact of alcohol container labels with health messages and standard drink information on the behaviour of people who consume alcohol. Neither review included studies examining alcohol container labels with nutrition information.<sup>57,58</sup>

The only known review of evidence examining nutrition information labels on alcohol containers is a recently published rapid systematic review by Robinson et al. (2021, digitally published ahead of print), which did not apply date limits and searched up to October 2020.<sup>23</sup> Influenced by the government of the United Kingdom’s announcement that it would consult on mandatory calorie labelling of alcoholic drinks as part of its public health strategy to reduce obesity, the rapid review



focused on three outcomes related specifically to the energy content of alcohol: consumer knowledge of energy content in alcoholic beverages, consumer support for energy labelling on alcoholic beverages, and the effects of energy labelling on drinking intentions and behaviours. The review included 16 studies from both the grey and peer-reviewed literature. Results showed consumers tended to be unaware of the energy content in alcohol and were likely to support energy labelling on alcoholic beverages. Results also showed that energy labelling did not significantly influence outcome measures related to alcohol drinking, although this finding was supported by primary studies with substantial methodological issues.<sup>23</sup>

## Objectives

The primary objective of this report is to systematically review published empirical studies investigating the impacts of nutrition information on alcohol container labels on key outcomes along the expected causal pathway: label attention and noticing; comprehension, perceived effectiveness and acceptance of nutrition label information; intentions to purchase or consume alcohol; and consumption behaviour. This report complements the results of the rapid review by Robinson et al. (2021, digitally published ahead of print)<sup>23</sup> by including studies examining alcohol container labels with calorie information plus other types of nutrition information, such as nutrition facts labels and ingredient lists, and by including studies examining nutrition label impacts on outcomes along the full expected causal pathway for effective product labels. Moreover, this report is written from a Canadian perspective.

The secondary objective is to systematically review published empirical studies investigating alcohol container labels with health messages, standard drink information and drink limit guidelines. The report provides a brief overview describing the evidence investigating these three label types in the secondary results section, and Appendix I, Tables 2–4 include detailed characteristics of included studies.

This report is intended for a broad audience including professionals, policy makers, students, educators and researchers in the fields of public health, substance use and addiction, nutrition and obesity, alcohol regulation, and food and drink regulation, as well as members of the general public interested in the health impacts of alcohol use and alcohol control policies.



## Methods

A systematic review was conducted to synthesize primary studies examining alcohol container labels with nutrition information, health messages, standard drink information and drink limit guidelines. This report primarily presents a subset of the systematic review findings focused specifically on the effects of alcohol container nutrition labels on label attention and noticing; comprehension, perceived effectiveness and acceptance of nutrition label information; intentions to purchase or consume alcohol; and consumption behaviour (Figure 1). The protocol for the full systematic review was pre-registered on PROSPERO (registration number CRD42020168240).

### Search Strategy

Electronic searches were conducted using 10 databases during the week of December 16, 2019. The following 10 databases were searched: MEDLINE (Ovid), Embase (Ovid), CINAHL (EBSCOhost), PsycINFO (Ovid), Cochrane Central Register of Controlled Trials (EBSCOhost), Communication Abstracts (EBSCOhost), Scopus (Elsevier), Google Scholar (Google), ProQuest Dissertation and Theses (ProQuest), and Northern Light Life Sciences Conference Abstracts (Ovid). A date limit of 1989 to present was applied to the search because mandatory alcohol warning labels were first implemented in the United States in 1989. Search results were limited to articles published in English. Search strategies were appropriately translated for each database. Our search approach retrieved articles containing at least one search term (subject heading, title keyword, natural language descriptor or abstract keyword) related to the concept of alcoholic beverages and one search term related to the concept of labelling. Medical Subject Headings related to alcoholic beverages included Alcoholic Beverages (including all narrower terms) or Alcohol Drinking. Natural language keyword terms related to alcoholic beverages included alcohol, ethanol, beverage, drink, alcopop, wine, beer, spirits, or liquor. Medical Subject Headings related to labelling included Product Labeling, Product Packaging, Drug Packaging, Drug Labeling, Food Packaging or Food Labeling. Natural language keyword terms related to labelling included label, decal, sticker, pictogram, graphic or infographic. The results from all databases were integrated and duplicates removed.

This search was updated using identical search terms and procedures during the week of May 5, 2020, and again the week of December 17, 2020. In response to peer review feedback in March 2021, a supplemental validation search was conducted in MEDLINE using natural language keyword terms related to nutrition information to ensure that all relevant studies on this topic were captured by the original search. This identified 25 records, none of which met the inclusion criteria for this review. Full search strategies for all databases are available in Appendix II. Reference lists of articles included after full-text screening were hand-searched for relevant articles and two authors independently screened relevant articles for inclusion. Finally, authors also accepted suggestions for evidence related to alcohol container labels from expert peer-reviewers.

### Eligibility and Selection

To be included in this report, a study had to examine alcohol container labels with nutrition information. Studies could assess outcomes ranging from label noticing and awareness to actual alcohol consumption, include alcohol consumers and non-consumers, include participants of any or all ages (e.g., adults, university students, adolescents), and alcohol container labels could be compared to no labels or different versions of alcohol container labels. Articles reporting the studies had to be available in English due to the capacity of the research team. Primary empirical studies were not limited by design; this systematic review included experimental, quasi-experimental,



observational and qualitative studies. Articles were excluded from this report if they were not an empirical study published in an academic journal (e.g., editorials, letters, commentaries, protocols, conference abstracts or proceedings, student theses, or grey literature) or examined the impact of nutrition information provided off-label (e.g., websites, in-store advertisements and restaurant menus). Studies evaluating alcohol container labels with health messages, standard drink information and drink limit guidelines were also identified using identical search terms and procedures described above, with additional criteria limiting inclusion to studies published from 2015 onwards to complement and expand upon the previously completed reviews by Hassan et al. (2018) and Wetlaufer (2018).<sup>57,58</sup> Results are briefly described in this report and study characteristics tables are included in Appendix I, Tables 2–4.

Two authors independently screened titles and abstracts and subsequently full-text manuscripts for inclusion. Any discrepancies were resolved by discussion between authors.

## Data Extraction

For all included articles, the authors, year of publication, country where study was conducted, study design and methods, sample characteristics and size, alcohol container label characteristics, outcome measures and key results were extracted. Extraction was completed independently by two authors and entered into a spreadsheet for ease of comparison and synthesis. Any discrepancies were resolved by discussion among the authors.

## Quality Appraisal

Because eligible studies varied in study design, two authors independently assessed each manuscript using quality appraisal tools corresponding to the study design to determine study quality and risk of bias. The Meta Quality Appraisal Tool (MetaQAT) was used to select the appropriate appraisal tool for each relevant study design.<sup>59</sup> The Effective Public Health Practice Project (EPHPP) was used for experimental and quasi-experimental studies, the Critical Appraisal Skills Program (CASP) was used for qualitative studies, the Newcastle–Ottawa Quality Assessment Scale (NOS) was used for cross-sectional and interrupted time-series studies, and the Mixed Methods Appraisal Tool (MMAT) was used for mixed methods studies.<sup>60–63</sup> All studies were given a final rating of weak, moderate or strong based on the criteria of the applicable appraisal tool. Any discrepancies were resolved by discussion between authors, and decisions on final ratings were made through consensus. Final quality appraisal ratings of included papers are reported in Appendix I, Table 1, and further details of the ratings are found in Appendix III.

## Synthesis

Due to the anticipated heterogeneity in study designs and outcome measures, meta-analysis was not planned or conducted.

Findings from studies investigating nutrition information labels on alcohol containers are presented in table format, along with narrative synthesis of results at the outcome level. Acknowledging the strengths and limitations of varying study designs regarding their capacity to provide evidence of intervention impact, studies that employed experimental or quasi-experimental designs were granted greater consideration in the summary of results. Studies that employed observational or qualitative designs provide evidence of association or explore preferences and perceptions, but do not demonstrate impact of label interventions and are included to provide contextual and descriptive information.



# Results

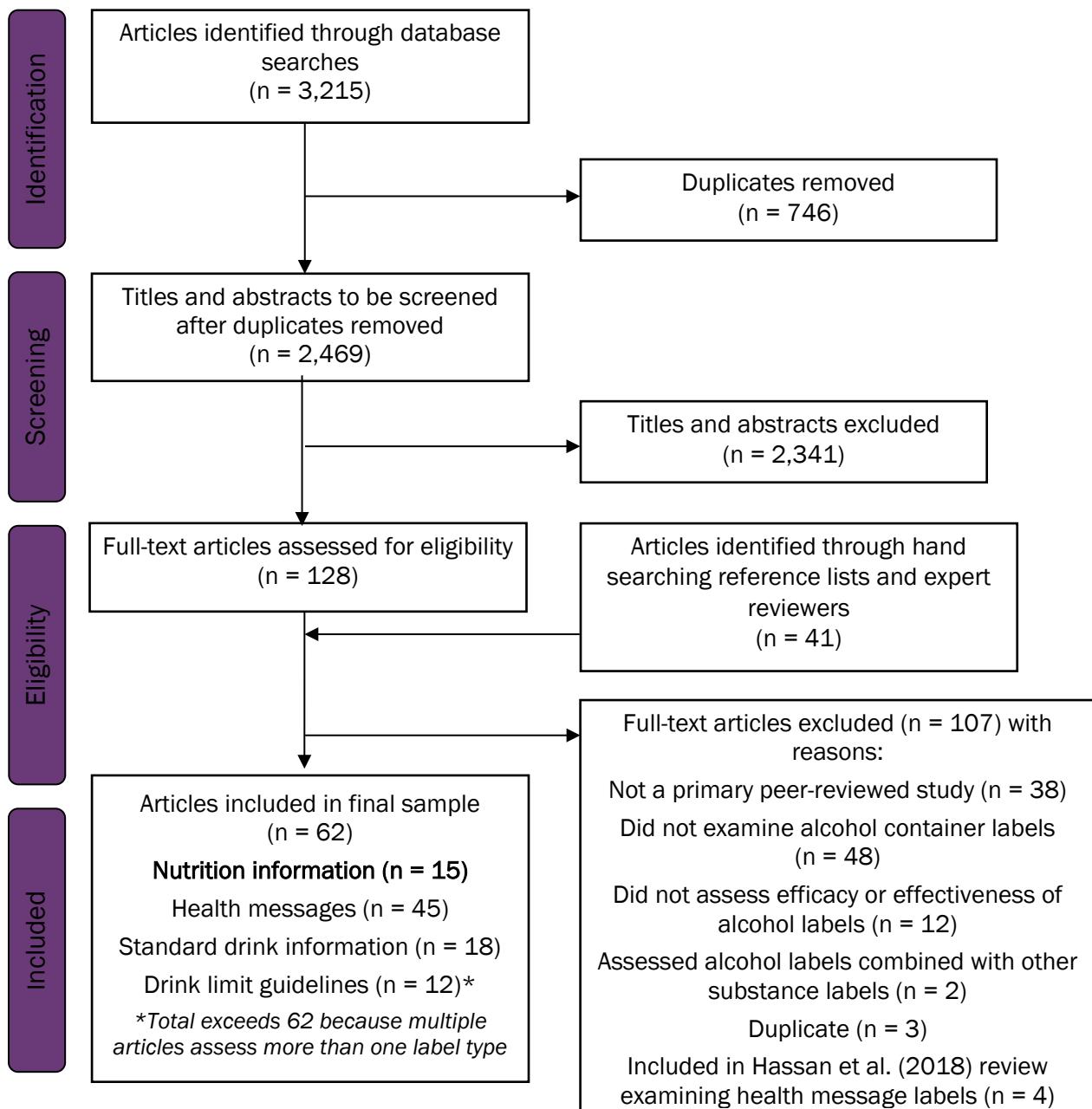
## Overview

The initial search in December 2019 identified 2,787 records; the two search updates in May 2020 and December 2020 identified 207 and 196 records respectively; and the supplemental validation search in March 2021 identified 25 records, for a total of 3,215 records identified from the library searches. After removing 746 duplicates and screening title, abstract and full text for inclusion, a total of 59 articles (51 studies) were included in the systematic review addressing the four alcohol container label types. An additional 39 potentially relevant titles were identified through hand searching the reference lists of articles included after full-text review and two articles were identified through discussion with expert peer-reviewers. After screening the additional 41 articles, three articles met the inclusion criteria for a final sample of 62 articles (54 studies). The study selection process is presented in Figure 2.

Of the 62 articles in the final sample, 15 articles (14 studies) examined alcohol container labels with nutrition information, 45 articles (39 studies) examined labels with health messages, 18 articles (15 studies) examined labels with standard drink information, and 12 articles (eight studies) examined labels with drink limit guidelines on alcohol containers. The number of articles by label type exceeds the total number of articles in the final sample because multiple studies assessed more than one label type, individually or in combination. This report will primarily focus on the subset of 15 articles (14 studies) that examined alcohol container labels with nutrition information. To the best of our knowledge, the studies included in this review have not received direct funding from the alcohol industry; however, some studies did not declare their funding sources. When available from full-text manuscripts, studies' funding sources were extracted and are reported in Appendix I, Tables 1–4.



Figure 2: Study selection





## Primary Results: Alcohol Container Labels with Nutrition Information

### Study Characteristics

Of the 15 articles (14 studies) examining alcohol container labels with nutrition information, seven studies employed an experimental design,<sup>64-70</sup> four studies used a cross-sectional design,<sup>71-75</sup> two studies incorporated mixed methods,<sup>76,77</sup> and one study used a qualitative approach.<sup>78</sup> Common weaknesses of the seven experimental articles were related to the study design, not adequately addressing confounders, reliability or validity of the data collection tools, or withdrawals/loss to follow-up. Common weaknesses in the five cross-sectional articles were lack of justification for sample size and lack of description of non-responders. Common strengths of cross-sectional studies included representativeness of the sample and appropriate outcome assessments and analyses. Weaknesses of the two mixed methods articles included inadequate descriptions of the methodology for quantitative study components, inadequate description of how qualitative and quantitative findings were integrated, and one study provided inadequate integration of qualitative and quantitative findings. The one qualitative study included in this review was rated as strong in quality, but did not explicitly address the relationship between researchers and participants and how this may affect the results, and did not adequately explore how the research contributed value to the topic. Final quality appraisal ratings are listed in Appendix I, Table 1 and the details of the quality appraisals for all included articles can be found in Appendix III.

Of the 15 articles (14 studies) that investigated alcohol container labels with nutrition information, two studies were conducted in Italy,<sup>70,71,73</sup> three in the United Kingdom,<sup>64,68,76</sup> two in the United States,<sup>65,67</sup> one in Columbia,<sup>66</sup> one in Germany,<sup>78</sup> one in Australia,<sup>77</sup> one in Canada,<sup>74</sup> and three included participants from multiple countries,<sup>69,72,75</sup> including Canada. Sample characteristics varied across the included studies: six studies recruited adults who regularly consumed alcohol,<sup>64,69-73,78</sup> one recruited adults from the general population,<sup>75</sup> two recruited adolescents and young adults from the general public,<sup>74,77</sup> two recruited young adult university students,<sup>65,68</sup> two recruited students and staff from university settings,<sup>66,76</sup> and one study recruited both university students and community members who regularly drank alcohol.<sup>67</sup>

The nutrition labels investigated in the 14 studies also varied by format and content. Seven studies examined associations with or exposure to nutrition labels containing calorie content per serving information, a detailed nutrition facts label per serving or 100mL, and/or an ingredient list.<sup>69-73,75-77</sup> Four studies exclusively investigated nutrition facts labels;<sup>65,67,74,78</sup> two studies included only calorie content per serving information on labels;<sup>64,68</sup> and one study did not specify the details of the nutrition information provided on labels.<sup>66</sup> Seven studies used back label conditions,<sup>65,69-73,76,78</sup> four studies asked about support for or interest in nutrition label messages but did not present a visual representation;<sup>64,74,75,77</sup> one study did not specify the location of labels on the alcohol containers;<sup>66</sup> two provided nutrition information immediately adjacent to but not on the actual product (e.g., a place card provided with beverage or an image of a nutrition facts label beside an image of a beer container);<sup>67,68</sup> and no study specified nutrition information was tested on front labels. Further details of study characteristics for the 15 articles examining alcohol container nutrition labels are presented in Appendix I, Table 1. Six of 15 articles provided images of the nutrition labels being investigated and these images are presented in Appendix IV.<sup>65,67,69,70,73,78</sup>



## ***Label Noticing and Attention***

Two studies examined consumer noticing of or attention to nutrition information or ingredient lists on alcohol container labels and found participants paid little attention to this information.<sup>76,78</sup> Strengths of the evidence informing this outcome are the consistent direction of results across both studies, and the direct measures of noticing and attention, while limitations include the small sample sizes, the variation in exposures and lack of statistical analyses.

Roderique-Davies et al. (2020) conducted a mixed methods study in the United Kingdom, including a mock shopping task using eye tracking technology to measure the time spent gazing at different label components on alcohol containers, such as ingredient lists, standard drink information and health messages, brand or logo information, and product descriptions.<sup>76</sup> Among the 25 adult participants, results showed little attention was paid to ingredient lists (mean gaze time = 0.57 milliseconds) and standard drink information and health messages (mean gaze time = 0.25 milliseconds) on container labels. In comparison, brand or logo information (mean gaze time = 27.24 milliseconds) and product descriptions (mean gaze time = 6.18 milliseconds) on labels were given more attention; however, statistical significance was not tested for this outcome.<sup>76</sup>

Pabst et al. (2019) conducted qualitative focus groups with 21 adults in Germany who consumed wine at least twice per month.<sup>78</sup> Participants were shown four wine bottles, each with a different label on the back, and asked to choose their preferred bottle and discuss their decision making. The four wine labels included 1) a real-world label with percent alcohol by volume (12.5%) and allergen information, and three study-designed detailed nutrition labels: all three labels included calories, alcohol, fat, carbohydrates, protein and salt per 100mL; 3) also include a condensed ingredient list; and 4) also included an extensive ingredient list. Based on authors' review of the focus group video recording, 81% of participants at least quickly scanned the back labels, but only 35% of those who scanned the label reported noticing nutrition or ingredient information when prompted. When not prompted, 29% of participants reported noticing the nutrition or ingredients information on the label.<sup>78</sup>

## ***Comprehension, Perceived Effectiveness and Acceptance of Labels***

### **Comprehension (Calorie Estimation)**

Two experimental studies investigated the impact of nutrition labels on participants' estimates of the calorie or nutrient content in alcoholic beverages, and found labels can improve the accuracy of the estimates.<sup>65,68</sup> Strengths of the evidence informing this outcome are the consistent direction of results and use of experimental study designs, while limitations include the small number of studies and variation in outcome measures used across studies.

Maynard et al. (2018) used a between-subjects design with 265 university student participants who consumed alcohol socially to test labels with calorie information, unit information, both calorie and unit information, and no calorie or unit information.<sup>68</sup> The experiment was presented as a "taste test" conducted in a bar laboratory setting on a university campus in the United Kingdom. Participants could drink as much or as little as they liked from two half-pint glasses of beer in a 10-minute period. Participants in the treatment condition were exposed to calorie and/or unit information (e.g., 128 calories, 1.4 units) and product information (e.g., origin) on place cards provided adjacent to the glasses of beer. Participants in the control condition were provided place cards with product information but no calorie or unit information. Place cards were provided in envelopes to blind the experimenter to the condition allocated to participants. Participants were



informed the envelopes contained information about the beers they were served. The beers and place cards were removed after 10 minutes, then participants completed a short survey in which they were asked to estimate the calorie content per half-pint of beer. Participants exposed to the calorie information estimated fewer calories per half-pint of beer compared to participants not exposed to calorie information (170.17 calories vs 256.70 calories,  $F(1,260) = 18.29$ ,  $p < 0.001$ ). A greater percentage of participants exposed to calorie information during the test were able to estimate the calorie content per half-pint of beer within 15% of the true value compared to those exposed to no calorie information (53.0% vs 10.6%, statistical significance was not reported); 36.4% of participants exposed to calorie information estimated the exact calorie content, and 0% of participants exposed to no calorie information were able to estimate the exact calorie content.<sup>68</sup>

Bui et al. (2008) used a within- and between-subjects experimental design to test 230 American university students' perceptions of the calorie and nutrient content of wine, distilled spirits, light beer and regular beer when exposed to a nutrition facts label compared to no nutrition facts label.<sup>65</sup> Participants in the treatment condition viewed an image of an alcohol container with a nutrition facts label, and those in the control condition viewed an image of an alcohol container label with alcohol by volume information but no nutrition information. Participants' perceptions of calories they consumed from alcoholic drinks over the past week were assessed. Participants exposed to the nutrition facts label estimated significantly more calories per drink consumed compared to the control condition (mean calorie estimate per drink = 108.3 vs 87.3,  $p < 0.05$ ). Participants in the treatment condition also estimated significantly more total calories consumed from all alcoholic drinks in the past week compared to the control condition (mean total calorie estimate = 1,373 vs 1,072 calories,  $p < 0.01$ ). In the same study, participants rated their perceptions of the calorie, carbohydrate and fat content of wine, distilled spirits, and regular and light beer on a nine-point scale from "very low" to "very high." Participants in the treatment condition perceived significantly lower calorie content in wine compared to the control condition (mean rating = 4.81 vs 5.57,  $p < 0.05$ ), but the treatment condition did not significantly affect calorie perceptions for distilled spirits, light beer or regular beer. Participants in the treatment condition perceived all four alcohol types to contain significantly lower fat content compared to the control condition: light beer (3.35 vs 4.12), regular beer (4.00 vs 5.42), wine (2.91 vs 4.02) and distilled spirits (2.96 vs 3.92,  $p < 0.001$  for all). Participants in the treatment condition perceived significantly lower carbohydrate content in wine (4.41 vs 5.62,  $p < 0.001$ ) and distilled spirits (3.41 vs 5.14,  $p < 0.001$ ), but the treatment condition did not significantly affect carbohydrate perceptions for regular beer and light beer.<sup>65</sup>

## Preferences for and Perceived Effectiveness of Nutrition Labels

Five studies assessed participants' preferences for and perceived effectiveness of nutrition labels on alcohol containers. Results across studies were mixed.<sup>67,71-73,76,78</sup> The evidence informing this outcome provides valuable descriptive and contextual findings, and the limitations include the wide variation in outcome measures and inconsistency in results across studies.

Martinez et al. (2015) conducted three small sub-studies in the United States, one of which was a cross-sectional study assessing participants' preferences for nutrition label information on alcohol and food packages.<sup>67</sup> Using an online survey, 191 adults who reported they consumed alcohol were shown images of the following products: bottles of beer, wine, vodka and soda, and a slice of cheese pizza. Each product was presented with four different labels: 1) no label, 2) an accurate nutrition facts label, 3) a nutrition facts label with increased vitamin C, and 4) a nutrition facts label with reduced calories. Preferences were measured using count variables that summed individuals' rated preferences for the types of label information that accompanied each product. Participants were also asked to openly write their opinions about the labels. Most participants (87%) preferred both alcohol



and food products with nutrition labels versus no labels. Results also revealed participants believed the benefits of nutrition labels on alcohol products included increased awareness of the calories being consumed, and supporting consumers to be better informed and make healthier choices. Some potential drawbacks of nutrition labels on alcohol containers were reported, including one participant stating nutrition labels could falsely lead consumers to believe there is nutritional value in alcohol or cause “young and irresponsible” people to rationalize that drinking is somehow good for them. Overall, participants reported a greater number of benefits than drawbacks.<sup>67</sup>

Annunziata et al. (2016a) conducted a cross-sectional study that surveyed 1,116 participants of legal drinking age in Italy, France, Spain and the United States who consumed wine at least once a month.<sup>72</sup> Participants viewed 10 wine bottle back labels designed for the study that varied in the amount of nutrition information displayed: 1) no nutrition information, 2) an icon with calorie content per glass, or 3) a nutrition facts label with percentage of guideline daily amounts. Labels also varied in price, health message and drink limit guideline information. Results demonstrated participants in Italy and Spain preferred a simplified label with calorie content per glass, and participants in the United States preferred labels with a nutrition facts label. Participants in the United States also assigned the greatest utility to nutrition information on wine (compared to health message and drinking guideline information), whereas participants in France assigned the least utility to nutrition information on wine. The cluster of participants who indicated higher utility for nutrition information followed by health messages on wine labels (22% of total sample) mainly comprised middle-aged women (ages 35–55) with higher levels of education.<sup>72</sup>

A separate cross-sectional study by Annunziata et al. (2016b; 2016c) surveyed 300 adult participants in Italy who consumed wine at least once per month.<sup>71,73</sup> Participants viewed eight of 36 possible wine bottle back labels designed for the study that varied in the amount of nutrition information displayed: 1) no nutrition information, 2) an icon with calorie content per glass, or 3) a nutrition facts label with percentage of guideline daily amounts. Labels also varied in price, health message and drink limit guideline information. Participants were asked to rate their preference for each label on a five-point scale from “not at all” to “totally” preferable, and to rate their agreement that it is useful to receive more information on nutrition and health characteristics of wine through the label on a five-point scale from “strongly disagree” to “strongly agree.” The most preferable labels were those with health warnings, followed by those with nutrition information presented as calorie content per glass. 55% of participants agreed information on nutrition and health characteristics of wine to be useful, 8% did not agree it would be useful, and 20% considered labels with nutrition values such as calorie and sugar content to be “extremely important.” Preferences for nutrition information on labels was higher among females, participants with higher education and participants with a health condition.<sup>71,73</sup>

A mixed-methods study by Roderique-Davies et al. (2020) consisted of a mock shopping task in a lab and a focus group with a separate group of participants.<sup>76</sup> In the focus group with 10 adults who regularly consumed alcohol, participants were shown wine bottles with four different labels: 1) a real-world alcohol label with alcohol by volume information, and three study-designed labels: 2) units of alcohol per serving and per container, liquid measurement, alcohol by volume, calorie content (not specified if per serving or per container), national drink limit guidelines, the National Health Service Choices website URL, and pictograms cautioning about age restrictions and drinking when pregnant or driving; 3) the same information as label 2, but with larger national drink limit guidelines on the front of the container; and 4) the same information as label 3, plus the health warning pictograms on the front of the container. Participants perceived calorie content information on labels to be important, but inadequate in size relative to other non-nutrition information on the label.<sup>76</sup>



Pabst et al. (2019) conducted qualitative focus groups with 21 adults in Germany who consumed wine at least twice per month.<sup>78</sup> Participants were shown four wine bottles, each with different labels varying in level of nutrition information: a real-world label with percent alcohol by volume (12.5%) and allergen information, and three study-designed detailed nutrition labels. All three study-designed labels included calories, alcohol, fat, carbohydrates, protein and salt per 100mL; one of them also included a condensed ingredient list and another also included an extensive ingredient list.

Participants overall did not perceive the nutrition information on wine containers to be useful, were generally surprised when exposed to the nutrition information because the calorie content was lower than expected, and considered certain information, such as protein content on the nutrition label, irrelevant to include on wine products. Participants also noted they mainly perceived wine as a special treat that they buy to enjoy the taste and do not consider the calorie content when selecting wine. In terms of ingredient lists, participants had positive reactions to seeing the bottle contained 99% wine and some reported the ingredients did not appear daunting. In contrast, negative reactions included not expecting to see any ingredient list, ingredients causing confusion or insecurity about the contents of the wine, or ingredients implying the wine is adulterated.<sup>78</sup>

## Support for, Interest in and Acceptance of Nutrition Labels

Seven studies described participants' support for or interest in nutrition information on alcohol container labels.<sup>64,70,72,74,75,77,78</sup> Two experimental studies descriptively reported support or interest as secondary measures, one mixed-methods and three cross-sectional studies surveyed the general public's support or interest in nutrition labels on alcohol containers, and one qualitative study explored participants' support of nutrition and ingredient information on wine labels. Overall, results consistently indicate participants' support for alcohol container nutrition labels. Strengths of the evidence informing this outcome are the consistency of results across studies, and the large sample sizes; the limitation is most studies assess this outcome descriptively.

Vecchio et al. (2018) conducted a within-subjects experimental auction among 103 participants in Italy who bought a bottle of wine at least once a month and consumed alcohol at least once a week to test their willingness-to-pay for wine.<sup>70</sup> The wine containers displayed four different labels on the back side with nutrition information varying in content and format: 1) calorie content per 100mL of wine; 2) a nutrition facts label with calorie and other nutrient content per 100mL of wine; 3) a website URL linking to detailed product and nutrition information; and 4) calorie, carbohydrate and sugar content per 100mL presented as a percentage of guideline daily amount icon. Interest in additional nutrition information related to wine was assessed in a post-auction survey in which participants rated three statements on a five-point scale from "Not interested" to "Interested." Interest ratings were assessed descriptively and not analysed against willingness-to-pay measures. "Interest in additional information on wine nutritional values" received a mean rating of 4.12; "Interest in wine nutritional information on the label," a mean rating of 4.23; and "Interest in mandatory ingredients lists on wine labels," a mean rating of 3.54.<sup>70</sup>

Blackwell et al. (2018) conducted a within-subjects experiment in the United Kingdom with 1,884 adult participants who reported drinking alcohol.<sup>64</sup> Participants were exposed to alcohol container labels with varying levels of standard drink and health message information, and required to complete two tasks, unrelated to nutrition information labels. As a secondary outcome, participants were asked to what extent they agree with a series of statements, including "Alcoholic beverages should include more nutritional information (i.e., calorie information)." These questions were answered using a 100-point visual analog scale with the anchors "Strongly disagree" and "Strongly agree," pre- and post-experiment. Results showed small increases in participants' support for



nutrition information (i.e., calorie information) from pre- to post-experiment (mean = 66.0 [SD = 28.1] vs mean = 67.2 [SD = 28.0]; p < 0.001).<sup>64</sup>

A mixed-methods study conducted by Thomson et al. (2012) in Australia included a cross-sectional telephone survey asking participants ages 16 and up to rate their support for various alcohol control policies on a five-point scale from “Strongly support” to “Strongly oppose.”<sup>77</sup> Of the 1,500 participants aged 16 and older who completed the survey, 76% supported or strongly supported implementing standardized nutrition labels with calories, protein, fat, carbohydrates and sugar content being displayed on alcohol containers. Moreover, 86% of participants supported or strongly supported implementing ingredient lists on alcohol container labels.<sup>77</sup>

Dekker et al. (2020) assessed public support for alcohol control policies among 7,545 adults from the general population in Australia, Canada, China, India, New Zealand, the United Kingdom and the United States in a cross-sectional study conducted through an online survey.<sup>75</sup> Participants rated their support for all suggested policies on a five-point scale from “Strongly disagree” to “Strongly agree.” Overall, 71% of participants supported standardized alcohol product packaging that included calories/kilojoules information (mean rating = 4.00), and 71% of participants supported alcohol product packaging that included ingredient lists (mean rating = 4.03). Across all included countries and all suggested alcohol control policies, those who were older, female and with higher income showed greater support for alcohol nutrition label policies. Those who reported they consumed alcohol and those who drank five or more days per week showed lower support for alcohol nutrition labelling policies.<sup>75</sup>

Bhawra et al. (2018) conducted a cross-sectional study that assessed support for multiple food labelling policies, including one policy related to alcohol labelling, among 2,729 adolescent and young adult participants (ages 16–30) in five major Canadian cities.<sup>74</sup> Participants were asked “Would you support or oppose a government policy that would require nutrition facts tables (e.g., calories) on alcoholic beverages?” The response options included “Support,” “Neutral,” “Oppose” or “Don’t know.” In total, 65.8% of participants supported this policy suggestion, 30.0% were neutral and 4.2% opposed. Age was found to be a significant predictor of support for all suggested policy types, with support tending to increase with age (p < 0.01).<sup>74</sup>

Annunziata et al. (2016a) conducted an online cross-sectional survey with 1,116 participants of legal drinking age in Italy, France, Spain and the United States.<sup>72</sup> Participants were asked to rate their interest in receiving additional information on wine labels related to nutritional values (e.g., calories, sugars, carbohydrates), drink limit guidelines, standard drink information or the potential side effects of excessive alcohol consumption on a five-point scale from “Not at all” to “Extremely.” Overall, participants in all four countries were most interested in information about side effects. Participants in the United States and Italy indicated significantly more interest in nutrition information (mean ratings = 3.6 and 3.4 respectively) than participants in France and Spain (mean ratings = 2.2 and 2.9 respectively, p < 0.001).<sup>72</sup>

Pabst et al. (2019) conducted qualitative focus groups with 21 adults in Germany who consumed wine at least twice per month.<sup>78</sup> Of the 21 participants, three supported including the same nutrition information on wine container labels that is required on food packaging. Approximately half (10 of 21) of the participants did not support nutrition labels on wine containers, and participants overall felt this information was relevant only to people with weight or health concerns.<sup>78</sup>

## **Intentions to Purchase or Consume Alcohol**

Six experimental studies examined and one qualitative study explored the impact of alcohol container nutrition labels on intentions to purchase or consume alcohol.<sup>65–70,78</sup> Results suggest



nutrition labels have no impact on intentions or possibly increase intentions to purchase or consume alcohol products with lower calorie content. A strength of the evidence informing this outcome is the availability of experimental studies, while limitations include the inconsistency of results across studies, the variability in outcome measures assessed and the lack of real-world studies.

Bui et al. (2008) used a within- and between-subjects experiment to test among 230 university student participants in the United States the impact of alcohol container labels with a nutrition facts label compared to no nutrition facts label on intentions to consume alcohol.<sup>65</sup> Participants in the treatment condition viewed an image of an alcohol container with a nutrition facts label, and those in the control condition viewed an image of an alcohol container label with alcohol by volume information but no nutrition information. Participants were asked to indicate if the information on the label would lead them to “increase” or “decrease” their consumption level of each alcohol type (i.e., wine, distilled spirits, light beer and regular beer). Results showed intentions to consume wine ( $p < 0.001$ ) and distilled spirits ( $p < 0.05$ ) significantly increased among participants who were exposed to the nutrition facts label relative to those in the control condition exposed to labels with no nutrition information. Intentions to consume regular beer and light beer did not significantly differ between the treatment and control conditions.<sup>65</sup>

Martinez et al. (2015) conducted a study examining the impact of alcohol container nutrition labels on alcohol consumption intentions using three sub-studies: 1) a between-subjects experiment with 80 university students under the legal drinking age who drink randomly assigned to be exposed to an image of a beer bottle with a nutrition facts label or no label; 2) a between-subjects experiment with 98 adults who were randomly assigned to be exposed to an image of a beer bottle with no label, an accurate nutrition facts label, a nutrition facts label with excessive vitamin C or a nutrition facts label reduced calories; and 3) a cross-sectional online survey with 191 adults who were shown images of alcohol and food products with the four label conditions described in sub-study 2.<sup>67</sup> In all three sub-studies, two measures assessed: i) intentions to drink five or more drinks within a two-hour sitting for males and four or more drinks within a two-hour sitting for females; with the following response options: will not, one time, 2–3 times, once a week, twice a week, 3–4 days a week, 5–6 days a week, every day; and ii) intentions on a typical day of drinking; with response options: 0 drinks, 1 drink, 2 drinks, 3–4 drinks, 5–6 drinks, 7–8 drinks, 9–11 drinks, 12–15 drinks, 16–18 drinks, 19–24 drinks, 25 or more drinks. Results in all three sub-studies found no evidence that providing nutrition information on alcohol container labels impacted participants’ intentions to drink ( $p > 0.01$  for all, due to multiple comparisons  $p < 0.01$  was used for significance cut-off by study authors).<sup>67</sup>

Maynard et al. (2018) conducted a between-subjects experiment in a bar laboratory setting in the United Kingdom.<sup>68</sup> 265 university students who consumed alcohol socially took part in what was presented as a “taste test” in which participants were permitted to drink as much or as little as they desired from two half-pint glasses of beer in a 10 minute period. Participants in the treatment condition were exposed to calorie and/or unit information (e.g., 128 calories, 1.4 units) and product information (e.g., origin) on place cards provided adjacent to the glasses of beer. Participants in the control condition were provided place cards with product information but no calorie or unit information. Place cards were provided in envelopes to blind the experimenter to the condition allocated to participants. Participants were informed the envelopes contained information about the beers they were served. The beers and place cards were removed after 10 minutes, then participants completed a short survey in which their intentions to consume an alcoholic beverage in the future were assessed as a secondary outcome. Results indicated no significant differences in reported intentions to drink in the future between participants exposed to calorie and unit information during the test and participants not exposed to the information ( $p = 0.39$ ).<sup>68</sup>



Escandon-Barbosa et al. (2019) used eye tracking technology in a simulated supermarket lab experiment in Columbia with 114 participants who were university students or staff who reported consuming wine.<sup>66</sup> Bottles of wine on supermarket shelves displayed labels that were manipulated to vary the amount of information related to the wines' denomination of origin, nutrition information (no information about type or amount of nutrition information provided on labels) and health warnings. Participants were asked to indicate wines they would buy or would not buy. Eye-tracking technology measured what label components the participants' gazes fixated and dwelled on. Findings suggest no main effects between label information and purchase intentions, but an interaction effect by consumer type was detected. Wine container labels with the wines' origin, health and nutrition information influenced the purchase intentions of men ( $p < 0.01$ ) and those categorized by authors as "expert consumers" (i.e., frequent weekly drinking over several years) ( $p < 0.05$ ) to a greater extent than their counterparts.<sup>66</sup>

A discrete choice experiment by Pabst et al. (2021) used a between- and within-subjects design to investigate reactions to wine container labels with different levels of nutrition and ingredient list information among 2,176 Italian, German and Australian participants who consumed wine at least once per month.<sup>69</sup> Before the choice task, participants were randomized to three media conditions: 1) media information about the negative aspects of wine ingredients (i.e., preservative ingredients framed as "unnatural chemical additives"); 2) media information about the positive aspects of wine ingredients (i.e., preservative agents framed as stabilizers preserving the integrity of the wine); and 3) a no media information control condition. Participants then completed 12 choice scenarios, each displaying three wine labels varying in levels of nutrition information (no information, calories per 100mL or detailed nutrition facts label per 100mL) and ingredients information (no ingredients information, condensed ingredient list, extensive ingredient list), where participants indicated which option they were most likely to purchase. Overall, results indicated nutrition facts labels, compared to calorie per 100mL or no information, increased consumer purchase intentions in Australia, Italy and Germany in all media conditions ( $p < 0.01$  for all), which study authors suggested was due to consumers strongly valuing transparency. The effects of labels with an ingredient list on purchase intentions were influenced by participants' previous exposure to positive or negative media information about wine ingredients and were not consistent across the three countries. For participants exposed to negative media in all three countries, an extensive ingredient list significantly increased purchase intentions compared to a condensed ingredients list or no ingredient list ( $p < 0.01$ , for both). It was also found that exposure to negative media information increased the odds of participants refraining from choosing any wine option in Italy and Germany ( $p < 0.01$ ), but not in Australia.<sup>69</sup>

Vecchio et al. (2018) conducted a within-subjects experimental auction among 103 participants in Italy who consumed wine at least once per week to test their willingness-to-pay for wine displaying four different nutrition labels.<sup>70</sup> The four label conditions included: 1) calorie content per 100mL of wine; 2) a nutrition facts label with calorie and other nutrient content per 100mL of wine; 3) a website URL linking to detailed product and nutrition information; and 4) calorie, carbohydrate and sugar content per 100mL presented as a percentage of guideline daily amount icon. Participants attributed the highest value, indicated by the amount they would actually pay if they won the auction, to wine with a nutrition facts label per 100mL (mean = €4.97). The least value was attributed to wine with a website URL linking to detailed product and nutrition information (mean = €3.92). However, the mean willingness-to-pay was significantly different across all four label conditions ( $p < 0.001$ ). Gender was significantly associated with the value attributed to nutrition facts label and percentage of guideline daily amount, suggesting women were more willing to pay for detailed nutrition label information than men.<sup>70</sup>



Lastly, in a study by Pabst et al. (2019) in which 21 adult participants in Germany who consumed wine at least twice per month took part in focus groups, some participants expressed that they might increase their wine consumption after learning from the nutrition information labels that it contained fewer calories than they initially believed.<sup>78</sup> In reference to increased ingredients information on the label, participants overall did not believe this would increase or decrease their wine consumption.<sup>78</sup>

## **Consumption Behaviour**

One experimental study examined the impact of short-term exposure to nutrition information on alcohol consumption behaviour in a 10-minute period and found no evidence of an effect.<sup>68</sup> There is insufficient evidence from a single study to conclude an overall effect of nutrition labels on alcohol consumption with any certainty.

The between-subjects experiment by Maynard et al. (2018) was presented as a “taste test” to 265 university student participants and conducted in a bar laboratory setting on a university campus in the United Kingdom.<sup>68</sup> Participants in the treatment condition were exposed to calorie and/or unit information (e.g., 128 calories, 1.4 units) and product information (e.g., origin) on place cards provided adjacent to two half-pints of beer. Participants in the control condition were provided place cards with product information but no calorie or unit information. Place cards were provided in envelopes to blind experimenters to the conditions allocated to participants. Participants were informed the envelopes contained information about the beers they were served. The beers and place cards were removed after 10 minutes, and researchers measured the total volume of beer remaining in both half-pint glasses for each participant. Results provided no evidence of a difference in consumption between the treatment conditions with calorie information (mean = 50% of glass consumed, SD = 29%) and control condition without calorie information (mean = 47% of glass consumed, SD = 25% p = 0.35).<sup>68</sup>

## **Secondary Results: Alcohol Container Labels with Health Messages, Standard Drink Information and Drink Limit Guidelines**

Brief overviews of the results from included studies examining the impacts of labels with health messages, standard drink information and drink limit guidelines are described in this section. Details of the characteristics of individual studies can be found in Appendix I, Tables 2–4.

Of the 62 articles (54 studies) included in the final sample of the systematic review, 45 articles (39 primary studies) examined the impacts of labels with health messages, 18 articles (15 studies) examined the impacts of labels with standard drink information, and 12 articles (eight studies) examined the impact of labels with drink limit guidelines. The total number of included articles exceeds 62 because multiple articles assess more than one label type, individually or in combination.

Similar to studies investigating the impacts of alcohol container nutrition information labels, studies assessing the impacts of labels with health messages, standard drink information and drink limit guidelines involved participants from adolescents to adults from multiple countries, and included participants who consumed alcohol and those who did not consume alcohol. Other similarities include the wide variety of methodological designs used across studies, and differences in direction, magnitude and significance of effects for a number of outcomes.



One key difference between studies investigating the impacts of alcohol container nutrition labels and other label types is the availability of published studies investigating other label types as natural experiments or in real-world settings. For example, one quasi-experimental study conducted in a real-world setting in Yukon and the Northwest Territories examined the impacts of alcohol labels with a health message, standard drink information and drink limit guidelines on a range of outcomes, including consumer noticing, knowledge of and support for labels, and per capita alcohol consumption.<sup>79-86</sup> Another mixed-method study conducted in the United Kingdom used a quasi-experimental design to test the effectiveness of drinking glasses labelled with standard drink information and drink limit guidelines on outcomes, including knowledge, estimation, message processing, perceptions and alcohol consumption.<sup>87</sup>

### **Labels with Health Messages**

A total of 45 articles (39 primary studies) investigating the impacts of alcohol container labels with health messages were identified in this systematic review. These 45 articles were published since 2015, providing updated evidence to build on findings from the review conducted by Hassan et al. (2018).<sup>57</sup> Of the 45 articles (39 studies), 20 studies employed experimental designs,<sup>64,88-106</sup> one study used a quasi-experimental design conducted in a real-world setting,<sup>79-81,85,86</sup> 11 studies used cross-sectional designs,<sup>71-73,75,84,107-114</sup> three studies incorporated mixed methods,<sup>76,115,116</sup> and four studies used qualitative approaches.<sup>117-120</sup> Overall, 14 studies were conducted in the United Kingdom,<sup>64,76,91,92,94,98-100,102,104,105,110,115,116</sup> nine in Australia,<sup>96,97,101,106,108,109,113,117,118</sup> five in Canada,<sup>79-81,84-86,88,89,111,120</sup> two in Italy,<sup>71,73,107</sup> one in France,<sup>119</sup> one in the Netherlands,<sup>93</sup> one in the United States,<sup>95</sup> one in Trinidad and Tobago,<sup>112</sup> one in Spain,<sup>103</sup> and four studies included participants from multiple countries.<sup>72,75,90,114</sup>

In studies examining alcohol container labels with health messages, the format and content of the health messages varied across studies. Four studies investigated mandatory or voluntary health message labels currently used in real-world practice,<sup>109,110,117,119</sup> 23 studies investigated research-driven labels or existing labels manipulated for research purposes,<sup>64,71-73,88,89,92,93,95-97,99,100,102-106,113-115,118,120</sup> seven studies included both existing real-world labels and research-driven or manipulated labels,<sup>76,79-81,84-86,90,91,94,101,107</sup> and five studies described support for health messages on container labels, but did not investigate actual labels.<sup>75,108,111,112,116</sup> Studies investigated labels displaying health messages that cautioned about the relationship between alcohol consumption and a variety of health and safety concerns, including cancer (in general or in specific sites such as liver, breast, bowel, mouth and throat), liver damage, brain damage, mental illness, heart disease, diabetes, violence, injuries, death, harms of drinking and driving, general harms of drinking, drinking while pregnant, heavy or risky drinking, and drinking under the legal drinking age.

Included studies assessed the following outcomes related to alcohol container labels with health messages: label noticing, attention and recall (16 studies);<sup>76,79-81,88-90,98,101-103,107,109,110,115,117,119</sup> label comprehension and message processing (four studies);<sup>79,80,113,118</sup> knowledge of alcohol-related health risks (two studies);<sup>85,109,121</sup> risk perceptions (four studies);<sup>92,94,96,105</sup> believability and credibility (seven studies);<sup>64,93,96,106,114,117,119</sup> emotional reactance or avoidance (six studies);<sup>64,92,103,105,107,109</sup> preferences (five studies);<sup>115,117-120</sup> product and consumer-based ratings (two studies);<sup>88,89</sup> support for or interest in health message labels (15 studies);<sup>64,71-73,75,76,81,84,92,95,100,108,111,112,116,120</sup> intentions to purchase or consume alcohol (10 studies);<sup>64,91,93,97,98,105,106,114,115,117</sup> and consumption behaviour (six studies).<sup>79,80,86,91,92,104,113,115</sup>

The identified body of evidence investigating health message labels on alcohol containers suggests several key findings. There is consistent evidence showing that health message labels that are large in size, use bright colours, are mandatory rather than voluntarily, and, in some instances, are applied



to plain packaged rather than branded alcohol containers, were more noticeable, more visually attended to and better recalled by participants.<sup>79-81,88-90,98,101,103,109,110,115,117,119</sup> Health message labels were also linked to increases in participants' thinking about, closely reading and talking with others about the label messages, and increases in participants' knowledge and perceptions of alcohol-related health risks, including serious yet relatively unknown health risks, such as cancer.<sup>64,80,81,85,92-94,97,105,109,113,114,118,120</sup>

The impacts of labels with health messages on consumer knowledge of alcohol's carcinogenic effects are critical, given that alcohol has been classified by the International Agency for Research on Cancer as a Group 1 carcinogen since 1988, yet public knowledge of the link between alcohol and cancer continues to be low in Canada and internationally.<sup>81,122,123</sup> Moreover, evidence suggests improving consumer knowledge that alcohol can cause cancer is associated with increased support for alcohol pricing policies.<sup>85</sup> This support is important as alcohol pricing policies are proven to reduce per capita alcohol consumption and related harms,<sup>124,125</sup> yet often endure strong opposition from sections of the public and hence also some policy makers.<sup>126,127</sup>

Evidence describing participants' perceptions of and preferences for different formats of health message labels (e.g., text or text plus image, negatively or positively framed messages, general or specific messages) is mixed.<sup>64,71-73,76,88-93,95,96,100,102,104-107,114,115,117-119</sup> Results related to participants' preferences for and perceptions of health message labels were similarly mixed in the review by Hassan et al, (2018).<sup>57</sup> However, it is important to note that despite the inconsistencies in preferences and perceptions, public support for health message labels on alcohol containers is consistently strong.<sup>64,75,81,84,92,100,108,111,112,116,120</sup>

Evidence of the impact of labels with health messages on participants' intentions to consume alcohol or on actual consumption behaviour are mixed, some studies indicated a null effect on intentions and/or consumption,<sup>91,98,114,115,117,118</sup> and others demonstrated decreases in intentions and/or consumption.<sup>64,79,80,86,91-94,96,97,104-106</sup> For example, a quasi-experimental study conducted in Yukon in 2017–2018 tested the effectiveness of large, bright yellow labels, with three rotating messages including a cancer warning applied to alcohol containers in the liquor store in Whitehorse.<sup>86</sup> Using official alcohol sales data, total per capita retail alcohol sales in Whitehorse decreased by 6.31% ( $p < 0.001$ ) during the intervention period relative to retail alcohol sales in two separate comparison sites with no enhanced labels.<sup>86</sup>

## **Labels with Standard Drink Information**

A total of 18 included articles (15 studies) examined the impacts of alcohol container labels with standard drink information, providing updated evidence to expand on findings from the systematic review conducted by Wettlaufer (2018).<sup>58</sup> Six studies employed experimental designs,<sup>64,68,94,121,128,129</sup> one study used a quasi-experimental design conducted in a real-world setting,<sup>80,83,84,86</sup> four studies used cross-sectional designs,<sup>75,111,130,131</sup> three studies incorporated mixed methods,<sup>76,87,115</sup> and one study used a qualitative approach.<sup>120</sup> Six studies were conducted in the United Kingdom,<sup>64,68,76,87,94,115</sup> five in Canada,<sup>80,83,84,86,111,121,129</sup> two in the United States,<sup>128,131</sup> one in Australia,<sup>130</sup> and one study included participants from multiple countries.<sup>75</sup>

Two studies investigating labels with standard drink information tested mandatory or voluntary labels currently used in real-world practice,<sup>130,131</sup> seven studies tested research-driven standard drink information labels,<sup>68,87,115,120,121,128,129</sup> four studies included both existing real-world labels and research-driven or manipulated labels,<sup>64,76,80,83,84,86,94</sup> and two studies described support for standard drink labels, but did not investigate an actual label.<sup>75,111</sup> The standard drink labels tested in the included studies varied in how they communicated standard drink information (i.e., the number



of standard drinks per container, the volume of one standard drink or the number of standard drinks per container in relation to drink limit guidelines), the specificity of the standard drink information (i.e., the specific number of standard drinks per container or the number of standard drinks for the most common strength alcohol), and the format used to present the information (i.e., text, chart, graph or pictogram).

Included studies assessed the following outcomes related to alcohol container labels with standard drink information: label noticing, attention and recall (four studies),<sup>76,80,83,115,130</sup> message processing (two studies),<sup>80,87</sup> label comprehension or estimation of standard drinks (nine studies),<sup>64,68,83,87,94,121,128,129,131</sup> perceptions and preferences (seven studies),<sup>76,87,94,115,120,121,129</sup> support for or interest in standard drink labels (seven studies),<sup>64,75,83,84,111,120,121,129</sup> intentions to purchase or consume alcohol (five studies),<sup>64,68,83,94,115</sup> and consumption behaviour (four studies).<sup>68,80,86,87,115</sup>

The evidence examining standard drink container labels consistently suggests exposure to these labels compared to alcohol by volume labels results in more accurate estimates of the amount of alcohol in a standard drink, the number of standard drinks in an alcohol container, and the number of standard drinks to reach drink limit guidelines.<sup>64,68,83,87,94,121,129</sup> Evidence also indicates standard drink labels better support accurately pouring one standard drink of alcohol relative to alcohol by volume labels.<sup>128</sup> These findings are consistent with results from the systematic review conducted by Wettlaufer (2018) that found standard drink labels can help consumers to accurately identify and pour a standard drink.<sup>58</sup>

These findings are particularly crucial because Canada's Low-Risk Alcohol Drinking Guidelines are expressed in terms of standard drinks an adult can consume at relatively lower risk per day and per week.<sup>26,132</sup> The current inconsistency between the alcohol by volume declaration required on alcohol container labels in Canada and the standard drinks used in Canada's Low-Risk Alcohol Drinking Guidelines causes consumer confusion and creates barriers to consumers complying with the guidelines.<sup>14,83,132,133</sup> Importantly, the quasi-experimental study conducted in Whitehorse, Yukon, found greater increases in the percentage of participants able to accurately estimate the number of standard drinks in an alcohol container in the intervention site exposed to standard drink labels relative to the comparison site without the labels (+6.3% vs +5.5%, AOR=1.06, 95% CI: 0.59, 1.93).<sup>83</sup> This study also found greater increases in participants' intentions to use standard drink information to drink within Canada's Low-Risk Alcohol Drinking Guidelines in the intervention site versus comparison site (+2.9% vs +0.3%, AOR=1.04, 95% CI: 0.75, 1.46).<sup>83</sup>

Participants' preferences varied across the standard drink label studies examining preferences for standard drink labels. For example, two studies found larger standard drink labels were perceived as visually unappealing,<sup>87,115</sup> while two other studies found participants' preferred larger labels and labels accompanied by drink limit guidelines to support tracking alcohol intake and to stay within the recommended alcohol drinking limits.<sup>76,120</sup> Overall, standard drink labels were supported by participants, and perceived as informative and beneficial for monitoring alcohol consumption.<sup>64,75,76,83,84,87,111,115,120,121,129</sup> Evidence of the impact of standard drink labels on participants' intentions to consume alcohol or on actual consumption behaviour was mixed, some studies indicated no impact and others demonstrated decreases in intentions to consume alcohol and decreases in actual alcohol consumption.<sup>64,68,80,83,86,87,94,115</sup>

A total of four studies investigated participants' intentions to use standard drink labels to purchase higher strength alcohol for lower prices, an argument the alcohol industry and some researchers have raised to challenge the use of standard drink labels and a potential outcome also captured in Wettlaufer's review (2018).<sup>58,64,68,77,83,115,129,134</sup> Studies observed that some participants report



intentions to use standard drink labels for this purpose, but this is less common than intentions to use standard drink labels to monitor or limit one's own or even others' consumption, or to adhere to drink limit guidelines.<sup>83,115,129</sup> Further, results of the quasi-experiment in Whitehorse, Yukon, suggest that when consumers are exposed to standard drink labels over time and become more familiar with the concept of a standard drink, they may be less likely to consider using the labels to purchase higher strength alcohol for lower prices.<sup>83</sup> At baseline, approximately one-third of participants in both the intervention and comparison sites of the quasi-experiment reported they would use standard drink labels for purchasing high-strength, low-cost alcohol. However, after the labelling intervention, participants in the intervention site exposed to standard drink labels had reduced odds of reporting intentions to use standard drink labels for unintended purposes relative to the comparison site (-5.7% vs. +2.5%, AOR 0.65, 95% CI 0.45, 0.93).<sup>83</sup>

### **Labels with Drink Limit Guidelines**

A total of 12 included articles (eight studies) examined the impacts of alcohol container labels with drink limit guidelines. Two studies employed experimental designs,<sup>94,121</sup> one study used a quasi-experimental design conducted in a real-world setting,<sup>79,80,82,84,86</sup> two used cross-sectional designs,<sup>108,130</sup> two incorporated mixed methods,<sup>87,115</sup> and one used a qualitative approach.<sup>120</sup> Three studies were conducted in Canada,<sup>79,80,82,84,86,120,121</sup> three in the United Kingdom,<sup>87,94,115</sup> and two in Australia.<sup>108,130</sup>

The types of labels with drink limit guidelines varied across studies. One study investigated mandatory labels currently used in real-world practice,<sup>130</sup> four studies tested research-driven drink limit guideline labels,<sup>87,115,120,121</sup> two studies included both existing real-world labels and research-driven or manipulated labels,<sup>79,80,82,84,86,94</sup> and one study described support for drink limit guideline labels, but did not investigate an actual label.<sup>108</sup> The format for communicating the drink limit guidelines on labels also varied across studies, with some studies testing drink limits per day, per week or both per day and week, and some included sex-specific drink limits.

Studies included in this review assessed the following outcomes: label noticing, attention and recall (two studies),<sup>79,80,82,115</sup> label comprehension and message processing (three studies),<sup>79,80,87,121</sup> knowledge of drink limit guidelines (three studies),<sup>82,87,94</sup> risk perceptions (two studies),<sup>94,120</sup> perceived effectiveness and preferences (four studies),<sup>87,115,120,121</sup> support for or interest in labels with drink limit guidelines (five studies),<sup>82,84,108,120,121,130</sup> intentions to consume alcohol (three studies),<sup>79,94,115</sup> and consumption behaviour (three studies).<sup>79,80,86,87,115</sup>

The small body of evidence examining the impacts of labels with drink limit guidelines demonstrated large and brightly coloured drink limit guideline labels were consistently found to be noticeable and to improve message recall compared to smaller less colourful labels.<sup>79,80,82,115</sup> Labels with drink limit guidelines consistently improved message processing measures such as closely reading, thinking about and talking with others about the drink limit guidelines, and improved knowledge of national drink limit guidelines in both Canada and the United Kingdom.<sup>79,80,82,87,94,121</sup> For example, a between-subjects experiment conducted by Gold et al. (2020) in the United Kingdom tested six custom labels with drink limit guidelines presented in various formats compared to a control label depicting alcohol units (i.e., units are the equivalent of standard drinks in the United Kingdom) per container.<sup>94</sup> All six custom labels significantly increased knowledge of the national drink limit guidelines compared to the control ( $p<0.001$  for all).<sup>94</sup> The quasi-experiment conducted in the Yukon found after the labelling intervention of including labels with drink limit guidelines by sex, there were greater increases in knowledge among participants in the intervention site exposed to the labels relative to the comparison group without the labels for the outcomes: awareness of national drink limit guidelines (+36.2% vs +12.7%, AOR=2.9, 95% CI: 2.0, 4.3), knowledge of daily drink limits (+20.1%



vs +14.7%, AOR=1.5, 95% CI: 1.0, 2.1), and knowledge of weekly drink limits (+14.0% vs +7.9%, AOR=1.4, 95% CI: 1.0, 2.0).<sup>82</sup>

Across studies assessing labels with drink limit guidelines, participants' specific perceptions of and preferences for labels with drink limit guidelines were inconsistent,<sup>87,94,115,120,121</sup> but overall these labels were supported.<sup>82,84,108,120,121,130</sup> Results of the impact of labels with drink limit guidelines on participants' intentions to consume alcohol and actual consumption behaviour were mixed; labels had either a null effect on intentions or consumption,<sup>87,115</sup> or decreased intentions or consumption.<sup>79,80,86,94</sup> The quasi-experimental study conducted in the liquor store in Whitehorse found exposure to alcohol container labels with drink limit guidelines was significantly associated with decreases in population-level per-capita alcohol consumption during the label intervention period relative to the comparison site.<sup>86</sup>

## Discussion

Alcohol products in Canada and in many countries internationally are not subject to the same standard of labelling requirements as other common consumer products like packaged foods or regulated psychoactive substances such as tobacco and cannabis.<sup>3,14-17</sup> Experts, including recommendations in Canada's Food Guide, urge Canadians to limit calories consumed through alcohol, but no clear calorie information is required to be consistently communicated on containers.<sup>11,14</sup> International and national public health organizations have recently called for, and in some cases initiated, actions to explore alcohol container nutrition labels to help consumers make more informed decisions about drinking alcohol by ensuring they have information they need and are not misled.<sup>3,25,34-37,135</sup> This report synthesizes empirical evidence from 15 articles (14 primary studies) examining relationships between alcohol container nutrition labels and key outcomes along the expected causal pathway for effective product labels: label noticing and attention; comprehension, perceived effectiveness and acceptance of nutrition information labels; label effects on intentions to purchase or consume alcohol; and consumption behaviour.

Alcohol container nutrition labels have been investigated in this small group of identified studies using a range of methodologies, including surveys, qualitative studies, experimental designs consisting of *ad libitum* and purchase tasks, and eye-tracking methodology studies in lab-based settings. Populations tested in these studies included samples of adolescents, university students and adults from a range of countries. Most studies recruited participants who reported they consumed alcohol, and few recruited from the general population regardless of alcohol consumption status. Studies also varied by the type of alcoholic beverages tested; some studies examined labels on a range of alcoholic beverages while others exclusively focused on wine or beer container labels.

The diversity of research designs and sample populations used to test alcohol container nutrition labels is a strength of this research, allowing a broad overview of relevant outcomes. However, an important finding from this review is the dearth of published literature investigating the effectiveness of nutrition information labels on alcohol containers in real-world settings. The empirical literature investigating nutrition information labels did not contain any "natural experiments" in which consumers are exposed to and make choices about purchasing or consuming alcohol in real-world settings. Testing the effects of nutrition labels in online or lab-based settings is challenging, given these experimental scenarios are highly controlled and unable to recreate the actual environment in which decisions about alcohol are made. These settings do not incorporate the complexity of factors that influence choices and behaviours in the real world.

The one study in this review that examined the impact of labels on actual alcohol drinking tested the extent to which labels impart information at the moment of consumption. Testing labels after a



single exposure at the point of consumption may influence effectiveness. Indeed, studies examining food and tobacco labels have found positive associations between label effectiveness and repeated exposure to labels over time.<sup>29,52,53,136</sup> No studies in this review tested the impact of nutrition information labels on outcomes over a longer period of time or after repeated exposures. The authors posit that a dose-response relationship similar to that found for food and tobacco labels is plausible for alcohol labels and warrants further research.

For labelling to be effective, labels must first be noticed and attended to by consumers.<sup>49-51</sup> Two small studies, using eye-tracking technology during a mock shopping task and focus groups with adults who reported they consumed alcohol, consistently found participants paid little attention to calorie information, nutrition facts labels or ingredient lists on the back labels of alcohol containers.<sup>76,78</sup> Focus group participants perceived the calorie information on the alcohol label to be important, but admitted paying little attention to it because of its inadequate size relative to other non-nutrition information on the label.<sup>76</sup> To draw attention to product labels, especially in busy retail settings or at point-of-consumption, evidence from food and tobacco label literature shows labels should be large in size and positioned on the front of containers or packages, use bright colours and images, large font and a direct message, and have a border to separate them from other label elements.<sup>50,53-56</sup> Results of studies examining alcohol container labels with health messages have shown labels that were large in size and brightly coloured tended to increase participants' noticing and attention to labels, and consistently improved participants' recall of label messages.<sup>79-81,98,101,103</sup> Optimizing product label design can help to maximize label effectiveness. With this in mind, implementation of nutrition labels on alcohol containers should be accompanied by further research to evaluate their effectiveness and continuously inform improvements.

If consumers are noticing and processing nutrition information on labels, they should be better able to estimate the calorie content of alcoholic beverages. Two small lab-based experiments examined the impact of nutrition labels on participants' ability to estimate calories in alcohol. One study assessed the efficacy of calorie labels on calorie estimates of two drinks immediately after consumption in a lab-based setting.<sup>65</sup> The other study assessed if exposure to nutrition facts labels influenced the perceived levels of calorie and nutrient content in four alcoholic beverages.<sup>68</sup> Results suggest exposure to nutrition information may lead to more accurate calorie estimates immediately after label exposure, and increased calorie estimates for all alcohol consumed over the past week. Similarly, in a report commissioned by the New Zealand government, a randomized controlled trial revealed providing calories per 125mL serving on alcohol container labels increased the accuracy of calorie estimates for alcoholic drinks compared to no nutrition information among a sample of adult participants.<sup>137</sup> Findings also showed increases in participants' confidence in estimating calorie content.<sup>137</sup> It is relatively well-established that people are largely unaware of the energy content of alcoholic drinks,<sup>23</sup> and providing calorie information on alcohol containers could help people more accurately estimate calories in alcohol. Further research confirming if calorie information on its own or in the format of a nutrition facts label would attract greater attention and contribute further to consumer comprehension is also warranted. Food labelling literature suggests education campaigns running in parallel to labels may be beneficial for enhancing consumers' understanding and use of nutrition labels on packaged food, and is likely an important consideration in alcohol labelling policy development.<sup>29,30,32,33</sup>

Results were somewhat inconsistent across studies that examined preferences for and perceptions of nutrition information labels, but participants generally believed alcohol container nutrition labels are useful and important for increasing awareness of the calories in alcohol.<sup>67,71-73,76</sup> One cross-sectional study found participants in the United States preferred more detailed nutrition information in the form of a nutrition facts label, and those in Europe preferred a simpler calories per serving



icon.<sup>72</sup> There was some evidence indicating positive associations between preferences for nutrition information and being a woman, having higher education and having a health condition.<sup>72,73</sup> Of note, food labelling studies have shown that although individuals may prefer more detailed nutrition information on packages, more detailed information does not necessarily aid consumers in making more informed or healthier food purchase or consumption decisions compared to simpler information.<sup>50,138</sup>

The use of labels with interpretative nutrition information is an additional area for future research that did not appear in any of the included peer-reviewed studies. In the report commissioned by the New Zealand government, one experimental condition tested a label presenting calorie content per serving and a suggested type and duration of exercise for an average adult to burn off those calories.<sup>137</sup> Participants preferred this interpretive label on the front of alcohol containers, compared to the nutrition facts label option that was preferred on the back of containers. However, no significant differences between the interpretative label and the nutrition facts label were detected for outcomes assessing label impact on calorie estimates, purchase intentions or consumption.<sup>137</sup>

Seven studies described support for alcohol container nutrition labels among participants in the United States, Italy, Germany, France, China, India, Australia, Canada and New Zealand.<sup>64,70,72,74,75,77,78</sup> Six studies, two of which included Canadian adolescent and adult participants, consistently found the majority of participants supported standardized nutrition information on alcohol containers, particularly calorie content and ingredient lists.<sup>64,70,72,74,75,77</sup> One large international cross-sectional study found positive associations between support for alcohol control policies overall, including labelling, and being a women, of older age and having higher income.<sup>75</sup> Participants believed consumers have a right to know the nutritional content of products they ingest and nutrition information labels would allow consumers who want this information to make more informed decisions.<sup>67,78</sup> However, support was mixed in one focus group study in Germany with adults who regularly consumed wine. Some participants were not supportive of nutrition labels on wine containers and believed nutrition information was only relevant to people with weight or health concerns, while a minority of the participants believed wine containers should display the same nutrition information as packaged food.<sup>78</sup>

Seven studies examined the influence of alcohol container nutrition labels on intentions to purchase or consume alcohol and found labels had either no effect or increased intentions to purchase or consume lower calorie alcohol options.<sup>65-70,78</sup> In two experimental studies, gender was significantly associated with the value attributed to nutrition information on wine bottle labels: one study suggested women were more willing to pay for detailed nutrition label information than men, and the other study found the combination of nutrition information, denomination of origin and health warnings increased the purchase intentions of men.<sup>66,70</sup> One potential explanation for alcohol container nutrition labels having no effect on or increasing purchase intentions is that nutrition information positively influences consumers' perceptions of alcohol as "healthier" than expected. This possibility was demonstrated in two studies where exposure to nutrition information labels led to increased intentions to purchase or consume lower calorie alcohol types (i.e., wine or spirits) but not higher calorie alcohol types (i.e., beer).<sup>65,69</sup> These findings align with global alcohol industry research reporting consumers are increasingly purchasing lower calorie alcoholic beverages, and this trend is driven by consumers' desire to drink in moderation and lead healthier lives.<sup>41</sup>

One experimental study testing the efficacy of calorie information on actual alcohol drinking showed it had no effect on consumption.<sup>68</sup> However, this study was conducted in a laboratory setting and promoted as a "taste test"; the nutrition information was provided via a product information card adjacent to a half pint of beer and the outcome measure was the amount of beer consumed in a 10-minute period. These features of the study severely limit its findings from reflecting a real-world



drinking occasion.<sup>68</sup> More research is required to better understand if and to what extent nutrition labels on alcohol containers may affect alcohol intake, intake over time and after repeated exposures to labels, and intake in real-world settings where consumers have access to various beverage alternatives containing more or less calories. The effect of a label on alcohol intake may be caused by a reduction in the number of drinks ordered, shifts between beverage categories, shifts from higher to lower calorie alcoholic beverages, or shifts to non-alcoholic beverages. None of these outcomes were experimentally tested in any studies in this review, which highlights additional opportunities for future research.

This review uncovered several evidence gaps with implications for future research and policy. First, only a small number of studies examining alcohol container nutrition labels have been conducted overall, and only two studies describing public support for alcohol container nutrition labels included participants in Canada.<sup>74,75</sup> It is important to acknowledge factors that limit the strength of the published evidence, including small sample sizes and inconsistent results for several outcomes. Ongoing research, especially research conducted in Canada, will help inform how best to improve alcohol container labelling standards and policies. It is also worth contextualizing the value of the entirety of the available literature. While there may be an assumption that alcohol consumption is the most important outcome, there is relatively consistent evidence to suggest labels improve transparency and consumer estimates of calories in alcoholic beverages, and have strong public support. The authors of this report suggest this evidence is equally worthy of consideration.

Next, findings from the Martinez et al. (2015) study suggest the potential for alcohol container nutrition labels to inadvertently imply alcoholic beverages have nutritional value.<sup>67</sup> This issue raises questions about if and how nutrition labels will influence consumer perceptions of alcohol as a food product. Alcohol products are currently exempt from most food labelling policies in Canada.<sup>14</sup> It is possible that altering alcohol labels to imitate the nutrition labels on food products could position alcohol as a food product instead of a psychoactive addictive substance that can cause serious health harms. This positioning is particularly possible as many jurisdictions in Canada are increasing access to alcohol through traditional food sales channels, such as supermarkets, restaurant takeout and food delivery services.<sup>41,139,140</sup> More research examining the influence of alcohol container nutrition labels on consumer perceptions and consumption is warranted. The potential for unintended effects of labelling policies needs to be carefully considered against the potential benefits of requiring enhanced alcohol container labels. Martin-Moreno et al. (2013) argue that, from an ethical standpoint, the potential drawbacks of enhanced alcohol container labels do not outweigh consumers' right to know basic product information.<sup>24</sup> Lastly, based on evidence indicating that the alcohol industry has interfered with and misrepresented research about the health risks associated with alcohol, the industry could be anticipated to use similar strategies to delay or oppose new policies mandating alcohol container nutrition labels.<sup>44,46</sup>

This review is focused on nutrition information applied directly to the alcohol container, an approach that provides information at the point-of-purchase and the point-of-pouring or consumption.

Research examining nutrition information provided for alcohol on restaurant menus, billboards and advertising, and sold through online retailers would help inform strategies for comprehensive and multi-faceted public health interventions. During the COVID-19 pandemic, substantial increases in the sale of alcohol products through online and delivery channels were observed.<sup>41</sup> These shifts toward online and delivery alcohol sales could limit the potential for container nutrition labels to impact decision making at the time of purchase, unless standardized requirements for nutrition information displayed online are also implemented. This consideration is important for future labelling policy, as regulations that mandate nutrition facts labels and ingredient lists on food packages in Canada do not explicitly require these labels to be displayed for food products sold



online.<sup>141,142</sup> While some online food retailers voluntarily display nutrition and ingredients information, such information is not consistently available for foods sold online, potentially leaving those who purchase groceries online with incomplete product information as they shop.<sup>143</sup>

Voluntary industry-initiated calorie or energy labels on alcohol containers are now being used by alcohol manufacturers as a marketing tool to promote alcohol products as “low calorie” or “low sugar.”<sup>41</sup> In the food labelling literature, studies show unregulated nutrition labels are inconsistently applied and often used by industry to promote foods of dubious nutritional quality, ultimately causing consumer confusion.<sup>29,138,144</sup> Standardized nutrition labels applied to all alcohol products and manufacturers can better support consumers in understanding and using information in decision making, and mandatory labelling requirements are favoured by the WHO over voluntary commitments.<sup>17</sup> Moreover, mandatory nutrition labels could incentivize the alcohol industry to reformulate products to lower the calorie content, or to introduce new lower calorie products, which are often also lower in alcohol by volume. Going forward, the potential implementation of novel alcohol container nutrition label policies passed or under consideration in the United Kingdom, Ireland, Australia and New Zealand provides valuable opportunities for conducting large-scale, real-world evaluations of the effects of mandatory labels on key outcomes, and should be prioritized for future research to bolster the quality of the existing evidence.<sup>36,37,135</sup>

## Alcohol Container Labels with Health Messages, Standard Drink Information and Drink Limit Guidelines

The evidence base for alcohol container labels with health messages, standard drink information and drink limit guidelines is distinct from the evidence related to nutrition information labels in several respects. For some key outcomes, the results are similar.

Studies investigating labels with health messages, standard drink information and drink limit guidelines consistently found large and brightly coloured labels improved participants’ noticing of, attention to and recall of label messages. These findings echo the evidence from the food and tobacco labelling literature and further emphasize the importance of well-designed labels.<sup>50,53-56</sup> Studies testing consumer knowledge showed pre-intervention and comparison groups’ knowledge of alcohol-related health risks, standard drink information and drink limit guidelines to be low, and exposure to enhanced container labels consistently improved this knowledge.

A key finding of this review is that public support was consistently strong and outweighed opposition for enhanced alcohol container labelling policies across all four label types. There is an overall trend in descriptive evidence indicating that alcohol container labels increase transparency around the composition and health risks associated with alcohol. Experimental evidence has shown that enhanced labels improve knowledge and estimation of nutritional content, standard drinks, health risks and drink limit guidelines.

A difference between the evidence for nutrition labels and for the other three label types was observed in their impact on intentions to purchase or consume alcohol and alcohol consumption behaviours. The evidence for these outcomes is stronger for the other three label types than for nutrition information labels because of the greater number of experimental and quasi-experimental studies examining labels with health messages, standard drink information and drink limit guidelines. Results of the impact of nutrition labels on intentions and consumption draw from a weaker evidence base, and found a mix between labels having no effect or potentially increasing intentions to purchase and consume alcohol options with lower calorie content. Evidence examining the impact of labels with health messages, standard drink information and drink limit guidelines



indicated no effect or decreases in intentions to purchase and consume, and decreases in actual consumption behaviours.

As policies for enhanced alcohol container labels are investigated and developed, it will be important to consider the positions of regulators, public health decision makers and the general public on consumers' right to know basic product information. The goal of container labels within broader efforts to address alcohol consumption and harms should also be considered. Is the goal to achieve greater transparency and availability of standardized information, or to shift population-level alcohol consumption behaviour?

While this review reports outcomes for each distinct label type separately, several studies examined labels with a combination of information from different label types (e.g., standard drink information combined with drink limit guidelines) and the results suggest these labels could have stronger influence on outcomes than each individual label type separately. The authors suggest that the four types of container labels examined in this report should not be perceived as single solutions or substitutes for each other, but as potentially complementary tools that provide distinct information. Nutrition information labels can provide basic product composition information to people who consume alcohol. Labels with health messages, standard drink information and drink limit guidelines can further inform consumers of the known health and safety risks associated with alcohol and provide clear guidelines for lower-risk levels of consumption.

## Strengths and Limitations

This systematic review adds to the body of evidence investigating alcohol container nutrition labels as it includes evidence examining the impact of labels on outcomes along the full expected causal pathway for product labels. The review complements and expands upon a recently published rapid systematic review investigating energy labelling on alcohol by covering a broader scope of outcomes, including studies examining alcohol container labels with calorie information and other types of nutrition information, and is written from a Canadian perspective.<sup>23</sup>

Systematic review methodology was adhered to, including a comprehensive search strategy in 10 databases and reduction of errors by conducting screening, data extraction and quality appraisal in duplicate. This report is also strengthened by multiple stages of peer review and revision. While there is considerable heterogeneity across included studies' designs and quality ratings, the findings provide a broad overview of relevant alcohol container labelling outcomes, highlight evidence gaps and provide suggestions for future research.

This systematic review has several limitations. Based on research team capacity, eligibility was limited to studies in English, so some relevant studies might have been missed. The choice to include only peer-reviewed published studies raises the possibility of excluding relevant grey and unpublished evidence and introducing publication bias. However, while conducting the review, the research team identified only one grey literature report, government-commissioned, examining alcohol container nutrition labels and its results were consistent with those of included studies.<sup>137</sup>

Available published evidence is limited to mostly experimental studies conducted online or in simulated environments, or observational studies requiring participants to make choices based on hypothetical scenarios. As noted, testing the behavioural effects of nutrition labels in online or lab-based settings is challenging as they typically cannot recreate real-world environments in which alcohol decisions are made or incorporate the complexity of factors that can influence choices and behaviours. For example, most labelling experiments, particularly those that assess purchasing intentions and consumption, do not include such factors as purchasing environment, social



influences, general purchasing habits and marketing material on containers or in the proximal environment. The presentation of novel labelling stimuli in a study setting does not adequately mimic the information environment when labelling regulations require labels on millions of alcohol containers, repeatedly exposing consumers to standardized messages over time.

Nearly half of the identified studies sampled specifically from adolescent, student or young adult populations, and the majority of studies recruited participants who self-reported as regular consumers of alcohol. As a result, all findings may not be generalizable to all populations who consume alcohol, such as older people and those who consume alcohol infrequently. Of the studies investigating nutrition information labels, only two cross-sectional studies that described public support for nutrition information on alcohol containers included participants from Canada, limiting direct generalization of findings to the Canadian population. Lastly, several experimental studies tested outcomes of interest as secondary measures and in some cases measured outcomes descriptively but not experimentally.

## Conclusions

Most countries, including Canada, exempt alcohol from the standards of container labelling required for either packaged foods or regulated psychoactive substances, and in most cases do not require any nutrition information be present on the label. The lack of information on alcohol container labels limits consumers' ability to make informed decisions about their alcohol intake.

A small number of studies examining alcohol container nutrition labels have been published in the peer-reviewed literature. Results of these studies consistently indicate strong public support for standardized nutrition information on alcohol containers. Results also suggest nutrition information labels can improve consumers' ability to estimate the calorie content of alcoholic drinks they consume, and increase transparency by ensuring consumers have access to complete information on the content and composition of alcohol products they consume.

Some may expect alcohol container labels to influence outcomes beyond increasing consumer awareness and knowledge. However, there is insufficient evidence to conclude with any certainty how nutrition information on alcohol container labels will impact alcohol consumption. Alcohol container labels with health messages, standard drink information and drink limit guidelines have been found to improve consumer knowledge of the label information, to be well supported by the public, and to have potential to decrease intentions to purchase or consume alcohol and actual alcohol consumption; they could be considered as complements to alcohol container nutrition labels. Implementation of alcohol container nutrition labels should be accompanied by high-quality, real-world evaluations to evaluate and improve future labelling standards and policies.



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# Appendix I: Characteristics of Included Studies

**Table 1: Characteristics of Included Studies Examining Labels with Nutrition Information**

First Author, Year, Study Location	Study Design	Sample Size and Characteristics	Methods and Nutrition Label Characteristics	Outcome Measures	Key Results	Funding Source	Quality Rating (Appraisal Tool)
<b>Experimental Studies</b>							
Blackwell, 2018, <sup>64</sup> United Kingdom	2x3 within-subjects experiment, conducted online  2 (pre-study, post-study) x3 (unit, health, or nutrition policy statement)	N=1,884  Adults ages 18+ who lived in the United Kingdom and reported drinking alcohol  Participants recruited from online marketing panel	Before and after completing 2 tasks related to alcohol labels with health message and standard drink information, participants were asked to report their support for 3 alcohol labelling policies, including alcohol labels with nutrition information.	<b>Support:</b> Participants were asked to what extent they agree with the following statements: 1) Alcoholic beverages should include more information about alcohol strength (i.e., unit information) 2) Alcoholic beverages should have information about the health impact of drinking (i.e., health warning labels) 3) Alcoholic beverages should include more nutritional information (i.e., calorie information)  Answers were rated on a 100-point visual analog scale with the anchors Strongly disagree and Strongly agree.	<b>Support:</b> There were small increases in participant support for labels with: <ul style="list-style-type: none"><li>• Standard drink information: pre: M=66.8, SD=26.8 post: M=69.7, SD=26.3, p&lt;0.001</li><li>• Nutrition information: pre: M=66.0, SD=28.1, post: M=67.2, SD=28.0, p&lt;0.001</li></ul> There was no significant change in support for labels with: <ul style="list-style-type: none"><li>• Health messages: pre: M=61.3, SD=27.9, post: M=61.7, SD=28.9, p=0.36</li></ul>	Supported by an Alcohol Research UK grant and an ESRC New Investigator Grant, both awarded by the Medical Research Council Integrative Epidemiology Unit at the University of Bristol.	Weak (EPHPP)
<b>Calorie Estimation</b>							
Bui, 2008, <sup>65</sup> United States	2x4 between-and within-subjects experiment  2 (nutrition facts label, no nutrition facts label) x4 (regular beer, light beer, wine, or distilled spirits)	N=230  University students ages 20-36	Participants were randomized to view 1 of 2 label conditions: <u>Treatment condition:</u> * Nutrition facts label on back label of alcohol products with calorie, carbohydrate, fat, protein, alcohol per serving, serving size (5 oz), servings per container, and standard drinks per serving. Label also included the mandatory United States government warning statements.	<b>Calorie Estimation:</b> Participants were asked to estimate how many standard drinks of the each alcohol type they consumed in the past week: light beer, regular beer, wine, and distilled spirits. Then, were asked to estimate the total calories they consumed from each alcohol type in the past week. Based on the number and types of beverages, and the calorie estimates provided, authors computed average perceived calories per drink and a summed score for total	<b>Calorie Estimation:</b> Participants in the treatment condition perceived an average 300 more total calories from all alcohol types during the past week compared to the control (M=1,373 vs. 1,072 calories, p<0.01). Participants in the treatment condition perceived an average 20 more calories per drink relative to the control (M=108.3 vs 87.3 calories, p<0.05). <b>Nutrient Estimation:</b> Participants exposed to the nutrition facts label perceived significantly less calorie content in wine compared to the control (M=4.81 vs 5.57, p<0.05),	Not reported	Weak (EPHPP)



Escandon-Barbosa, <sup>66</sup> 2019, Columbia	Mock shopping task with eye tracking technology	N=114  University students and staff members who drank wine  Participants were categorized by gender and as expert (frequent weekly drinking over several years) or non-expert consumers	<u>Control condition:</u> No nutrition information, included the mandatory United States government warning statements.  Participants then completed calorie and nutrient estimation, and drinking intention questions for 4 alcohol types: regular beer, light beer, wine, and distilled spirits.	perceived calories consumed for the week.  <b>Nutrient Estimation:</b> For all 4 alcohol types, participants rated the perceived level of calorie, carbohydrates, and fat contained in the beverage on 9-point scale (1=very low to 9=very high)  <b>Intentions:</b> For each alcohol type participants were asked "Given the information shown on the front and the back of the mock bottle, would the available information increase or decrease the amount you would drink, that is, your consumption level?" Response options: would decrease consumption level, or would increase consumption level	there was no significant effect on calorie perceptions of the other 3 alcohols.  The nutrition facts label significantly decreased fat content perceptions for all 4 alcohol types: Light beer (3.35 vs 4.12), regular beer (4.00 vs 5.42), wine (2.91 vs 4.02), and distilled spirits (2.96 vs 3.92) ( $p<0.001$ for all).  The nutrition facts label significantly decreased perceptions of carbohydrate content in wine (4.41 vs 5.62, $p<0.001$ ) and spirits (3.41 vs 5.14, $p<0.001$ ), but not regular or light beer.  <b>Intentions:</b> Intentions to consume wine ( $p<0.001$ ) and spirits ( $p<0.05$ ) significantly increased among participants exposed to the nutrition facts label, but intentions to drink regular beer or light beer were not significantly affected by exposure to the nutrition facts label ( $p>0.1$ ).	Not reported	Weak (EPHPP)
Martinez, <sup>67</sup> 2015, United States	3 sub-studies: 2 experiments and 1 cross-sectional	<b>Study 1:</b> N=80 University students below the legal drinking age (21) who consumed alcohol.  <b>Study 2:</b> N=98	<b>Study 1:</b> Between-subjects experiment in which participants were randomly allocated to view 1 of 2 conditions: <sup>*</sup> 1) Bottle of beer with a % daily value nutrition facts label containing calories, fat, carbohydrates, protein,	<b>Preferences:</b> Alcohol related beliefs were measured by asking participants to openly write their opinions about nutrition labels on alcohol products. In the cross-sectional sub-study, preferences were measured using count variables that summed	<b>Preferences:</b> Participants reported preferences for alcohol products with fewer calories. Suggested benefits of nutrition labels included awareness of calories being consumed, and ability of consumers to be better informed and make healthier choices. Potential drawbacks included	Supported by internal grants in the Department of Psychology, Colgate University	Weak (EPHPP)



	Adults ages 21+ who consumed alcohol <b>Study 3:</b> N=191 Adults ages 21+ who consumed alcohol	minerals and vitamins per serving (12 oz). 2) No nutrition label <b>Study 2:</b> Between-subjects experiment in which participants were randomly allocated to view 1 of 4 conditions: 1) Bottle of beer with an accurate nutrition facts label 2) Bottle of beer with a nutrition facts label displaying increased vitamin C content 3) Bottle of beer with a nutrition facts label displaying reduced calorie content 4) Bottle of beer with no nutrition label <b>Study 3:</b> Cross-sectional online survey in which participants viewed the same 4 label conditions used in Study 2 applied to the following products: beer, wine, vodka, soda, and a slice of cheese pizza.	individuals' rated preferences for the types of label information that accompanied each product. <b>Intentions:</b> Participants indicated intended alcohol consumption on 2 scales: 1) Heavy drinking ( $\geq 5$ drinks for males, $\geq 4$ drinks for females within a 2-hour sitting - Response options: will not; one time, 2-3 times, once a week, twice a week, 3-4 times a week, 5-6 days a week, or every day. 2) A typical day of drinking - Response options: no drinks, 1 drink, 2 drinks, 3-4 drinks, 5-6 drinks, 7-8 drinks, 9-11 drinks, 12-15 drinks, 16-18 drinks, 19-24 drinks, or 25+ drinks.	nutrition labels falsely leading consumers to believe there is any nutritional value in alcohol, or causing "young and irresponsible" people to rationalize that drinking is somehow good for them. 87% of participants preferred to have nutrition information over no nutrition information. <b>Intentions:</b> Results showed no evidence that providing a nutrition facts label on alcohol containers affected participants' intentions to drink ( $p > 0.01$ for all, due to multiple comparisons $p < 0.01$ was used for significance cut-off by study authors).		
Maynard, 2018, <sup>68</sup> United Kingdom	2x2 between-subjects experiment, <i>ad libitum</i> test presented to participants as a "taste test"  2 (calorie information, no calorie information) x2 (unit information, no unit information)	N=264  University students who consumed alcohol socially	Participants were randomized to be exposed to 1 of 2 label information conditions: 1) Treatment: a place card with calorie per serving and/or unit information (128 calories, 1.4 units) and product information 2) Control: a place card with product information only (e.g., "most popular beer in the UK"), no calorie or unit information.  Participants were provided with 2 half-pints of beer and accompanying place cards in envelopes based on allocated condition, and were told the envelope contained	After the beer and place cards were removed: <b>Consumption:</b> Researchers measured the volume of beer remaining in participants' glasses. <b>Calorie Estimation:</b> Participants were asked to estimate the number of units and calories in the beer. <b>Intentions:</b> Participants were asked to indicate, in the event they could only consume beer for an evening, how many half-pints they would choose to consume.	<b>Consumption:</b> There was no significant difference in consumption between the treatment condition ( $M=50\%$ consumed) and control ( $M=47\%$ consumed, $p=0.35$ ). <b>Calorie Estimation:</b> A greater percentage of participants in the treatment condition were able to accurately estimate calorie content within 15% of the true value (53.0%) compared to control (10.6%). 36.4% of participants in the treatment condition estimated the exact calorie content, compared to 0% in control. Statistical significance was not tested for these outcomes. <b>Intentions:</b> There was no significant difference between participants in treatment ( $M=4.61$ )	Supported by the Medical Research Council Integrative Epidemiology Unit at the University of Bristol  Moderate (EPHPP)



			information about the beer. They had 10 minutes to complete a "taste test", and instructed to drink as much or as little of the beer as they would like.	and control conditions ( $M=4.43$ ) on reported intentions to drink ( $p=0.39$ ).				
Pabst, 2021, <sup>69</sup> Australia, Germany, Italy	Between- and within-subjects experiment, conducted online	N=2,176  3 (negative media, positive media, no media) x3 (no nutrition information, calorie content, nutrition facts label) x3 (no ingredients, condensed ingredients, extensive ingredients)	Adults who consume wine at least once per month  <b>Media conditions:</b> 1) Media information about the negative aspects of wine ingredients 2) Media information about the positive aspects of wine ingredients 3) No media information <b>Nutrition information:</b> 1) No nutrition information 2) Calorie content per 100mL 3) Nutrition facts label per 100mL (calories, fats, saturated fatty acids, carbohydrates, sugar, protein and salt) <b>Ingredient information:</b> 1) No ingredients 2) Condensed ingredients list 3) Extensive ingredients list	Participants were first randomized to 3 media conditions, and then exposed to wine back labels with varying nutrition and ingredient information.  <b>Conditions:</b>  <b>Media conditions:</b> 1) Media information about the negative aspects of wine ingredients 2) Media information about the positive aspects of wine ingredients 3) No media information <b>Nutrition information:</b> 1) No nutrition information 2) Calorie content per 100mL 3) Nutrition facts label per 100mL (calories, fats, saturated fatty acids, carbohydrates, sugar, protein and salt) <b>Ingredient information:</b> 1) No ingredients 2) Condensed ingredients list 3) Extensive ingredients list	<b>Intentions:</b> Participants were asked to imagine they are buying wine for an informal occasion, are evaluating multiple wines, and are happy with the way the front labels look so have decided to choose a wine based on the back labels. Participants were shown 12 choice scenarios, each with 3 wine back labels and were asked to choose one wine they were most likely to purchase. After each selection, participants were asked whether they would realistically purchase the wine chosen as the most preferred in the choice set. In case of a negative response, the choice was converted to a "None" option.	<b>Intentions:</b> In all media conditions and countries, nutrition information significantly increased purchase intention, and more detailed information (nutrition facts label) was preferred to calorie only or no information ( $p<0.01$ ). The effects of ingredient lists on purchase intentions were influenced by participants' media conditions, and were not consistent across the 3 countries. For participants in the negative media condition in all three countries, a long ingredient list significantly increased purchase intent compared to a short ingredient list or no list ( $p<0.00$ ). In Germany, participants in both the positive and negative media conditions showed increased purchase intent of extensive ingredients lists. Exposure to negative media information increased the odds of participants refraining from choosing any wine option in Italy and Germany ( $p<0.00$ ), but not in Australia.	Partly funded by a research grant offered by the International Organisation of Vine and Wine	Weak (EPHPP)
Vecchio, 2018, <sup>70</sup> Italy	Within-subjects auction experiment	N=103  Adults ages 21+ who bought a bottle of wine at least once per month and consumed alcohol at least once per week	Participants were provided with 4 wine bottles, one by one, with different back labels and asked to express a sealed bid for each wine bottle.  <b>Label conditions:</b> 1) Calorie content per 100mL of wine 2) Nutrition facts label with calorie, fat, carbohydrates,	Participants were asked to rate their level of interest for wine labels with nutrition information, and an ingredients list using a 5-point scale anchored from 1=Not interested to 5=Interested  <b>Intentions:</b> Participants were asked to indicate their willingness-to-pay for each	<b>Support:</b> In a post-auction survey, participants were asked to rate their level of interest for wine labels with nutrition information, and an ingredients list using a 5-point scale anchored from 1=Not interested to 5=Interested  <b>Intentions:</b> Participants attributed the highest value, indicated by the amount they would be willing to	Funded by the University of Naples Parthenope	Weak (EPHPP)	




Mixed-Methods Studies				
Roderique-Davies, 2020, <sup>76</sup> United Kingdom	Mixed methods: mock shopping task with eye tracking technology, qualitative focus group	N=25 (mock shopping task with eye tracking technology) N=10 (focus group)  University students and staff, ages 18+, who regularly consumed alcohol	<p><b>Mock shopping task:</b> Participants “purchased” items from a shelving unit with various alcohol products (beer, cider, wine, liquor). Shelving signs contained information related to the product, prices and health risks. Alcohol container labels included brand, alcohol by volume, liquid measurement, units and health information (not specified), product description, ingredients, and sell by date.</p> <p><b>Focus group:</b> Participants who did not take part in the mock shopping task were shown bottles with 4 different labels.</p> <p><b>Label Conditions:</b></p> <ul style="list-style-type: none"> <li>1) Real label: current industry standard, details not provided</li> <li>2) Back label with units per serving and container, liquid measurements, alcohol by volume, calories (not specified if per serving or container), drink limit guidelines, the National Health Service’s Choices website, and symbols</li> </ul>	<p>bottle of wine displaying four different nutrition labels. Participants were asked to commit to buying the product if they won the auction.</p> <p>pay, to the wine with a nutrition facts label per 100mL (mean=€4.97), and the least value was attributed to wines with a website address linking to detailed product and nutrition information (mean=€3.92). Gender was significantly associated with the value attributed to nutrition information, suggesting women were more willing to pay for detailed nutrition labels information than men.</p>



			representing age restrictions, warnings cautioning about drinking when pregnant and driving 3) Back label with the same information as condition 2, but with larger drink limit recommendations moved to front label 4) Label with the same information as condition 3 but with health warnings moved to front label				
Thomson, 2012, <sup>77</sup> Australia	Mixed methods: cross-sectional telephone survey, qualitative focus groups	N=1,500 (survey) N=45 (focus groups)	Suggested nutrition policies in survey: 1) Nutrition information (calories, protein, fat, carbohydrates, sugar) displayed on label 2) Ingredients displayed on labels.  Focus groups did not discuss nutrition information	<b>Support:</b> Survey participants were asked to rate their support for various alcohol control policies (1 relevant to nutrition information) on a 5-point scale (1=Strongly support, 2=support, 3=neither support nor oppose, 4=oppose, 5=strongly oppose).	<b>Support:</b> 76% of survey participants supported or strongly supported nutrition information being displayed on labels. 86% of survey participants supported or strongly supported ingredients displayed on labels.	Not reported  Moderate (MMAT)	
<b>Cross-Sectional Studies</b>							
Annunziata, 2016a, <sup>72</sup> Italy, France, Spain, United States	Cross-sectional, online survey	Total: N=1,016 Italy: N=330 France: N=185 Spain: N=195 US: N=306  Adults ages 18-70 in Europe, and ages 21-70 in the United States, who consumed wine at least once per month	Participants were presented with 10 wine back labels with varying combinations of label attributes:  <u>Health message</u> : No health message, "Don't drink and drive" logo, or logo and message <u>Nutrition information</u> : No nutrition information, an icon with calorie content per glass, or a nutrition facts label <u>Drink limit guideline</u> : information: Units not to exceed regularly, or no unit guideline <u>Price</u> : Average market price, or average market price plus 10%  Data was analysed first using conjoint-analysis to	<b>Preferences:</b> Participants were asked to express their preferences for each label they viewed on a 5-point scale (1=not preferable at all to 5=totally preferable)  <u>Interest</u> : Participants were asked to indicate their interest in receiving the following information on wine labels on a 5-point scale (1=not at all to 5=extremely): 1) Nutritional value (calories, sugars, carbohydrates, etc.) 2) Maximum number of servings not to exceed 3) Number of glasses per bottle 4) Information about possible side effects	<b>Preferences:</b> Participants in Italy and Spain preferred a simplified label with calorie content per glass, and participants in the United States preferred a nutrition facts label.  <b>Interest</b> : In every country participants expressed the most interest in information about possible side effects. The results of conjoint analysis showed interest in nutrition information on wine labels differed by country. Interest in nutrition information in the United States ( $M=3.6$ ) and Italy ( $M=3.4$ ) was significantly higher than interested in nutrition information in France ( $M=2.2$ ) and Spain ( $M=2.9$ , $p<0.001$ ). <b>Cluster analysis</b> Cluster 1: Attached higher utility to nutrition information, followed by health messages [22% of total]	Partially funded by the International Organization of Vine and Wine and by the University of Naples	Moderate (NOS)



				determine participants' preferences for different label attributes. Next, cluster-analysis methods grouped participants based on their preferences and utility ratings.		sample – characteristics: women ages 35-55, with higher education] Cluster 2: Attached higher utility to health messages, followed by nutrition information [35% of total sample – characteristics: young women (<45), and people with children under the age of 16] Cluster 3: Attached higher utility to health messages, followed by units not to exceed [28% of total sample – characteristics: adult men (>35), with an average level of education] Cluster 4: Attached higher utility to units not to exceed, followed by health messages [15% of total sample – characteristics not described]		
Annunziata, 2016b, <sup>71</sup> Italy  Same survey data as Annunziata, 2016c	Cross-sectional, online survey	N=300  Adults ages 18+ who consumed wine at least once per month	Participants were presented with wine back labels varying in price, health message, nutrition, and drink limit guideline information.  Conditions: <u>Health message</u> : no health message, "Don't drink and drive" logo, or logo and message. <u>Nutrition information</u> : no nutrition information, an icon with calorie content per glass, or a nutrition facts label. <u>Drink limit guideline information</u> : units not to exceed regularly, or no unit guideline <u>Price</u> : €5, or €5.5	<b>Perceptions:</b> Participants were asked to rate their agreement with the following statement: It useful to receive more information on nutritional and health characteristics of wine through the label (1=strongly disagree to 5=strongly agree)	<b>Perceptions:</b> 55% considered nutrition and health information to be useful on labels.	Partially funded by the University of Naples Parthenope within the University program of support for local research	Moderate (NOS)	
Annunziata, 2016c, <sup>73</sup> Italy  Same survey data as Annunziata, 2016b	Cross-sectional, online survey	N=300  Adults ages 18+ who consumed wine at least once per month	Participants were presented with 8 of 36 wine back labels varying in price, health message, nutrition, and drink limit guideline information.  Conditions: <u>Health message</u> : no health message, "Don't drink and drive" logo, or logo and message.	<b>Preferences:</b> Participants were asked to express their preferences for each label they viewed on a 5-point scale (1=not preferable at all to 5=totally preferable)  <b>Perceptions:</b> Participants were asked to rate their agreement with the following statement on a 5-point scale (1=strongly disagree to 5=strongly agree):	<b>Preferences:</b> Participants assigned the greatest utility to the logo and message health warnings on wine labels, followed by nutrition information in the form a calories per glass.  <b>Perceptions:</b> Overall, 55% of participants agreed nutrition and health information to be useful on wine labels; 8% believed it useless. 20% considered labels with calorie	Partially funded by the International Organization of Vine and Wine	Moderate (NOS)	



				<p><u>Nutrition information</u>: no nutrition information, an icon with calorie content per glass, or a nutrition facts labels with Guideline Daily Amount %</p> <p><u>Drink limit guideline information</u>: units not to exceed regularly, or no unit guideline</p> <p><u>Price</u>: €5, or €5.5</p>	<p>It is useful to receive more information on nutritional and health characteristics of wine through the label</p>	<p>and sugar content to be extremely important.</p> <p><b>Cluster analysis:</b></p> <p>Cluster 1: detailed information seekers who preferred the nutrition panel label, and attached high value to health messages [25% of total sample – characteristics: women ages 55+, higher levels of education, and those who suffer from a health condition]</p> <p>Cluster 2: health warning seekers who attached high value to health messages, followed by nutrition information, and preferred the health message with a logo [48% of total sample – characteristics: men ages 18-24 and 35-44, with higher levels of education]</p> <p>Cluster 3: simplified information seekers who attached high value to nutrition information and preferred the calories per glass logo over the nutrition facts label. This cluster mainly comprised people aged 45-54, with lower education levels than the other 2 clusters.</p>		
Bhwara, 2018, <sup>74</sup> Canada (Edmonton, Halifax, Montreal, Toronto, Vancouver)	Cross-sectional, online survey	N=2,729	Adolescents and young adults of the general population ages 16-30	Participants were asked to report their support for 1 policy related to nutrition facts tables on alcohol: 1) Would you support or oppose a government policy that would require mandatory nutrition facts tables (e.g., calories) on alcoholic beverages?	<p><b>Support:</b> Participants indicated the extent of their support for 21 suggested food labelling policies (1 relevant to nutrition facts tables on alcohol) with the response options “Support”, “Neutral”, “Oppose”, or “Don’t know”</p>	<p><b>Support:</b> 65.8% of participants supported mandatory nutrition facts tables on alcohol, 30.0% were neutral, and 4.2% opposed. Age was found to a significant predictor of support for all suggested policy types, with support tending to increase with age (<math>p&lt;0.01</math>).</p>	Funding received from the Public Health Agency of Canada, and the Canadian Institutes of Health Research Chair in Applied Public Health	Moderate (NOS)
Dekker, 2020, <sup>75</sup> Australia, Canada, China, India, New Zealand, United Kingdom, United States	Cross-sectional, online survey	N=7,545	Adults of the general population ages 18+	Participants were asked to complete survey measures rating support for 14 alcohol control initiatives	<p><b>Support:</b> Participants were asked “To what extent do you agree or disagree with each of the following?” and presented with 14 different alcohol control policies, including 2 relevant to nutrition labels: 1) Alcohol products should have calories/kilojoules</p>	<p><b>Support:</b> 71% (<math>M=4.00</math>, <math>SD=1.02</math>) of participants were in support of calorie information being provided on alcohol products. 71% (<math>M=4.03</math>, <math>SD=1.01</math>) were in support of ingredients lists being provided on alcohol products. Across countries and all alcohol control policies, age (<math>p\le0.001</math>),</p>	Not reported	Moderate (NOS)



information provided on the package  
2) Alcohol products should have an ingredients list on the package  
Responses were rated on a 5-point scale (1=Strongly disagree to 5=Strongly agree). Authors considered responses of 4=Agree or 5=Strongly agree as support.

female gender ( $p \leq 0.001$ ), and higher income ( $p=0.028$ ) were positively associated with support. Being a drinker ( $p=<0.001$ ) and drinking 5+ days per week ( $p=<0.001$ ) were negatively associated with overall policy support.

### Qualitative Studies

Pabst, 2019, <sup>78</sup> Germany	Qualitative focus groups	N=21  Adults who consumed wine at least twice per month	All focus group participants were shown four wine back labels: <sup>*</sup> 1) An actual label with legally required information (allergens, alcohol content) 2) Nutrition facts label per 100mL 3) Nutrition facts label per 100mL and a condensed ingredients list 4) Nutrition facts label per 100mL and an extensive ingredient list  The focus groups were video recorded.	<p><b>Label Noticing:</b> If participants did not mention or were not aware of the back label they were asked directly about the importance of back label information.</p> <p><b>Perceptions, Support, Intentions:</b> Participants were shown wine bottles with the first 3 labels and asked to indicate which they would choose and talk about their decision strategy. The fourth label was then revealed, reactions observed, and participants' were asked whether they would buy wine with this label.</p>	<p><b>Label Noticing:</b> Based on authors' review of the video recording, 81% of participants at least quickly scanned the back label, only 35% of those who scanned the back label reported noticing the nutrition or ingredient information. When not specifically prompted, 29% of participants reported noticing the nutrition or ingredients label information.</p> <p><b>Perceptions:</b> Participants did not perceive the nutrition information on wine bottles to be useful, were alarmed when confronted with nutrition information as the calorie content was lower than expected, and considered information such as protein content to be irrelevant. Participants also noted they mainly perceived wine as a special treat that they buy to enjoy the taste and do not consider the calorie content.</p> <p>Positive reactions to ingredients included seeing the bottle contained 99% wine and ingredients did not appear daunting, negative reactions included not expecting to see any ingredients list, ingredient causing confusion or insecurity, and implying the wine is adulterated.</p> <p><b>Support:</b> 10 of 21 participants did not support nutrition labels on wine containers, and participants</p>	Not reported	Strong (CASP)
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perceived this information as relevant only to people with weight or health concerns. 3 of 21 participants supported including nutrition information which would match that which is required for other foods so consumers at least have the option to view it.

**Intentions:** Participants believed displaying calorie information on wine bottles might increase consumption because they learned it contained fewer calories than expected. Participants overall did not believe displaying ingredients information would increase or decrease their consumption.

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\*Images of alcohol container nutrition label images available in Appendix IV



Table 2: Characteristics of Included Studies Examining Labels with Health Messages

First Author, Year, Study Location	Study Design	Sample Size & Characteristics	Methods, Label Characteristics	Outcome Measures	Key Results	Funding Source	Quality Rating (Appraisal Tool)
<b>Experimental and Quasi-experimental Studies</b>							
Al-hamdani, 2017, <sup>89</sup> Canada (Nova Scotia)	Within- and between-subjects experiment conducted online 3 (beer, wine, spirits) x2 (plain, branded) x3 (50%, 75%, 90% size)	N=440  Adults of legal drinking age (19+) who consumed alcohol in the last 12 months	All participants viewed front labels with an image of a diseased liver and the warning: "Heavy drinking causes liver cancer. Your chances for a 5-year survival from the disease are 3% when caught in its late stages."  Participants saw 3 alcohol images separately, 1 randomly assigned image for each alcohol type: beer, wine, spirits, on either a plain or branded bottle, with either a 50%, 75%, or 90% size warning.  Participants completed product-based, consumer-based, and bottle boringness ratings for each image. Preferences for health warnings as a source of knowledge was assessed overall.	<b>Warning recognition:</b> Participants were asked to identify the actual health warning from 4 multiple choice options. Responses were dichotomized: correct/incorrect <b>Product-based ratings:</b> Based on only the physical look of the alcohol product I just saw, I think the alcohol product... a) is attractive relative to the products I have seen before b) is a product that has the potential to be popular among consumers c) is a product that I might try (1=strongly disagree to 5=strongly agree) <b>Consumer-based ratings:</b> Describe the alcohol consumer of this bottle... a) trendy b) successful c) confident (1=strongly disagree to 5=strongly agree) <b>Boringness:</b> This bottle is boring... (1=strongly disagree to 5=strongly agree) <b>Preferences:</b> I prefer warning labels on alcohol bottles as a source of knowledge on the risks of liver cancer from heavy drinking... (1=highly preferred to 5=not preferred at all)	<b>Warning recognition:</b> Accuracy was 75.1% for spirits, 81.8% for wine, and 96.9% for beer. Odds of recognizing the correct warning were higher for plain vs branded bottles for spirits ( $OR=1.7$ ; $p=0.03$ ), but no significant differences for wine ( $p=0.72$ ) or beer ( $p=0.18$ ). <b>Product-based ratings:</b> Warning size had no overall effect on ratings, but: <ul style="list-style-type: none"><li>spirits and wine bottles with 90% vs 50% sized warnings received lower ratings (<math>p&lt;0.01</math>)</li><li>50% sized warnings on beer received higher ratings vs 50% sized warnings on spirits (<math>p&lt;0.001</math>) and wine (<math>p&lt;0.002</math>)</li></ul> Plain packaging resulted in significantly lower ratings than branded packaging for all 3 alcohol types ( $p\leq0.02$ ). <b>Consumer-based ratings:</b> Plain vs branded packaging on wine and beer received significantly lower ratings ( $p<0.05$ for both), but not spirits ( $p=0.06$ ). <b>Boringness:</b> No significant effect on ratings by warning size and packaging type, but branded bottles of beer were rated higher vs spirits ( $p=0.02$ ). <b>Preferences:</b> 15.4% preferred warning labels as a source of knowledge, 15.5% had neutral preference, and 69.1% did not prefer warning labels at all.	Not Reported	Weak (EPHPP)



Al-hamdani, 2015, <sup>88</sup> Canada (Nova Scotia)	Within- and between-subjects experiment conducted online 3 (wine, spirits, beer) x4 (standard, text, text and image, text and image on plain package)	N=92	Text warning read: "Heavy drinking causes liver cancer. Your chances for a 5-year survival from the disease are 3% when caught in its late stages." Text warnings occupied 25% of front label.  Image was of a liver cancer. Text and image warnings occupied 50% of front label.  Plain packaging containers included a text and image warning that occupied 50% of front label and brand imagery elements were removed.  Standard bottles were unaltered commercial bottles.  Participants were randomly assigned to 1 of the 4 packaging levels for each of beer, wine, and spirits, then separately viewed 3 alcohol images and completed measures.	<b>Warning recognition:</b> Participants were asked to identify the actual health warning from 4 multiple choice options. Responses were dichotomized: correct/incorrect  <b>Product-based ratings:</b> Based on only the physical look of the alcohol product I just saw, I think the alcohol product... a) is attractive relative to the products I have seen before b) is a product that has the potential to be popular among consumers c) is a product that I might try (1=strongly disagree to 5=strongly agree)  <b>Consumer-based ratings:</b> When I saw the alcohol product that was displayed to me, I associated it with someone who is... a) trendy b) young c) masculine d) sociable e) confident (1=strongly disagree to 5=strongly agree)	Sex, age, and drinking preferences did not have a significant effect on outcomes.  <b>Warning recognition:</b> Accuracy was 41.0% for spirits, 36.6% for wine, and 27.2% beer. Plain vs standard packaging increased the odds of recognition for wine ( $OR=7.5$ , $p<0.01$ ), but did not significantly affect warning recognition for spirits or beer.  <b>Product-based ratings:</b> Packaging level influenced ratings for all 3 alcohol types overall ( $p<0.05$ ). Ratings were significantly lower for text and image, and text and image on plain packages vs standard bottle for spirits, wine, and beer ( $p<0.05$ for all). Ratings for text only warnings vs standard bottle were significantly lower for spirits ( $p<0.05$ ), but not for wine and beer.  <b>Consumer-based ratings:</b> Packaging level influenced ratings for all 3 alcohol types overall ( $p<0.05$ ). Compared to standard bottle, ratings for text and image were significantly lower for spirits and wine (but not beer), and for text and image on plain packages for spirits, wine, and beer ( $p<0.05$ for all). Ratings were not significantly different for text warnings vs standard bottle for all alcohol types.	Financial support from the Govrn't of Nova Scotia Dept of Health and Wellness	Weak (EPHPP)
Annunziata, 2019, <sup>90</sup> France, Italy	Discrete choice experiment, conducted online	Total N=500 France N=250 Italy N=250  Generation Y (born in years 1978-2000) individuals who consume wine	Survey measures assessed participants' attention to, recall of, and level of processing of current alcohol container health warning labels in Italy (voluntary) and France (mandatory).	<b>Label Recall:</b> Noticing current alcohol container health warning labels was assessed. Response options (never/ rarely/ sometimes/often/ always) Message recall was assessed through free text responses categorized as: correct, wrong, don't remember	<b>Label Recall:</b> • 72% in France and 62% in Italy reported ever noticing the current health warning labels ( $p<0.001$ ) • 40% in France and 30% in Italy correctly recalled the health warning label messages, and 52% in France and 66% in Italy	Funded by University of Naples Parthenope	Weak (EPHPP)



Armitage, 2016, <sup>91</sup> United Kingdom	2 sub-studies, both pre-post wine pouring experiments	N=85 (study 1) N=58 (study 2)	A discrete choice experiment assessed participants' preferences for different attributes for wine container labels. Participants viewed 4 choice sets, each with 3 wine bottles, and asked to choose their preferred bottle. Bottle labels varied by the following attributes and levels:  <u>Health warning &amp; logo:</u> risk of brain damage, risk of car crash, no warning logo <u>Alcohol by volume:</u> 11.5%, 12.5%, 13.5% <u>Message framing:</u> neutral, negative, no warning <u>Logo size:</u> big, small <u>Logo position:</u> back label, front label	<p><b>Message Processing:</b> Participants indicated the effects of current alcohol container health warning labels on their behaviour:</p> <ol style="list-style-type: none"><li>1) I reduced consumption</li><li>2) I thought about reducing consumption</li><li>3) I discussed with friends</li><li>4) I thought about the side effects</li><li>5) No effects</li></ol> <p><i>In the discrete choice experiment:</i> <b>Preferences:</b> In each choice set, participants were asked to choose the preferred bottle to drink during a dinner with friends. Participants' wine choices were analysed with random utility models to calculate the importance assigned to each attribute (warning, alcohol content, message framing, size, position), and the utility of the attribute options (increased utility=more likely to choose)</p>	<p>don't remember the health warning label messages</p> <p><b>Message Processing:</b></p> <ul style="list-style-type: none"><li>• 38% in Italy and 14% in France believed health warning container labels influenced them to think about side effects</li><li>• 7% in Italy and 3% in France believed health warning container labels influenced them to discuss with friends</li><li>• 39% in Italy and 72% in France believed health warning container labels had no effects</li></ul> <p><i>In the discrete choice experiment:</i> <b>Preferences:</b></p> <p>Label elements driving choice:</p> <ul style="list-style-type: none"><li>• health warning logo: 61.4% [negative utility for brain damage logo (<math>p&lt;.01</math>)]</li><li>• logo position: 19.3% [negative utility for front label (<math>p&lt;.01</math>)]</li><li>• message framing: 11.1% [negative utility for negatively framed (<math>p&lt;.01</math>)]</li><li>• logo size: 6.3% [negative utility for big logo (<math>p&lt;0.05</math>)]</li><li>• alcohol by volume: 1.9% [no significant effects]</li></ul>	Funding received from Research United Kingdom	Moderate (EPHPP)	



Blackwell, 2018, <sup>64</sup> United Kingdom	Within- subjects experiment, conducted online	N=1,884	Two tasks to examine impact of labels: <b>Health information task:</b> Participants were randomized to view 1 of 8 labels varying by health message content, specificity, and framing:  1) Alcohol increases your risk of cancer (general, negative) 2) Drinking less reduces your risk of cancer (general, positive) 3) Alcohol increases your risk of bowel cancer (specific, negative) 4) Drinking less reduces your risk of bowel cancer (specific, positive) 5) Alcohol increases your risk of mental illness (general, negative) 6) Drinking less reduces your risk of mental illness (general, positive) 7) Alcohol increases you risk of depression (specific, negative) 8) Drinking less reduces your chance of depression (specific, positive)	1) I intend to drink within [safe levels, Study 1] / [government recommended levels, Study 2] (1=definitely do not, to 7=definitely do) 2) How confident are you that you will be able to drink within [safe levels, Study 1]/ [government recommended levels, Study 2]? (1=not very confident to 7=very confident) <b>Consumption:</b> Units per week consumed, assessed on an adapted version of the timeline follow-back technique at 1 month follow-up.	<ul style="list-style-type: none"><li>• Study 1: treatment M=13.71 units vs control M=21.85 units, <math>p&lt;0.01</math></li><li>• Study 2: treatment M=13.87 units vs control M=20.76 units, <math>p&lt;0.01</math></li></ul>	<b>Intentions:</b> Motivation to drink less was higher among participants exposed to: <ul style="list-style-type: none"><li>• Cancer messages vs mental health messages (<math>p&lt;0.01</math>)</li><li>• Negatively framed messages vs positively framed messages (<math>p&lt;0.01</math>)</li></ul> <b>Reactance:</b> Reactance scores were higher among those exposed to: <ul style="list-style-type: none"><li>• General messages vs specific messages (<math>p=0.01</math>)</li><li>• Negatively framed messages vs positively framed messages (<math>p=0.02</math>)</li></ul> <b>Avoidance:</b> Avoidance scores were higher among those exposed to: <ul style="list-style-type: none"><li>• Cancer messages vs mental health messages (<math>p&lt;0.001</math>)</li><li>• Negatively framed messages vs positively framed messages (<math>p=0.01</math>)</li></ul> <b>Believability:</b> Specific warning statements were rated more believable than general warning statements ( $p<0.001$ ) <b>Self-efficacy:</b> No significant differences in self-efficacy between label conditions. <b>Risk Perceptions:</b> Risk perceptions were higher among	Supported by an Alcohol Research UK grant and an ESRC New Investigator Grant, both awarded by the Medical Research Council Integrative Epidemiology Unit at the University of Bristol. Weak (EPHPP)



Clarke, 2021, <sup>92</sup> United Kingdom	Between-subjects randomised experiment with a 2 (text, no text) x 2 (image, no image) factorial design conducted online	N=6,024	Participants were randomized to 1 of 4 label conditions: 1) Control: no health warning label 2) Text-only health warning label 3) Image-only health warning label 4) Image-and-text health warning label	Participants were randomized to 1 of 4 label conditions: 1) Control: no health warning label 2) Text-only health warning label 3) Image-only health warning label 4) Image-and-text health warning label	<p><b>Unit information task:</b> Participants were randomized to 1 of 4 label conditions varying by standard drink information content and format. Details of labels and results provided in Table 2.</p> <p>Support for label policies was assessed using a 2 (pre, post) x 3 (information type: unit information, health warning, calorie information) design.</p> <p>Participants completed outcome measures post-exposure, except support measures were assessed pre- and post-exposure.</p>	<p>that I drink in the next week would be (1=very difficult to 5=very easy)</p> <p><b>Risk Perception:</b> To what extent do you think that cutting down on your drinking would reduce your risk of alcohol related disease? (1=not at all likely to 5=extremely likely)</p> <p><b>Support:</b> Participants were asked to what extent they agree with the following statements:</p> <ol style="list-style-type: none"><li>1) Alcoholic beverages should include more information about alcohol strength (i.e., unit information)</li><li>2) Alcoholic beverages should have information about the health impact of drinking (i.e., health warning labels)</li><li>3) Alcoholic beverages should include more nutritional information (i.e., calorie information)</li></ol> <p>Answers were rated on a 100-point visual analog scale with the anchors Strongly disagree and Strongly agree.</p>	<p>those exposed to specific messages vs general messages (<math>p=0.01</math>)</p> <p><b>Support:</b> There were small increases in participant support for labels with:</p> <ul style="list-style-type: none"><li>• Standard drink information: pre: M=66.8, SD=26.8 post: M=69.7, SD=26.3, <math>p&lt;0.001</math></li><li>• Nutrition information: pre: M=66.0, SD=28.1, post: M=67.2, SD=28.0, <math>p&lt;0.001</math></li></ul> <p>There was no significant change in support for labels with:</p> <ul style="list-style-type: none"><li>• Health messages: pre: M=61.3, SD=27.9, post: M=61.7, SD=28.9, <math>p=0.36</math></li></ul>



			(3 soft drinks, 3 non-alcoholic beer and wine) in turn. Participants then viewed images of all the 12 drinks simultaneously, in random order, and were asked to choose one they would like to consume either immediately or later on that day. Not selecting a drink was an option.	/help you lead a healthier life] (1=Strongly disagree, 4=neither agree nor disagree, 7=strongly agree). <b>Support:</b> Do you support or oppose putting this label on alcoholic drinks? (1=Strongly oppose, 4=neither oppose nor support, 7=strongly support)	and-text label, then text-only labels. <b>Support:</b> Overall, 32% of participants rated health warning labels as acceptable to some degree (rating $\geq 5$ ) <ul style="list-style-type: none"><li>• Image-and-text labels were less acceptable than text-only labels (3.60 vs 3.87, <math>p&lt;0.001</math>)</li><li>• Image-and-text labels were more acceptable than image-only labels (3.60 vs 3.13, <math>p&lt;0.001</math>)</li></ul>			
de Wilde, 2016, <sup>93</sup> Netherlands	Between-subjects randomized experiment, conducted online	N=262	Individuals ages 17-85 who consumed alcohol	Participants were randomized to 1 of 3 alcohol container warning label conditions, each presented on an image of a beer bottle: 1) Fear based: "Alcohol causes irreversible brain damage" 2) Coping: "Do not finish your drink all at once, enjoy in moderation" 3) Fear based plus coping: "Alcohol causes irreversible brain damage; do not finish your drink all at once, enjoy in moderation"  Each warning label depicted an image of a brain and an alcoholic beverage.  Participants rated perceptions, intentions, and support related to the health warning label they viewed.	<b>Intentions:</b> To what extent are you planning on drinking less alcohol? (1=no intention at all to 10=great intention) <b>Perceptions:</b> All rated on 10-point scale (1=strongly disagree to 10=strongly agree) Credibility: This label is credible Personal relevance: This warning is meant for someone like me Induced fear: This warning makes me afraid Change in intention: This warning makes me want to drink less alcohol Defensive behaviour: This warning makes me want to drink more alcohol Perceived response efficacy: I think it's important or my health to drink less, based on this information Perceived self-efficacy: I think I'm capable of changing my behaviour based on this information	<b>Intentions:</b> No main effect of label condition on intentions. A significant interaction between label condition and age group was found ( $p=0.053$ ): among ages 26+, fear-based labels rated higher ( $M=4.2$ ), than fear based plus coping labels ( $M=3.3$ , $p=0.003$ ). <b>Perceptions:</b> In the 17-25 age group, significant differences were found between label conditions for: credibility ( $p=0.015$ ), induced fear ( $p=0.005$ ), change in intention ( $p=0.006$ ), perceived response efficacy ( $p=0.031$ ) and perceived self-efficacy ( $p<0.001$ ). The fear based plus coping label rated highest, and the coping label rated lowest in all significant differences.  In the 26+ age group, a significant difference was found between label conditions for credibility ( $p=0.007$ ): the fear-based label rated highest ( $M=5.4$ ) and the coping-based label rated lowest ( $M=3.8$ ). <b>Significant covariates:</b> <ul style="list-style-type: none"><li>• Age significantly affected overall personal relevance ratings:</li></ul>	Not reported	Weak (EPHPP)



Gold, 2021, <sup>94</sup> United Kingdom	Between-subjects randomized experiment, conducted online	N=7,516	Participants were randomized to view 1 of 7 label designs: 1) Control: current industry standard with units per container; 2) Food label – serving: units and % of low-risk drinking guideline per serving; 3) Food label – serving and container: units and low-risk drinking guideline per serving and per container; 4) Pictograph – serving: proportion of low-risk drinking guideline per serving; 5) Pictograph - container: low-risk drinking guideline per serving; 6) Pie chart – serving: proportion of low-risk drinking guideline per serving; 7) Risk gradient – serving: units per and low-risk drinking guideline per serving marked on coloured gradient from 0-35 units.  500 participants (~70 per condition) were randomized to see a health warning underneath the assigned label condition which read "Warning: Alcohol causes cancer" in bold with a red border.	<b>Knowledge/Estimation:</b> 1) Participants were asked: "The government's low risk drinking guideline recommends that people not regularly drink more than a certain number of alcohol units per week. What do you think the low-risk drinking guideline is?" (free text numeric response; correct/ incorrect) 2) 10 understanding questions for beer, wine, and spirits, presented in a random order: "How many [servings/containers of this size (in ml)] of [beverage] could you have before reaching 14 units?" (free text numeric response; responses grouped by servings and containers) <b>Risk Perception:</b> 1) To what extent do you think that cutting down on your drinking would reduce your own risk of alcohol related disease? (1=Not at all likely, 2=Not very likely, 3=Slightly likely, 4=Quite likely, 5=Extremely likely) 2) How many units of alcohol do you personally think a person would need to regularly drink per week to seriously damage their health? (free text response). <b>Intentions:</b> Earlier, you saw the following alcohol label [image of beer label displayed]. To what extent do you agree or disagree with the following statement: This information makes me feel motivated to drink less. (1	ages 17-25 ( $M=2.5$ ), ages 26+ ( $M=2.0$ , $p=0.033$ ). • Alcohol consumption level was positively correlated with personal relevance ( $p<0.001$ ) and defensive behaviour ( $p=0.021$ ) • Alcohol consumption level was negatively correlated with public support ( $p=0.001$ )	Participants exposed to the health warning had no significant differences in responses to any outcome measures compared to those not exposed to the health warning (all $p>0.1$ ) <b>Knowledge/Estimation:</b> All 6 custom labels increased knowledge of the low-risk drinking guideline compared to the control (all $p<0.001$ ) <b>Per Serving:</b> Overall, more participants underestimated than overestimated the number of servings to reach guideline: <ul style="list-style-type: none"><li>Least accurate: control condition underestimated by <math>M=-4.64</math> servings, CI: -4.85, -4.44</li><li>Most accurate: pictograph per serving condition underestimated by <math>M=-0.93</math> servings, CI: -1.06, -0.80</li></ul> <b>Per Container:</b> Overall, more participants overestimated than underestimated containers to reach guideline: <ul style="list-style-type: none"><li>Least accurate: food label - per serving overestimated by <math>M=1.10</math> containers, CI: 1.02, 1.17</li><li>Most accurate: control group overestimated by <math>M=0.09</math> containers, CI: 0.03, 0.16</li></ul>	Funded by Public Health England	Moderate (EPHPP)



Hall, 2019, <sup>95</sup> United States	Within-subject experiment, conducted online	N=454	Participants completed a survey with measures assessing knowledge/estimation, risk perceptions, and intentions.	=Strongly disagree, 2=Disagree, 3=Neither agree nor disagree, 4=Agree, 5=Strongly agree)	<ul style="list-style-type: none"><li>All label conditions were significantly less accurate than the control (<math>p&lt;0.001</math>)</li><li>Participants across all conditions were more accurate in estimates for beer, and less accurate for wine and spirits.</li></ul> <p><b>Risk Perception:</b> Participants in all conditions thought on average it was "quite likely" that cutting down on alcohol consumption would reduce risk of disease (<math>M=3.88</math>, <math>SD=1.22</math>), and on average overestimated the number of units needed to consume in a week to seriously damage health (<math>M=26.24</math>, <math>SD=62.60</math>). Experimental label designs had no significant effect on perception responses (all <math>p&gt;0.3</math>).</p> <p><b>Intentions:</b> Experimental labels associated with decreased motivation to drink less vs the control (<math>p&lt;.001</math> for all), albeit by a very small amount (0.1 - 0.3 points on a 5-point scale)</p>	<p><b>Perceptions:</b></p> <p>1) Which of these warnings would most discourage you from wanting to use alcohol?</p> <p>2) Which of these warnings would least discourage you from wanting to use alcohol?</p> <p><b>Support:</b></p> <p>3) Which of these warnings would you most support being on alcohol?</p> <p>Response options for each question were warnings with each of the 4 causal language variants.</p>	<p><b>Perceptions:</b> 72.7% of participants selected "causes" as the most effective language to discourage alcohol use.</p> <p>63.4% selected "may contribute to" as the least effective language to discourage alcohol use.</p> <p><b>Support:</b> Overall, stronger language in alcohol health warnings was more supported than weaker language:</p> <ul style="list-style-type: none"><li>28.9% supported "causes"</li><li>27.5% supported "contributed to"</li><li>20.9% supported "can contribute to"</li><li>22.7% supported "may contribute to"</li></ul> <p>Heavy alcohol consumers were less likely to support "causes" than light drinkers (<math>p&lt;0.001</math>)</p>	Supported by the National Cancer Institute, National Institutes of Health, the National Heart, Lung, and Blood Institute, the Food and Drug Administration, Center for Tobacco Products, Carolina Population Center, Economic and Social	Weak (EPHPP)



						Research Council	
Hobin, 2020a, <sup>81</sup> Canada (Yukon, NWT)	Quasi-experiment, prospective cohort conducted using 3 waves of surveys (1 pre-, 2 post-intervention)	N=2,049	<u>Intervention condition:</u> 3 rotating labels with a cancer warning, standard drink information, and national drinking guidelines were affixed to all alcohol containers in 1 liquor store in the intervention site for a total of 5 months. Labels were 5cm x 3cm in size, brightly coloured, included a phone number and website for information or help, and were affixed on the sides or backs of containers.  <u>Comparison condition:</u> Warning labels cautioning about drinking while pregnant or operating a motor vehicle and a general health message continued to be affixed to all alcohol containers in the 2 liquor stores in the comparison site.  Participants were systematically recruited as they exited liquor stores, and independently completed survey on a tablet without interviewer assistance. In follow-up waves, repeat participants were emailed the survey, and identical procedures to recruit new participants in Wave 1 were used in follow-up waves.	<b>Label Noticing:</b> Participants were asked if they had seen any warning labels on bottles or cans of beer, wine, hard liquor, coolers or ciders (noticed/did not notice/don't know)  <b>Label Recall:</b> Those who reported noticing warning labels were asked what messages they saw on the labels (unprompted, open response). Any mention of "cancer" was coded as recall of the cancer label.  <b>Knowledge:</b> Based on what you know or believe, can drinking alcohol cause . . . ? This item was asked for breast cancer, liver disease, the flu, and [when pregnant] harm to unborn babies. (yes/no/don't know)  <b>Support:</b> Participants were asked the extent to which they agree or disagree with the statement, "Cans and bottles of alcoholic beverages should be labeled with warnings describing the link between alcohol and diseases, such as cancer" on a 5-point scale (1=strongly disagree to 5=strongly agree)	<b>Label Noticing:</b> Noticing of any warning label was high across all 3 waves in both the intervention and comparison conditions (>75% for all) and was not significantly different between the conditions.  <b>Label Recall:</b> Greater increases in recall of the warning label message between waves 1 and 3 in the intervention vs comparison condition: <ul style="list-style-type: none"><li>• Unprompted recall (+12.6% vs +1.6%, AOR=8.8, 95% CI: 1.6, 49.4)</li><li>• Prompted recall (+23.7% vs +4.6%, AOR=3.5, 95% CI: 2.0, 6.2)</li></ul> <b>Knowledge:</b> Knowledge that alcohol can cause cancer was low in wave 1 in both conditions, and greater increases in knowledge between waves 1 and 3 occurred in the intervention vs comparison condition (+16.0% vs +11.4%, AOR=1.1, 95% CI: 0.7, 1.6) <ul style="list-style-type: none"><li>• Those who recalled the cancer warning label had greater odds of knowing alcohol can cause cancer (AOR=2.3, 95% CI: 1.9, 2.7)</li></ul> <b>Support:</b> The majority of participants agreed or strongly agreed alcohol containers should be labeled with warnings in both the intervention and comparison sites. <ul style="list-style-type: none"><li>• Treatment: Wave 1=57.4%, Wave 2=57.3%, Wave 3=61.3%</li><li>• Comparison: Wave 1=53.7%, Wave 2=51.6%, Wave 3=53.7%</li></ul> Those who know alcohol can cause cancer are more likely to support health warning labels vs to those who do not know (AOR=1.6, 95% CI: 1.38, 1.89).	Project funding from Health Canada; 1 author received funds from Swedish and Finnish government retail alcohol monopolies; 1 author received partial funds from Educ'alcool from 2008-2014	Weak (EPHPP)



Hobin, 2020b, <sup>80</sup> Canada (Yukon, NWT)  Article from single labelling study conducted in Yukon/NWT, Canada	Quasi-experiment, prospective cohort conducted using 3 waves of surveys (1 pre-, 2 post-intervention)	N=2,049	<p><b>Intervention condition:</b> 3 rotating labels with a cancer warning, standard drink information, and national drinking guidelines were affixed to all alcohol containers in 1 liquor store in the intervention site for a total of 5 months. Labels were 5cm x 3cm in size, brightly coloured, included a phone number and website for information or help, and were affixed on the sides or backs of containers.</p> <p><b>Comparison condition:</b> Warning labels cautioning about drinking while pregnant or operating a motor vehicle and a general health message continued to be affixed to all alcohol containers in the 2 liquor stores in the comparison site.</p> <p>Participants were systematically recruited as they exited liquor stores, and independently completed survey on a tablet without interviewer assistance. In follow-up waves, repeat participants were emailed the survey, and identical procedures to recruit new participants in Wave 1 were used in follow-up waves.</p>	<p><b>Label Noticing:</b> Participants were asked if they had seen any warning labels on bottles or cans of beer, wine, hard liquor, coolers or ciders (yes/no/don't know/prefer not to say). Those who reported seeing warning labels were asked if they had noticed any changes to warning labels on bottles or cans of beer, wine, hard liquor, coolers or ciders (yes vs no/don't know).</p> <p><b>Message Processing:</b></p> <ol style="list-style-type: none"> <li>How often have you read or looked closely at the warning labels on bottles and cans of beer, wine, liquor, coolers, or ciders?</li> <li>How often have you thought about the warning labels on bottles and cans of beer, wine, hard liquor, coolers, or ciders?</li> <li>How often have you talked about the warning labels on bottles or cans of beer, wine, hard liquor, coolers, or ciders with others?</li> </ol> <p>(1=never, 2=rarely, and 'don't know' versus 3=sometimes, 4=often, and 5=very often)</p> <p><b>Behaviour:</b> Has the amount of alcohol you are drinking changed as a result of the warning labels on bottles or cans of beer, wine, hard liquor, coolers, or ciders? (less, same amount, more, don't know or prefer not to say)</p>	<p><b>Label Noticing:</b> Greater increases in noticing changes to warning labels between waves 1 and 3 in intervention vs comparison condition (+31.1% vs -3.4%, AOR=17.2, 95% CI: 8.2, 36.2)</p> <p><b>Message Processing:</b> Greater increases in all 3 measures of message processing between waves 1 and 3 in intervention vs comparison condition:</p> <ul style="list-style-type: none"> <li>Reading labels closely (+6.8% vs -15.7%, AOR=2.6, 95% CI: 1.8, 3.7)</li> <li>Thinking about labels: (+11.6% vs -6.3%, AOR=2.7, 95% CI: 1.8, 4.0)</li> <li>Talking with others about the labels: (+9.5% vs -3.3%, AOR=3.4, 95% CI: 1.9, 5.9)</li> </ul> <p><b>Behaviour:</b> Participants in the intervention condition had higher odds of reporting drinking less alcohol due to labels between waves 1 and 3 vs the comparison condition: (+3.0% vs -8.0%, AOR=3.7, 95% CI: 2.0, 7.0).</p>	Project funding from Health Canada; 1 author received funds from Swedish and Finnish government retail alcohol monopolies; 1 author received partial funds from Educ'alcool from 2008-2014	Weak (EPHPP)
Hobin, 2020c, <sup>79</sup> Canada (Yukon, NWT)  Article from single labelling study conducted in	Quasi-experiment, prospective cohort conducted using 2 waves of surveys (1 pre-, 1 post-intervention)	N=1,647	<p><b>Intervention condition:</b> 3 rotating labels with a cancer warning, standard drink information, and national drinking guidelines were affixed to all alcohol containers in 1 liquor store in the intervention site for a total of 5 months. Labels were 5cm x 3cm in size,</p>	<p><b>Label Noticing:</b> Participants were asked if they have seen any warning labels on bottles or cans of beer, wine, hard liquor, coolers, or ciders (yes/no/do not know).</p> <p><b>Label Recall:</b> Participants were asked to indicate what messages they had seen on warning labels on bottles or cans of beer, wine, or liquor (unprompted, open</p>	<p><b>Label Noticing:</b> Noticing was high and not significantly different between the intervention (wave 1=80.4%, wave 2=76.7%) and comparison condition (wave 1=87.0%, wave 2=78.5%).</p> <p><b>Label Recall:</b> Greater increases in warning label message recall between waves 1 and 2 in intervention vs comparison</p>	Project funding from Health Canada – Substance Use and Addiction Program. 1 author was	Weak (EPHPP)



Yukon/NWT,  
Canada

comparison sites, consumed ≥1 drinks in the past 30 days, had purchased alcohol at the liquor store, and did not self-report being pregnant or breastfeeding

brightly coloured, included a phone number and website for information or help, and were affixed on the sides or backs of containers.

**Comparison condition:**  
Warning labels cautioning about drinking while pregnant or operating a motor vehicle and a general health message continued to be affixed to all alcohol containers in the 2 liquor stores in the comparison site.

Participants were systematically recruited as they exited liquor stores, and independently completed survey on a tablet without interviewer assistance. In follow-up waves, repeat participants were emailed the survey, and identical procedures to recruit new participants in Wave 1 were used in follow-up waves.

response). Any mention of "cancer" or "drinking guidelines" were coded yes for unprompted recall of cancer and drinking guideline labels.

**Message Processing:**

- 1) How often, if at all, have you read or looked closely at the warning labels on bottles and cans of beer, wine, hard liquor, coolers, or ciders?
- 2) How often, if at all, have you thought about the warning labels on bottles and cans of beer, wine, hard liquor, coolers, or ciders?
- 3) How often have you talked about the warning labels on bottles or cans of beer, wine, hard liquor, coolers, or ciders with others?  
(1=never and 2=rarely versus 3=sometimes, 4=often, and 5=very often)

**Intentions:** To what extent, if at all, have warning labels on bottles or cans of beer, wine, hard liquor, coolers, or ciders influenced you to cut down your drinking? (1=no influence to 5=main influence)

**Behaviour:** Has the amount of alcohol you are drinking changed as a result of the warning labels on bottles or cans of beer, wine, hard liquor, coolers, or ciders? ("less" vs "same amount" or "more").

conditions (+24.2% vs 0.6%, AOR=32.2, 95% CI: 5.4, 191.1, p<0.05).

- The warning label message was more likely to be recalled by those with higher education (AOR=1.8, 95% CI: 1.0, 3.1, P<0.05) and adequate literacy (AOR=1.8, 95% CI: 1.1, 2.9, p<0.05)

**Message Processing:** Greater increases in message processing between waves 1 and 2 in intervention vs comparison condition:

- Reading labels closely (+5.3% vs -8.8%, AOR=1.8, 95% CI: 1.3, 2.5, p<0.05)
- Thinking about labels (+11.2% vs -1.5%, AOR=2.0, 95% CI: 1.4, 2.9, p<0.05)
- Talking with others about labels (+11.5% vs +1.9%, AOR=2.1, 95% CI: 1.3, 3.6, p<0.05)

Females were more likely than males to closely read the label (AOR=1.2, 95% CI: 1.0, 1.5, p<0.05), and participants ages 45+ were less likely to talk about the labels compared to those ages 19 to 25 (AOR=0.6, 95% CI: 0.4, 0.9, p<0.05).

**Intentions:** Greater increases in intentions to cut down drinking between waves 1 and 2 in the intervention vs comparison condition (+4.0% vs -0.5%, AOR=2.5, 95% CI: 1.3, 4.7, p<0.05).

- Females were more likely than males to report cutting down drinking (AOR=1.5, 95% CI: 1.0, 2.1, p<0.05)
- Those with medium (AOR=0.5, 95% CI: 0.3, 0.8) and high income (AOR=0.6, 05% CI: 0.4, 1.0) were less likely to report

supported by  
a NIAAA grant



Jongenelis, 2018a, <sup>96</sup> Australia	Between-subjects randomized experiment with a 2 (single source, multiple source) x6 (health message variants) design conducted online	N=2,087	Participants were unequally randomized to 1 of 2 warning label source conditions: <b>Single source (20% of participants):</b> Participants were randomized to view 1 of 6 warning labels, and viewed the same warning 5 times on screen <b>Multiple sources (80% of participants):</b> Participants were randomized to view 1 of 6 warning labels via 3 online simulation locations: a living room, a doctor's office, and a bus stop.	<b>Intentions:</b> 1) To what extent do you think that you, personally, should reduce the amount of alcohol you consume? (1=not at all to 5=to a very great extent) 2) To what extent do you think that you, personally, will actually reduce the amount of alcohol you consume? (1=not at all to 5=to a very great extent) 3) Do you intend to drink 5 or more standard alcoholic beverages in a single session in the next 2 weeks? (1=definitely intend not to, to 5=definitely intend to)	<b>Intentions:</b> Greater improvements in all intentions ratings from pre-to post-exposure in the multiple sources vs single source condition: <ul style="list-style-type: none"><li>Belief one should reduce alcohol consumption (+0.3 vs +0.09, p&lt;0.001)</li><li>Belief one will actually reduce alcohol consumption (+0.28 vs +0.00, p&lt;0.001)</li><li>Intention to consume 5+ drinks (-0.23 vs -0.14, p&lt;0.001)</li></ul> <b>Perceptions:</b> Those in the multiple sources condition found the health messages more believable (3.8 vs 3.59), convincing (3.58 vs	Supported by the Western Australian Health Promotion Foundation (Healthway) research grant	Moderate (EPHPP)
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			<p>Clicking on different items (including alcohol containers) in each simulation produced the allocated warning, participants had to click on all 5 “warning” items before moving on to the next simulation location, viewing the same warning label a total of 15 times.</p> <p><u>Warning label messages:</u></p> <ol style="list-style-type: none"><li>1) Alcohol increases your risk of bowel cancer</li><li>2) Alcohol increases your risk of breast, bowel, throat, and mouth cancer</li><li>3) Alcohol increases your risk of breast cancer</li><li>4) Warning: Alcohol increases your risk of cancer</li><li>5) Alcohol increases your risk of cancer</li><li>6) Reduce your drinking to reduce your risk of cancer</li></ol> <p>Participants answered survey questions about intentions pre- and post-health warnings exposure, and about perceptions post-exposure.</p>	<p><b>Perceptions:</b></p> <ol style="list-style-type: none"><li>1) How believable/unbelievable did you find this message? (1=not at all believable to 5=very believable)</li><li>2) How convincing/unconvincing did you find this message? (1=not at all convincing to 5=very convincing)</li><li>3) How much do you feel this message applies to you? (1=it does not apply to me at all to 5=it directly applies to me)</li></ol>	<p>3.29) and personally relevant (3.06 vs 2.83) compared to those in the single source condition (<math>p&lt;0.001</math> for all).</p>		
Jongenelis, 2018b, <sup>97</sup> Australia	Within- and between- subjects randomized experiment, conducted online	N=364	<p>Participants were randomized to view 1 of 5 health warning labels via 3 online simulation locations: a living room, a doctor’s office, and a bus stop.</p> <p>Clicking on different items (including alcohol containers) in each simulation produced the allocated health warning, participants had to click on all 5 “warning” items before moving on to the next simulation location, viewing the same warning label a total of 15 times.</p>	<p><b>Risk Perceptions:</b> To what extent do you believe alcohol is a risk factor for each of the following conditions: cancer, diabetes, liver damage, mental illness and heart disease (1=not at all to 5=to a very great extent)</p> <p><b>Intentions:</b></p> <ol style="list-style-type: none"><li>1) To what extent do you think that you should reduce the amount of alcohol you consume? (1=not at all to 5=to a very great extent)</li><li>2) To what extent do you think that you, personally, will actually reduce the amount of alcohol you</li></ol>	<p><b>Risk Perceptions:</b> Belief in alcohol as a risk factor significantly increased from pre- to post-exposure for those exposed to warning labels for:</p> <ul style="list-style-type: none"><li>• Cancer (2.78 vs 3.58, <math>p&lt;0.001</math>)</li><li>• Diabetes (3.29 vs 4.35, <math>p&lt;0.001</math>)</li><li>• Mental illness (3.15 vs 4.07, <math>p&lt;0.001</math>)</li><li>• Heart disease (3.51 vs 4.34, <math>p&lt;0.001</math>)</li></ul> <p>No significant change in belief in alcohol as a risk factor for liver damage (4.35 vs 4.50, <math>p=0.083</math>),</p>	<p>Supported by the Western Australian Health Promotion Foundation (Healthway) research grant</p>	Weak (EPHPP)



			<p><u>Warning label messages:</u></p> <ol style="list-style-type: none"> <li>1) Warning: Alcohol increases your risk of cancer</li> <li>2) Warning: Alcohol increases your risk of diabetes</li> <li>3) Warning: Alcohol increases your risk of liver damage</li> <li>4) Warning: Alcohol increases your risk of mental illness</li> <li>5) Warning: Alcohol increases your risk of heart disease</li> </ol> <p>Participants answered survey questions about perceptions and intentions pre- and post-exposure to health warnings.</p>	<p>consume? (1=not at all to 5=to a very great extent)</p> <p>3) Do you intend to drink 5 or more standard alcoholic beverages in a single session in the next 2 weeks? (1=definitely intend not to, to 5=definitely intend to)</p>	<p>though beliefs were already high for this condition.</p> <p><b>Intentions:</b> Composite scores of intention outcomes significantly increased from pre- to post-exposure for health warnings about:</p> <ul style="list-style-type: none"> <li>• Diabetes (2.50 vs 2.86, p&lt;0.001)</li> <li>• Mental illness (2.83 vs 3.03, p=0.008)</li> <li>• Cancer (2.65 vs 2.89, p=0.002)</li> <li>• Heart disease (2.71 vs 2.90, p=0.033)</li> </ul> <p>No significant change in intentions form pre- to post-exposure for the liver damage health warning (2.95 vs 3.01, p=0.422).</p>		
Kersbergen, 2017, <sup>98</sup> United Kingdom	2 sub-experiments  2 (advice condition: alcohol or control) x2 (attention condition: brand or health) between-subjects eye-tracking experiment	N=60 (study 1) N=120 (study 2)	<p><b>Study 1:</b> Participants viewed 40 beverage containers (20 alcohol, 20 soda) while eye movements were tracked. Alcohol container labels included UK responsibility deal guidelines: alcohol content, daily drink limit guidelines, a pregnancy warning, an optional URL to Drink Aware website, and an optional responsibility statement.</p> <p>Participants answered survey questions about motivation to reduce alcohol consumption.</p> <p><b>Study 2:</b> Similar stimuli to Study 1, except participants viewed 30 containers (15 alcohol, 15 soda), and were randomly allocated to advice and attention conditions.</p> <p><b>Advice conditions:</b> Brief advice on sensible alcohol consumption, or brief advice about study habits.</p>	<p><b>Study 1</b></p> <p><b>Attention:</b> Eye-tracking technology measured time spent viewing different label components: health information, brand information, or the rest of the packaging.</p> <p><b>Motivation:</b> A motivation to reduce drinking score was created by averaging the Temptation Restraint Inventory restraint subscale, the Readiness to Change Questionnaire contemplation and action subscales, and the contemplation ladder.</p> <p><b>Study 2</b></p> <p><b>Attention:</b> Same outcome measure as Study 1</p> <p><b>Intentions:</b></p> <ol style="list-style-type: none"> <li>1) Participants were asked how many pints of cider/beer, large glasses of wine, and shots of hard liquor they intended to drink in the next week. Responses combined into a single measure of intended consumption in UK units</li> </ol>	<p><b>Study 1</b></p> <p><b>Attention:</b> Participants spent less time viewing health information than both brand information and the rest of the packaging on alcohol containers (p&lt;0.001). Alcohol warning labels were viewed longer when they were larger in size and less complex.</p> <p><b>Motivation:</b> Motivation to reduce drinking was negatively associated with attention to branding on alcohol containers (p&lt;0.01) and health information on alcohol containers (p&lt;0.05).</p> <p><b>Study 2</b></p> <p><b>Attention:</b> Participants in the health attention condition fixated longer on health information than brand information (<math>M=2.13</math> vs 0.86 seconds, p&lt;0.001). Those in the brand attention condition fixated longer on brand information than health information (<math>M=2.41</math> vs 1.05 seconds, significance not reported).</p>	Funding from the Medical Research Council, British Heart Foundation, Cancer Research UK, Economic and Social Research Council, and the National Institute for Health Research under the auspices of the UK Clinical Research Collaboration	Moderate (EPHPP)



			<u>Attention conditions:</u> Bright yellow border around health information, or bright yellow border around brand information	2) Binge drinking intentions were measured with three 9-point Likert scales (e.g., "Do you plan to binge-drink in the next week?"). The scores were averaged into a single binge drinking measure	<b>Intentions:</b> No significant effect of advice or attention conditions on intentions to reduce drinking.		
Monk, 2017, <sup>99</sup> United Kingdom	Eye-tracking experiment, using a 2 (Image: graphic or neutral) x2 (Area of interest: text or image) x2 (Positive expectancy change: increase or decrease/no change) mixed factorial design	N=22  University undergraduate students	Participants viewed 15 of 50 possible alcohol health warning labels. Each warning contained text describing adverse effects of consuming alcohol (e.g., alcohol damages brain functioning, alcohol causes liver disease), and a content congruent image. Participants were randomized to view 1 of 2 label image severity levels: <u>Graphic condition:</u> explicit (e.g., medical images) <u>Neutral condition:</u> Non-explicit (e.g., cartoon physiology)	<b>Label Attention:</b> Eye-tracking technology measured fixation points on areas of interest (image, text, or surrounding area), and dwell time in milliseconds (ms) on areas of interest.	<b>Label Attention:</b> Areas of interest: <ul style="list-style-type: none"><li>Dwell time on label images (<math>M=55243.09</math> ms) were higher than on text (<math>M=2777.05</math> ms, <math>p&lt;0.001</math>).</li></ul> <b>Image severity:</b> <ul style="list-style-type: none"><li>No significant difference in image dwell time between neutral and graphic image conditions.</li></ul> <b>Positive expectancy change:</b> <ul style="list-style-type: none"><li>No significant difference in dwell times between those whose positive expectancies increased or decreased.</li></ul> <b>A significant 2-way interaction was found between area of interest and positive expectancy change:</b> <ul style="list-style-type: none"><li>Image dwell time was longer for those whose positive expectancy increased (<math>M=6211.31</math> ms) vs those whose positive expectancy decreased (<math>M=4527.79</math> ms, <math>p&lt;0.01</math>)</li></ul> <b>Text dwell time was shorter in those whose positive expectancies increased (<math>M=2007.85</math> ms) vs decreased (<math>M=3309.57</math>, <math>p&lt;0.001</math>).</b>	Not reported	Moderate (EPHPP)
Pechey, 2020, <sup>100</sup> United Kingdom	Between-subjects experiment conducted online	N=5,528  Adults ages 18+ who self-reported consuming either beer or	Participants were randomized to view 1 of 21 image-and-text health warning labels on an alcoholic drink, then answered survey questions.	<b>Perceptions/Reactions :</b> Negative emotional arousal: How [afraid/worried/uncomfortable/dispersed] does the label on this drink make you feel? (1=not at all to 7=very)	<b>Perceptions/Reactions:</b> <ul style="list-style-type: none"><li>Bowel cancer labels received the highest negative emotional arousal ratings (<math>M=4.53</math>) vs the other 6 health consequence labels (no overlap in respective 95% CIs).</li></ul>	Funded by a Collaborative Award in Science from Wellcome Trust	Weak (EPHPP)



	wine at least once a week. Recruited though a market research company.	Each label depicted 1 of 7 health consequences, stating "Alcohol causes..." 1) Bowel cancer 2) Breast cancer 3) Liver cancer 4) 7 types of cancer 5) Heart disease 6) Liver disease 7) Liver cirrhosis	Desire to consume the labelled product: How much do you want to drink this (wine or beer) right now? (1=Not at all to 7=very much) <b>Support:</b> Do you support or oppose putting this label on alcoholic drinks? (1=Strongly oppose, 4=neither oppose nor support, 7=strongly support) Ratings above 4 considered support.	• No significant differences between label messages and desire to consume, but bowel cancer labels received overall lowest ratings ( $M=3.20$ ), the 7 types of cancer labels received the highest ratings ( $M=3.41$ ) Of the effectiveness free-text comments, 25.5% felt health warning labels would be effective in reducing alcohol consumption. Surprise at the link between alcohol and cancer, especially bowel and breast cancer, were often expressed in other free-text comments. <b>Support:</b> <ul style="list-style-type: none"><li>Only liver cirrhosis labels received a mean score above 4 (<math>M=4.01</math>)</li><li>Bowel cancer labels were least supported (<math>M=3.65</math>) vs the 6 other label types (no overlap in respective 95% CIs).</li></ul> Of the acceptability free-text comments, 26.5% found health warning labels on alcohol acceptable.		
Pettigrew, 2016, <sup>106</sup> Australia	Between-subjects pre-post-experiment conducted online	N=1,680 Adults ages 18-65 who have consumed alcohol at least 2 days per month	Participants were randomized to view 1 of 6 health message conditions via 3 online simulation locations: a living room, a doctor's office, and a bus stop. Clicking on different items (including alcohol containers) in each simulation produced the allocated health message, participants had to click on all 5 "message" items before moving on to the next simulation location (viewed the same health message a total of 15 times). <b>Health messages:</b> 1) Alcohol increases your risk of bowel cancer	<b>Measured post-exposure to health messages</b> <b>Perceptions:</b> 1) How believable/unbelievable did you find this message? (1=not at all believable to 5=very believable) 2) How convincing/ unconvincing did you find this message? (1=not at all convincing to 5=very convincing) 3) How much do you feel this message applies to you? (1=it does not apply to me to 5=it directly applies to me)  <b>Measured pre- and post-exposure to health messages</b> <b>Intentions:</b> 1) To what extent do you think that you should reduce the	<b>Perceptions:</b> All 6 health messages were found to have neutral to favourable ratings across all 3 outcomes (all composite $M>3.4$ ). "Alcohol increases your risk of bowel cancer" consistently rated highest across all 3 outcomes, though statistical significance was not tested. <b>Intentions:</b> Composite intentions scores changed favorably across all 6 conditions ( $p<0.001$ to $p<0.005$ ). <ul style="list-style-type: none"><li>"Alcohol increases your risk of bowel cancer" produced the largest overall change in intentions, though no significant differences between the 6 health messages were found</li></ul>	Supported by the Western Australian Health Promotion Foundation (Healthway) Weak (EPHPP)



Pham, 2018, <sup>101</sup> Australia	2 between-subject experiments	N=559 (study 1) Recruited online via email, social media, and snowball recruitment  N=87 (study 2) Recruited in person at a university campus.  Adults who live in Australia	<p><b>Study 1:</b> Participants were randomly assigned to view 1 of 4 warning label conditions:            1) Control: Get the Facts DrinkWise logo with website URL, and pregnancy warning pictogram, no colour.            2) Colour: Logo and pictogram coloured red instead of black            3) Size: Logo and pictogram size increased by 50%, no colour            4) Colour and size: Logo and pictogram coloured red and size increased by 50%.</p> <p><b>Study 2:</b> Participants were randomly assigned to view 1 of the same 4 warning labels conditions used in Study 1.</p>	<p>2) Alcohol increases your risk of breast, bowel, throat, and mouth cancer            3) Alcohol increases your risk of breast cancer            4) Warning: Alcohol increases your risk of cancer            5) Alcohol increases your risk of cancer            6) Reduce your drinking to reduce your risk of cancer</p> <p>amount of alcohol you consume? (1=not at all to 5=to a very great extent)</p> <p>2) To what extent do you think that you, personally, will actually reduce the amount of alcohol you consume? (1=not at all to 5=to a very great extent)</p> <p>3) Do you intend to drink 5 or more standard alcoholic beverages in a single session in the next 2 weeks? (1=definitely intend not to, to 5=definitely intend to)</p> <p>A composite score comprising all 3 intention variables was derived by calculating the mean of all intention outcome variables.</p>	<p>Those with baseline higher risk of alcohol-related harm had greater reductions in intention composite scores vs those with baseline lower risk in all 6 conditions (<math>p&lt;0.001</math>).</p>	Not reported	Weak (EPHPP)
Sillero-Rejon, 2019, <sup>103</sup> Spain	Between-subjects eye-tracking experiment	N=64  Adults ages 18-30, recruited from university staff and	Participants were randomized to view images of beers with study-designed container label conditions which varied by:	<b>Label Attention:</b> Eye-tracking technology measured the number of fixations to the health warning label	<b>Label Attention:</b> Health warning label size had a positive effect on number of fixations, there were an average of 1.33 fixations on small health warnings and an average	Not reported	Weak (EPHPP)



			<p>students, and members of the general public</p> <p><u>ABV content:</u> 0.4%, 4.6%, 15%</p> <p><u>Size:</u> small vs large <u>Format:</u> text or traffic light</p> <p>A sub-sample of half of the participants viewed images of beers with a health warning label ("Alcohol harms your mind and your body") which varied in size (small vs large)</p>	<p>of 3.79 fixations on large health warnings (<math>p&lt;0.001</math>).</p> <p>A significant effect of ABV% on health warning fixations was found (<math>p&lt;0.001</math>), with more fixations on 4.6% conditions (<math>M=3.47</math>), followed by 15% conditions (<math>M=2.41</math>), and least fixations on 0.4% conditions (<math>M=1.81</math>).</p>		
Sillero-Rejon, 2018, <sup>102</sup> United Kingdom	Between-subjects eye-tracking experiment	N=128	<p>Participants first randomized to 1 of 2 self-affirmation conditions. Participants received a list of values, and:</p> <p><u>Self-affirmation condition:</u> participants selected the most important value to them and wrote a short essay about it</p> <p><u>Control condition:</u> participants selected the least important value to them and wrote about why it could be important to someone else.</p> <p>Participants then viewed a total of 12 pictorial health warning labels on the bottom third of a large beer can. Health warnings were related to 6 health outcomes, text stated "Alcohol causes..."</p> <ul style="list-style-type: none"><li>1) Liver cirrhosis</li><li>2) Brain damage</li><li>3) Mental illness</li><li>4) Cancer</li><li>5) Road accidents</li><li>6) Risk to an unborn child</li></ul> <p>Images varied by severity, all participants viewed 6 moderately-severe and 6 highly-severe images.</p>	<p><b>Attention:</b> Eye-tracking technology measured the number of fixations on the health warning labels.</p> <p><b>Perceptions:</b></p> <p><b>Avoidance:</b> How likely is it that you would try to avoid thinking about the warning?</p> <p>How likely is it that you would try to avoid looking at the warning on your alcohol can?</p> <p>How likely is it that you would keep the can out of sight to avoid looking at the warning? (1=not at all likely to 5=extremely likely)</p> <p><b>Reactance:</b> This warning annoys me. This warning is trying to manipulate me.</p> <p>The health effect on this warning is overblown. (1=strongly disagree to 5=strongly agree)</p> <p><b>Perceived Susceptibility:</b> How likely is it that I will experience the problems described in the message if I do not change my drinking behaviour? (1=not at all likely to 5=very likely)</p> <p><b>Perceived effectiveness:</b> How effective is this health warning? (1=not at all to 5=extremely)</p> <p><b>Motivation:</b></p>	<p><b>Attention:</b> Overall participants spent 47% of time looking at the pictorial health warnings. No significant effect of self-affirmation or image severity had significant on the number of fixations on health warnings.</p> <p><b>Perceptions:</b> No significant effect of self-affirmation condition on any perceptions measures.</p> <p>Image severity had a significant effect on most perceptions measures. Highly-severe label images increased ratings for the following measures relative to moderately-severe label images (<math>p&lt;0.001</math> for all):</p> <ul style="list-style-type: none"><li>Avoidance: 3.26 vs 2.31</li><li>Reactance: 2.42 vs 2.20</li><li>Perceived effectiveness: 3.25 vs 2.50</li><li>Motivation: 2.63 vs 2.17</li></ul> <p>No significant effect of image severity on perceived susceptibility.</p>	<p>Supported by funding awarded to 1 author by Alcohol Research UK, and by the Medical Research Council Integrative Epidemiology Unit at the University of Bristol, which is supported by the Medical Research Council and the University of Bristol</p> <p>Weak (EPHPP)</p>



			Participants completed outcome measures after viewing the labels.	To what extent would this warning motivate you to drink less? (1=not at all to 5=a lot)			
Stafford, 2017, <sup>104</sup> United Kingdom	Between-subjects experiment	N=45	<p>Participants were randomly allocated to 1 of 3 alcohol container label conditions:</p> <ol style="list-style-type: none"> <li>1) Text-only label: "Alcohol causes fatal liver cancer"</li> <li>2) Pictorial label with the text: "Alcohol causes fatal liver cancer" and an image of diseased liver</li> <li>3) No label</li> </ol> <p>Participants consumed an alcoholic beverage (275 ml, 4% alcopop) bearing the allocated label in a simulated relaxed environment. Participants completed a product design questionnaire before and after consuming the beverage.</p>	<p><b>Behaviour:</b> Speed of consumption measured from time of first sip to time the empty bottle was placed on the table.</p> <p><b>Perceptions:</b> Pre- and post-test questionnaire assessed the acceptability of the bottle participants drank from on a 7-point scale (1=not at all to 7=extremely)</p> <ol style="list-style-type: none"> <li>1) How pleasing do you find the design of the alcohol beverage?</li> <li>2) How professional do you find the design of the alcohol beverage?</li> <li>3) How eye catching are the colours used on the design of the alcohol beverage?</li> <li>4) How important to you is the feel of an alcohol beverage in a glass or bottle/can</li> <li>5) What is the likelihood of you purchasing this alcohol beverage based on its design?</li> </ol>	<p><b>Behaviour:</b> Consumption was significantly faster in the no label condition compared to both the text-only and pictorial conditions (<math>p&lt;0.001</math> for both), with no significant differences between the text-only and pictorial conditions (<math>p=0.76</math>).</p> <p><b>Perceptions:</b> Overall, acceptability ratings were highest in the no label condition, followed by text-only, and lowest in the pictorial condition.</p> <ul style="list-style-type: none"> <li>• A significant difference was found between the pictorial and no label conditions (<math>p=0.002</math>)</li> <li>• No significant difference was found between the text-only and no label condition (<math>p=0.1</math>), or between the text-only and pictorial conditions (<math>p=0.41</math>)</li> </ul> <p>No significant correlations were found between speed of consumption and acceptability scores.</p>	Funded by the University of Portsmouth	Weak (EPHPP)
Weerasinghe, 2020, <sup>85</sup> Canada  <i>Article from single labelling study conducted in Yukon/NWT, Canada</i>	Pre-post quasi-experiment, with data from prospective cohort conducted using 2 waves of surveys (1 pre-, 1 post-intervention)	N=1,730	<p><b>Intervention condition:</b> 3 rotating labels with a cancer warning, standard drink information, and national drinking guidelines were affixed to all alcohol containers in 1 liquor store in the intervention site for a total of 5 months. Labels were 5cm x 3cm in size, brightly coloured, included a phone number and website for information or help, and were affixed on the sides or backs of containers.</p> <p><b>Comparison condition:</b> Warning labels cautioning about drinking while pregnant or operating a motor vehicle and a general</p>	<p><b>Knowledge:</b> Based on what you know or believe, can drinking alcohol cause . . . ? This item was asked for breast cancer, liver disease, the flu, and [when pregnant] harm to unborn babies. (yes/no/don't know).</p> <p>Increases in knowledge of alcohol as a carcinogen following the alcohol labelling treatment is defined as a participant who responded "Not caused by alcohol" in wave 1 and responded "Caused by alcohol" in wave 2 for breast cancer.</p>	<p><b>Knowledge:</b> Among all participants who completed surveys in both waves 1 and 2, an increase in knowledge of alcohol as a carcinogen was observed among 20.2–20.3% of participants.</p>	Project funding from Health Canada Substance Use and Addictions Program grant	Weak (EPHPP)



			health message continued to be affixed to all alcohol containers in the 2 liquor stores in the comparison site.			
Wigg, 2016, <sup>105</sup> United Kingdom	Between-subjects experiment	N=60  University students ages 18-35	<p>Participants were systematically recruited as they exited liquor stores, and independently completed survey on a tablet without interviewer assistance. In follow-up waves, repeat participants were emailed the survey, and identical procedures to recruit new participants in Wave 1 were used in follow-up waves.</p> <p>Participants were randomized to view alcohol containers with 1 of 3 label conditions:</p> <ol style="list-style-type: none"><li>1) Control: no health warning</li><li>2) Text-only warning: "Alcohol causes fatal liver cancer" on front of container</li><li>3) Pictorial health warning: "Alcohol causes fatal liver cancer" and image of a diseased liver on front of container.</li></ol> <p>Participants viewed the label condition on a beer and wine container, then completed outcome measures.</p>	<p>All outcome measures rated on 7-point scales (e.g., 1=not [fearful] at all to 7=extremely [fearful])</p> <p><b>Perceptions:</b></p> <ol style="list-style-type: none"><li>1) Level of fear arousal for the health warning on the alcoholic beverage</li><li>2) Extent to which the health warning made them think about the health risks of consuming alcohol</li></ol> <p><b>Intentions:</b></p> <ol style="list-style-type: none"><li>1) Intentions to reduce alcohol consumption as a result of viewing the health warning</li><li>2) Intentions to quit alcohol consumption as a result of viewing the health warning</li></ol>	<p><b>Perceptions:</b> Overall, both perception outcomes were rated highest in the pictorial and lowest in control condition.</p> <ul style="list-style-type: none"><li>• Fear arousal was significantly higher in pictorial vs control (<math>p&lt;0.001</math>). No significant differences between pictorial vs text-only, or text-only vs control.</li><li>• Thinking about health risks was significantly higher in pictorial vs control (<math>p=0.03</math>). No significant differences in thinking about health risks between pictorial vs text-only, or text-only vs control.</li></ul> <p><b>Intentions:</b> Overall, both intentions measures were highest in the pictorial and lowest in the control condition.</p> <ul style="list-style-type: none"><li>• Intentions to reduce alcohol consumption were significantly higher in the pictorial vs control condition (<math>p=0.04</math>).</li><li>• Intentions to quit alcohol consumption were significantly higher in pictorial vs control (<math>p=0.03</math>).</li><li>• No significant differences in either intentions measure</li></ul>	No support or funding reported  Moderate (EPHPP)



between pictorial vs text-only, or  
text-only vs control.

Interrupted Time-Series Study							
Zhao, 2020, <sup>86</sup> Canada (Yukon, NWT)	Interrupted time series	N=NR	<b>Intervention condition:</b> 3 rotating labels with a cancer warning, standard drink information, and national drinking guidelines were affixed to all alcohol containers in 1 liquor store in the intervention site for a total of 5 months. Labels were 5cm x 3cm in size, brightly coloured, included a phone number and website for information or help, and were affixed on the sides or backs of containers.  <b>Comparison condition:</b> Warning labels cautioning about drinking while pregnant or operating a motor vehicle and a general health message continued to be affixed to all alcohol containers in the 2 liquor stores in the comparison site.	<b>Behaviour:</b> Alcohol consumption during the quasi-experimental intervention labelling period was compared with consumption during the period without the intervention labels. Data was collected for 28 months before, and 14 months after the intervention condition labels were applied in the Yukon intervention liquor store site.  Monthly retail alcohol sales data for all of Yukon were converted to pure alcohol in standard drinks, and used to calculate monthly per capita alcohol consumption for people ages 15+. This was compared to monthly retail alcohol sales data for the intervention condition liquor store, to the NWT, and to surrounding rural areas of Yukon.	<b>Behaviour:</b> Relative to the comparison sites, the labelling intervention condition site was associated with: <ul style="list-style-type: none"><li>• a 6.31% reduction in alcohol consumption during the treatment period, Nov 2017-Jul 2018 (<math>p=0.0001</math>)</li><li>• a 9.97% reduction in alcohol consumption during the post-treatment months, Aug-Dec 2018 (<math>p=0.0001</math>)</li></ul>	Project funding from Health Canada-Substance Use and Addictions Program	Moderate (NOS)
<b>Mixed-Methods Studies</b>							
Clarke, 2020, <sup>115</sup> United Kingdom	Mixed methods: <i>ad libitum</i> between-groups/pairs experiment in bar laboratory; focus groups	Experiment: N=162 2 focus groups: N=17  Young adults who drank alcohol at least weekly	<b>Experiment:</b> Participants were recruited as pairs (i.e., friends). Pairs sat together and drank the same beverage type, either beer (4%) provided in 880mL jug, or wine (5.5%) provided in a 500mL carafe. Participants were given glasses to drink from, and directed to pour and consume as much as they like. The <i>ad libitum</i> drinking period lasted 20 minutes. Each pair was randomly assigned to use	<b>Consumption:</b> Amount of alcohol consumed after 20 minutes was measured in ml and converted to units  <b>Label Noticing:</b> 1) Did you notice the unit and warning label? (yes/no/unsure)  <b>Perceptions:</b> 2) Do you think it had an effect on how much alcohol you consumed? (yes/no/unsure) 3) Do you think these glasses could be useful in getting people to drink less? (yes/no/unsure)	<b>Consumption:</b> No significant main effect by label condition (1.61 units vs 1.69 units, $p=0.35$ ), even after controlling for gender and drinking characteristics.  <b>Intentions:</b> No significant main effect on change in urge to drink scores by label condition (4.48 vs 4.86, $p=0.41$ ), even after controlling for gender and drinking characteristics.  <b>Label Noticing:</b> Of those exposed to labelled glasses, 85% reported noticing the unit and health warning labels.	Funded by The Economic and Social Research Council (ESRC) through a PhD CASE studentship (case partner is the charity Alcohol Research UK, now merged)	Moderate (MMAT)



Li, 2017, <sup>116</sup> United Kingdom	Mixed methods: telephone cross-sectional survey; focus groups	N=3,460 (cross-sectional survey) N=89 (16 focus groups)	<b>Cross-sectional survey:</b> Participants rated their support for 7 alcohol policy statements, grouped into 4 dimensions: pricing, alcohol availability, provision of health information and treatment services, and greater law enforcement. 1 policy (provision of health information and treatment services) referred to alcohol container labels: “Labels on alcohol products warning of the harms of alcohol”.	<b>Support:</b> Survey: Participants rated their support for all policy statements on a 5-point scale (1=strongly oppose, 2=oppose, 3=neither support nor oppose, 4=support, 5=strongly support).  <b>Additional survey questions:</b> 1) Would you say that people in Scotland/England are generally discouraged or encouraged to drink alcohol? (1=strongly discouraged to 5=strongly encouraged). 2) Would you say that people in Scotland/England have a very unhealthy or healthy relationship with relationship with alcohol	<b>Perceptions:</b> Of those exposed to labelled glasses, 80% did not believe the glasses influenced their drinking. 35% believed they could be useful in getting people to drink less, 30% did not, 17.5% were unsure, and 17.5% believed they would be useful for certain people. <b>Open-ended feedback</b> provided by participants after the experiment and provided by the focus group participants: Glasses were likely to be ineffective because they were not visually appealing, contained too much information, would have decreased effectiveness after drinking had begun, and could be used for unintended purposes (i.e., maximizing alcohol content). Participants indicated the labelled glass may be helpful to monitor how many drinks have been consumed, but would not likely be used to consume within the guidelines. Some participants believed the guidelines were not relevant to their drinking, only to heavier drinkers, people with health concerns or older people.	with Alcohol Concern and called Alcohol Change UK).	Funding for this research came from the Medical Research Council (MRC) National Prevention Research Initiative (NPRI). Data for this article is from the International Alcohol Control Study (IAC), developed



Roderique-Davies, 2020, <sup>76</sup> United Kingdom	Mixed methods: Mock shopping task with eye tracking technology;	N=25 (mock shopping task with eye tracking technology) N=10 (focus group)	<b>Mock shopping task:</b> Participants “purchased” items from a shelving unit with various alcohol products (beer, cider, wine, liquor). Shelving signs contained information	<b>Label Attention:</b> Participants wore eye tracking technology and were directed to “purchase” alcohol for a weekend party. Mean standardized gaze time was measured for each label component. Audio was recorded	<ul style="list-style-type: none"><li>• believe people were encouraged to drink alcohol (<math>p&lt;.01</math>), and</li><li>• believe Scotland/England have an unhealthy relationship with alcohol (<math>p&lt;0.05</math>)</li><li>• Female, older age (<math>p&lt;.05</math> for both)</li></ul> <p>Focus groups: Part 1) General questions were used to explore participants' attitudes towards alcohol and their opinions on the problems caused by alcohol in their country. Part 2) A selection of alcohol policies were presented to participants. Participants were asked to comment on the extent to which they liked/disliked the policy, and how effective/ineffective they thought it would be. Group discussion, votes, and/or consensus were used to describe each policy as being liked/disliked, and effective/ineffective.</p>	<p>Negative associations between support for provision of health information and treatment services and high income and drinking at harmful/hazardous levels (<math>p&lt;0.05</math> for both).</p> <p>Focus groups: Support for policies providing health information and treatment services was more varied relative to survey results, and alcohol warning labels were mostly unsupported. Authors suggest this is because participants assumed labels would be similar to cigarette labels, which were perceived as ineffective. Some participants did not perceive alcohol to be as harmful as smoking, and thought labels would be “excessive”. A dominant theme indicated greater support for policies targeting “problematic others” (i.e., harmful or youth drinkers) and less support for policies impacting their own drinking, such as pricing. When discussing context and feasibility, participants rationalized support for policies requiring less resources (taxes, labels) relative to more resources (increased law enforcement).</p>	with funding from the Health Promotion Agency, new Zealand.	Moderate (MMAT)



qualitative focus groups	University students and staff, ages 18+, who regularly consumed alcohol	related to the product, prices and health risks. Alcohol container labels included brand, alcohol by volume, liquid measurement, units and health information (not specified), product description, ingredients, and sell by date. <b>Focus group:</b> Participants who did not take part in the mock shopping task were shown bottles with 4 different labels. <u>Label Conditions:</u> 1) Real label: current industry standard, details not provided 2) Back label with units per serving and container, liquid measurements, alcohol by volume, calories (not specified if per serving or container), drink limit guidelines, the National Health Service's Choices website, and symbols representing age restrictions, warnings cautioning about drinking when pregnant and driving 3) Back label with the same information as condition 2, but with larger drink limit recommendations moved to front label 4) Label with the same information as condition 3 but with health warnings moved to front label	and participants were directed to "think aloud" as they made their choices. <b>Perceptions:</b> In the focus group, alcohol products (alcohol/container type not specified) with the four different labels were revealed to participants, starting with the real label, followed by the three study-designed labels. Participants were asked to share their opinions on the labels in a semi-structured interview.	Post-task questionnaire: 40% of participants recalled noticing health information on alcohol labels, 84% recalled noticing the alcohol volume. Statistical significance was not tested for gaze times or questionnaire responses. Focus group: "Some" participants recalled seeing health warnings on real alcohol labels, but overall attention/ recall was reported to be minimal. <b>Support:</b> Post-task questionnaire: 64% of participants agreed alcohol products should have health warnings. <b>Perceptions:</b> Post-task questionnaire: Those who agreed alcohol products should have health warnings expressed labels need to be accurate, highly visible, and include graphic images. There were mixed opinions for message content, some suggested focusing on long term harms and others on short term effects. Those who disagreed with health warnings perceived the information as common knowledge, or believed it would have limited impact on drinking behaviour. Focus group: Real labels' health warnings were perceived to be minimally visible, and the study-designed labels more visible. Some believed the information would be helpful, and others expressed doubts about the impact of labels on actual behaviour. <b>Preferences:</b> Focus groups: Participants preferred <ul style="list-style-type: none"><li>• Detailed text-based information compared to symbols</li><li>• Text that is larger or coloured so it stands out</li></ul>
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- Labels on the front instead of the back of containers to increase visibility
- Specific/bold/explicit messages

Cross-Sectional Studies								
Annunziata, 2017, <sup>107</sup> Italy	Cross-sectional, online survey	N=385	University students ages 18-30	<p>Participants were asked if they had noticed 3 voluntary alcohol container health message labels:</p> <ol style="list-style-type: none"> <li>1) "Drink responsibly" statements</li> <li>2) "Do not drink and drive" logos</li> <li>3) Number of drinks not to exceed</li> </ol> <p>Next, participants rated their preferences for 5 health warnings from the European Alcohol Policy Alliance (Eurocare) library of health warning labels:</p> <ol style="list-style-type: none"> <li>1) Do not drink and drive</li> <li>2) Do not drink while taking medicine</li> <li>3) Don't serve alcohol to underage individuals</li> <li>4) Alcohol can cause harm during pregnancy</li> <li>5) Alcohol can damage brain functions.</li> </ol> <p>Then, preferences for 2 warning formats were tested, differentiated by positive and negative framing:</p> <ol style="list-style-type: none"> <li>1) Negative framing: Driving while drink causes fatal accidents (image of car crash)</li> <li>2) Positive framing: Do not drink and drive (car symbol with red strike through)</li> </ol>	<p><b>Label Noticing:</b> Participants were asked if they have noticed 3 voluntary health messages on alcohol container labels:</p> <ol style="list-style-type: none"> <li>1) "Drink responsibly" statements</li> <li>2) "Do not drink and drive" logos</li> <li>3) Number of drinks not to exceed (never/at least once/rarely/ often)</li> </ol> <p><b>Perceptions:</b> Participants were asked to express their degree of perceived utility of each of the 5 Eurocare warning labels for changing drinking behaviour. (1=strongly useless to 5=strongly useful)</p> <p>Participants were asked to indicate which of 2 pictorial warning labels related to drinking and driving (negative or positive) provided more emotional impact.</p> <p>Participants rated their agreement with the following statements about health warnings in general:</p> <ol style="list-style-type: none"> <li>1) Warnings are not relevant to me</li> <li>2) There are too many warnings on labels</li> </ol> <p>(1=strongly disagree to 5=strongly agree)</p> <p><b>Behaviour:</b> Participants were asked to indicate effects of exposure to voluntary health messages:</p> <ol style="list-style-type: none"> <li>1) I have reduced consumption</li> <li>2) I have reflected about the effects of alcohol on health</li> </ol>	<p><b>Label Noticing:</b></p> <ul style="list-style-type: none"> <li>• 91%, 54%, and 24% reported "never" noticing number of glasses not to exceed, drink responsibly statements, and do not drink and drive logo, respectively</li> <li>• 27% reported "often" noticing do not drink and drive logo, no other label message was noticed "often"</li> </ul> <p><b>Perceptions:</b> Of the 5 Eurocare warning labels, "Do not drink while taking medicine" (<math>M=3.8</math>) and "Do not drink and drive" (<math>M=3.7</math>) were rated significantly more useful than the other 3 messages which were rated useless to neutral (<math>M=2.8-2.9</math>, <math>p&lt;0.05</math>).</p> <p>82% of the participants attached more emotional impact to the negatively framed warning with an image of a car crash vs the positively framed warning with a logo/symbol.</p> <p>Mean agreement scores for statements about health messages in general:</p> <ul style="list-style-type: none"> <li>• Warnings are not relevant to me: <math>M=3.4</math> (<math>SD=1.04</math>)</li> <li>• There are too many warnings on labels: <math>M=3.7</math> (<math>SD=0.92</math>)</li> </ul> <p><b>Behaviour:</b> 97%, 80%, and 50% of those who reported noticing number of glasses not to exceed, drink responsibly statements, and</p>	Funded by University of Naples Parthenope within the research project "Consumer use and understanding of health and nutritional claims on food and beverages"	Weak (NOS)



				Cluster analysis investigated the effects of participant socio-demographic variables on outcome measures.	3) I have discussed it with friends 4) It does not affect my drinking habits in any way	do not drink and drive logo, respectively, reported the information does not affect their drinking habits in any way <b>Cluster analysis:</b> Cluster 1: Those who drink for pleasure and are not fully informed of risks only occasionally pay attention to warning labels and are doubtful about their influence on their choices [32% of total sample – characteristics: age 22-25, first three years of university or graduate school] Cluster 2: Those who drink less often and are more aware of social and health risks showed more positive attitude and greater attention to warning labels [40% of total sample – characteristics: age 26-30, final years of university or graduate school] Cluster 3: Those who drink more alcohol more often, generally with friends, and are uninformed of risks do not pay attention to warning labels and do not perceive them as useful [28% of total sample – characteristics: age 18-20, men, smokers]		
Annunziata, 2016a, <sup>72</sup> Italy, France, Spain, United States	Cross-sectional, online survey	Total: N=1,016 Italy: N=330 France: N=185 Spain: N=195 USA: N=306	Participants were presented with 10 wine back labels with varying combinations of label attributes: <b>Health message:</b> No health message, “Don’t drink and drive” logo, or logo and message <b>Nutrition information:</b> no nutrition information, an icon with calorie content per glass, or a nutrition facts panel <b>Drink limit guideline information:</b> units not to exceed regularly, or no unit guideline	<b>Preferences:</b> Participants were asked to express their preferences for each label option on a 5-point scale (1=not preferable at all to 5=totally preferable) <b>Perceptions:</b> Participants were asked to indicate how useful they considered the following 5 health messages: 1) Ban on alcoholic beverages to children under 18/21 2) Do not drive after drinking 3) Avoid drinking alcohol during pregnancy 4) Avoid drinking alcohol when you are taking medicine 5) Alcohol increases the risk of violence	<b>Preferences:</b> Participants in Italy and Spain preferred the health message label with a logo and a message, participants in France and the United States preferred the simplified version only with a logo. <b>Perceptions:</b> Participants in all 4 countries assigned high utility (all rated $\geq 4.1$ ) to the messages “Do not drive after drinking” and “Ban on alcoholic beverages to children under 18/21”. The message “Avoid drinking during pregnancy” was considered more useful by participants in the United States and France, than by participants in Spain and Italy ( $p<0.001$ ).	Partially funded by the International Organization of Vine and Wine and by the University of Naples	Moderate (NOS)	



Annunziata, 2016b, <sup>71</sup> Italy  Same survey data as Annunziata, 2016c	Cross-sectional, online survey	N=300	<p><u>Price:</u> average market price, or average market price plus 10%</p> <p>Data was analysed first using conjoint-analysis to determine participants' preferences for different label attributes. Next, cluster-analysis methods grouped participants based on their demographics, preferences and utility ratings.</p>	<p>(1=not at all to 5=extremely)</p> <p><b>Interest:</b> Participants were asked to indicate their interest in receiving the following information on wine labels</p> <ul style="list-style-type: none"><li>1) Nutritional value</li><li>2) Maximum number of servings not to exceed</li><li>3) Number of glasses per bottle</li><li>4) Information about possible side effects</li></ul> <p>(1=not at all to 5=extremely)</p>	<p><b>Interest:</b> Participants in all 4 countries expressed the highest interest in information about possible side effects, and expressed the lowest interest in the number of glasses per bottle.</p> <p><b>Cluster analysis</b></p> <ul style="list-style-type: none"><li>Cluster 1: Attached higher utility to nutrition information, followed by health messages [22% of total sample – characteristics: women ages 35-55, with higher education]</li><li>Cluster 2: Attached higher utility to health messages, followed by nutrition information [35% of total sample – characteristics: young women (&lt;45), and people with children under the age of 16]</li><li>Cluster 3: Attached higher utility to health messages, followed by units not to exceed [28% of total sample – characteristics: adult men (&gt;35), with an average level of education]</li><li>Cluster 4: Attached higher utility to units not to exceed, followed by health messages [15% of total sample – characteristics not described]</li></ul>	<p><b>Preferences:</b> Participants were asked to express their preferences for each label they viewed on a 5-point scale (1=not preferable at all to 5=totally preferable).</p> <p>Participants were asked to select which of the 2 health message formats they preferred.</p> <p><b>Perceptions:</b> Participants were asked to rate their agreement with: "It useful to receive more information on nutritional and health characteristics of wine through the label" (1=strongly disagree, 2=disagree, 3=neither agree or disagree, 4=agree, 5=strongly agree)</p>	<p><b>Preferences:</b> 62% of participants preferred the logo and message format of the health warning.</p> <p><b>Perceptions:</b> 55% of participants agreed nutrition and health information to be useful on wine labels.</p> <p>% of participants who believed warning to be useful or strongly useful:</p> <ul style="list-style-type: none"><li>66%: "do not drink after drinking"</li><li>63%: "avoid drinking while taking medicines"</li><li>63%: "ban alcoholic beverages to children under 18 years"</li><li>39% : "alcohol increases risk for violence"</li><li>37%: "avoid drinking alcohol during pregnancy"</li></ul>	Partially funded by the University of Naples Parthenope within the University program of support for local research	Moderate (NOS)



Annunziata, 2016c, <sup>73</sup> Italy  Same survey data as Annunziata, 2016b	Cross-sectional, online survey	N=300	Participants were presented with 8 of 36 possible wine back labels varying in price, health message, nutrition, and drink limit guideline information.  Conditions: <u>Health message</u> : no health message, "Don't drink and drive" logo, or logo and message. <u>Nutrition information</u> : no nutrition information, an icon with calorie content per glass, or a nutrition facts panel. <u>Drink limit guideline information</u> : units not to exceed regularly, or no unit guideline <u>Price</u> : €5, or €5.5  Data was analysed first using conjoint-analysis to determine participants' preferences for different	Participants rated their perceptions and interests, and probit analysis was used to determine the influence of socio-demographic factors on responses.  <u>Price</u> : €5, or €5.5	Participants rated the usefulness of 5 health warnings 1) Do not drink after drinking 2) Alcohol increases risk for violence 3) Avoid drinking while taking medicines 4) Ban alcoholic beverages to children under 18 years 5) Avoid drinking alcohol during pregnancy (1=strongly useless, 2=useless, 3=neither useful or useless, 4=useful, 5=strongly useful) <b>Interest:</b> Participants were asked to rate their agreement regarding their interest in receiving information on wine labels about possible side effects of excessive consumption (1=strongly disagree, 2=disagree, 3=neither agree or disagree, 4=agree, 5=strongly agree)	<b>Interest:</b> 52% would like to receive information on labels about possible side effects related to the excessive consumption.  The most relevant socio-demographics influencing increased interest toward health warning labels on wine are being female, younger age (18-35), higher education level, presence of children in the household, and being the main person responsible of grocery shopping ( $p<0.1$ , significance level set by study authors)	<b>Preferences:</b> Participants assigned the greatest utility to the logo and message health warnings on wine labels, followed by nutrition information in the form of calories per glass. <b>Perceptions:</b> Overall, 55% of participants agreed nutrition and health information to be useful on wine labels; 8% believed it useless. <b>Cluster analysis:</b> Cluster 1: detailed information seekers who preferred the nutrition panel label, and attached high value to health messages [25% of total sample – characteristics: women ages 55+, higher levels of education, and those who suffer from a health condition] Cluster 2: health warning seekers who attached high value to health messages, followed by nutrition information, and preferred the health message with a logo [48%]	Partially funded by the International Organization of Vine and Wine	Moderate (NOS)



				label attributes. Next, cluster-analysis methods grouped participants based on their preferences and utility ratings.		of total sample – characteristics: men ages 18-24 and 35-44, with higher levels of education] Cluster 3: simplified information seekers who attached high value to nutrition information and preferred the simple calories per glass logo over the nutrition panel [27% of total sample – characteristics: ages 45-54, with lower education levels than the other 2 clusters]		
Buykx, 2015, <sup>108</sup> Australia	Cross- sectional, online survey	N=2,482	Adults from New South Wales recruited through market research company. Excluded if undergoing cancer treatment, or worked in advertising, alcohol, or tobacco industry	As part of a survey assessing knowledge and attitudes regarding cancer prevention, participants were asked to rate their support towards 7 alcohol policies in the domains of pricing and taxation, availability, marketing, and labelling.	<b>Support:</b> Participants were asked “To reduce the problems associated with excessive alcohol use, to what extent do you support or oppose...” and presented with 7 different alcohol control policies, including 2 relevant to alcohol labels: 1) “Health warnings on alcohol containers” 2) “Drinking guideline information on containers”  Responses were reported on a 5-point scale (1=strongly oppose to 5=strongly support)	<b>Support:</b> 72.0% and 65.6% supported or strongly supported health warnings and drinking guideline information on alcohol containers, respectively. <ul style="list-style-type: none"><li>• Females vs males indicated greater support for health warning labels (<math>OR=1.61</math>, 95% CI: 1.33, 1.96, <math>p&lt;0.001</math>)</li><li>• Increased age (each year of increase) was positively associated with support for labels with health warnings (<math>OR=1.01</math>, 95% CI: 1.00, 1.01, <math>p&lt;0.05</math>).</li><li>• Increased alcohol consumption levels (each unit of increase) was inversely associated with support for labels with health warnings (<math>OR=0.92</math>, 95% CI: 0.90, 0.95, <math>p&lt;0.001</math>).</li><li>• Awareness of alcohol as a cancer risk was positively associated with support for labels with health warnings (<math>OR=1.44</math>, 95% CI: 1.20, 1.73, <math>p&lt;0.001</math>)</li></ul>	Data collection was funded by Cancer Council New South Wales 1 author received a Monash University Advancing Women's Research Success award, funds were used to support the completion of this paper.	Moderate (NOS)
Coomber, 2017a, <sup>109</sup> Australia	Cross- sectional, survey conducted online	N=1,061	Adults ages 18-45 who reported they drank alcohol	Survey questions first assessed knowledge of the consequences of alcohol use.  Next, awareness of current alcohol container warning labels in Australia was assessed without prompting,	<b>Knowledge:</b> 1) “Which of the following do you think are likely consequences of a single occasion of heavy drinking?” Followed by 7 short-term consequences associated with alcohol use: impaired coordination and reflexes; reduced concentration; vehicle,	<b>Knowledge:</b> The majority of participants responded “definitely true” to 5 of 7 short-term consequences. Most participants were not aware drowning and coma/death were short term consequences.	Funding received from Australian Research Council, Australian National Health and Medical	Moderate (NOS)



Critchlow, 2019, <sup>110</sup> United Kingdom	Cross- sectional, survey conducted online	N=3,399	Youths ages 11- 19	Participants responded to survey questions about their awareness of health messaging on alcohol packaging, their drinking status, and intentions for drinking in the future.	bicycle or pedestrian accidents; falls, accidents, violence and self-harm; alcohol poisoning; drowning; coma and death. 2) "Which of the following do you think are likely consequences of consuming alcohol over many years?" Followed by 12 long-term consequences associated with alcohol use: harm to unborn babies; liver cirrhosis; brain damage; stomach problems; heart and blood disease; pancreatitis; bowel cancer; pharyngeal cancer; oesophageal cancer; mouth cancer; larynx cancer; breast cancer. Response options for each consequence (definitely true/probably true/probably false/definitely false). <b>Label Awareness:</b> Participants were asked how often they see warning labels on alcohol containers and which labels they recall (open-text response). After viewing the 4 DrinkWise labels participants were asked if they recognized them. Awareness was defined as the proportion of participants who freely recalled any alcohol warning label, plus the proportion who did not freely recall the label but recognised it after viewing it.	<ul style="list-style-type: none"><li>Females were more likely than males to be aware of all short-term consequences (<math>p&lt;0.01</math>)</li><li>Awareness of warning labels on alcohol containers had no significant effect on knowledge of short-term consequences</li></ul> <p>The majority of participants responded "definitely true" to only 2 of 12 long-term consequences of alcohol consumption: Harm to unborn babies and liver cirrhosis. Knowledge was lowest for cancer, for each of 6 specific cancer types, less than 25% of participants responded "definitely true"</p> <ul style="list-style-type: none"><li>Participants who were aware of warning labels on alcohol containers were more likely than those who were not aware to know that alcohol causes harm to unborn babies (<math>OR=1.34</math>, 95%CI: 1.00, 1.78, <math>p=0.048</math>) and cirrhosis of the liver (<math>OR=1.50</math>, 95%CI: 1.13, 1.99, <math>p=0.005</math>)</li></ul> <p><b>Label Awareness:</b> 51.7 % of participants were aware of warning labels on alcohol containers.</p>	Research Council, NSW Government, National Drug Law Enforcement Research Fund, Foundation for Alcohol Research and Education, Cancer Council Victoria, Queensland Government and Australian Drug Foundation, Australian Drug Strategy Conference.



Dekker, 2020, <sup>75</sup> Australia, Canada, China, India, New Zealand, United Kingdom, United States	Cross-sectional, online survey	N=7,545	Participants were asked to complete survey measures rating support for 14 alcohol control initiatives	<b>Support:</b> Participants were asked “To what extent do you agree or disagree with each of the following...?” and presented with 14 different alcohol control policies, including 2 relevant to health message labels: 1) Alcohol products should have pregnancy warning labels on the package 2) Alcohol products should have health warning labels on the package Responses were rated on a 5-point scale (1=Strongly disagree to 5=Strongly agree) Authors considered responses of 4=Agree or 5=Strongly agree as support.	<ul style="list-style-type: none"><li>• Among never-drinkers: those who intend to drink vs those do not intend to drink in the next year (21% vs 16%, p=0.01)</li></ul> The most commonly recalled messages: <ul style="list-style-type: none"><li>• Drink responsibly/in moderation: 18%</li><li>• Avoid drinking in pregnancy: 13%</li></ul> Least commonly recalled messages: <ul style="list-style-type: none"><li>• Gender related drink limit guidelines: 2%</li><li>• Age limits for alcohol: 1%</li><li>• Product ABV: &lt;1%</li></ul> “Don’t know” what messages they had seen: 47%	<b>Support:</b> 73% (M=4.09, SD=1.07) supported pregnancy warning labels on alcohol packages. 67% (M=3.93, SD=1.09) supported health warning labels on alcohol packages. Across all policies, support was highest for labelling requirements, in particular for pregnancy warnings (67-85%) and standard drink quantity information (63-83%). Across all countries and 14 alcohol policies, age ( $p \leq 0.001$ ), female gender ( $p \leq 0.001$ ), and higher income ( $p=0.028$ ) were positively associated with support. Being a drinker ( $p \leq 0.001$ ) and drinking 5+ days per week ( $p \leq 0.001$ ) were negatively associated with policy support.	Not reported	Moderate (NOS)
Kongats, 2020, <sup>111</sup> Canada (Alberta, Quebec)	Cross-sectional, survey	N=2,400 general public: recruited through random-digit dialing  N=302 policy influencers: provincial and	Survey participants were asked to rate their support for 1 health message labelling policy: 1) Mandatory front-of-package graphic health warning labels on alcoholic beverages	<b>Support:</b> Participants were asked to rate their support for various alcohol control policies (1 relevant to health message labels) on a 4 point scale (1=strongly oppose, 2=oppose, 3=support, 4=strongly support).	<b>Support:</b> Policy makers: <ul style="list-style-type: none"><li>• 63.8% of policy influencers in Alberta and 68.0% of policy influencers in Quebec strongly supported or somewhat supported health message labelling on alcoholic beverages</li></ul>	Survey was part of a project funded by the Canadian Partnership Against Cancer’s Coalitions	Moderate (NOS)	



Study Information	Participants	Intervention/Exposure	Outcomes	Findings	Conclusion	Funding	Linking Action & Science for Prevention (CLASP) in partnership with Weight Coalition in Quebec		
Author, Year, Country	Design	N	Setting	Policy	Support	Education	Income		
Maharaj, 2018, <sup>112</sup> Trinidad and Tobago	Cross-sectional, surveys conducted face-to-face	N=1,695	Participants were asked to report their support for 1 alcohol container health message label policy: 1) More prominent warning labels on products displaying the harmful effects of alcohol	<b>Support:</b> Participants were asked "Which of the following changes do you believe members of this household would support in a national campaign?" and presented with 15 alcohol control policies (1 relevant to health message labels).	Analysis of responses was done by calculating differences in proportions of those who "supported" (1=strongly support or 2=somewhat support) a given alcohol policy between different levels given different covariates (i.e., public/policy influencer category, province, gender, age, education, and income).	<ul style="list-style-type: none"> <li>No significant differences in support by age, gender, or location among policy makers</li> </ul> <p>General public:</p> <ul style="list-style-type: none"> <li>The general public in Quebec indicated significantly more support than the general public in Alberta (72.7% vs 64.3%, p&lt;0.05)</li> <li>Females of the general public indicated higher support than males (74.2% vs 62.3%, p&lt;0.05)</li> <li>Ages 46+ indicated higher support than ages 18-45 (70.6% vs 64.4%, p&lt;0.05)</li> </ul>	<b>Support:</b> Among households who reported using alcohol, 86.9% supported more prominent warning labels. Among households who reported not using alcohol, 90.1% supported more prominent warning labels (non-significant).	Funding received from the Campus Research and Publications Grant of The University of the West Indies, St. Augustine	Moderate (NOS)



				No significant associations between ethnicity and support, or alcohol use and support.			
Miller, 2016, <sup>113</sup> Australia	Cross-sectional, survey conducted online	N=1,547 Australian adults ages 18+	4 specific warning labels were presented on 3 types of alcohol containers (wine, spirits, beer)  1) Three drinks a day increases your chance of bowel cancer by 20% 2) Alcohol causes cancer 3) Two or more drinks a day can increase your risk of mouth and throat cancer by over 50% 4) 1 in 5 breast cancers are caused by alcohol	<b>Message Processing:</b> For each of the 4 proposed labels, participants were asked their level of agreement (1=strongly agree to 5=strongly disagree) with the following impact statements: 1) Raise awareness about the link between regular alcohol consumption and cancer 2) Prompt conversations about the cancer risk involved in drinking alcohol regularly 3) Prompt me to drink alcohol less often 4) Prompt my friends to drink alcohol less often 5) Prompt me to talk to my family and/or friends about the cancer risk associated with alcohol 6) Prompt me to educate my children about the cancer risk associated with alcohol	<b>Message Processing:</b> • 93% total agreement labels could raise awareness about the link between alcohol and cancer. • 86% total agreement labels would prompt conversations about cancer risk • 36% total agreement the labels would prompt them to drink less often • 30% total agreement the labels would prompt their friends to drink less often • >58% agreed the labels would prompt them to talk to family or friends about the cancer risk • 84% total agreement labels would prompt them to educate their children about the cancer risk  Factors associated with agreement with all 6 impact statements: • Females relative to males ( $p \leq 0.002$ ) • Lower risk drinkers relative to higher risk drinkers ( $p \leq 0.03$ ) Overall greater agreement across impact statements for specific cancer warnings (labels 1, 3, 4) vs general cancer statement (label 2).	Funded by the Australian Research Council and Linkage Partners, Cancer Council Australia and Drug and Alcohol Services of South Australia	Moderate (NOS)
Vallance, 2020, <sup>84</sup> Canada (Yukon, NWT)  Article from single labelling study conducted in Yukon/NWT, Canada	Cross-sectional survey	N=836 Adults of legal drinking age (19+), and at time of recruitment were residents of either intervention or comparison sites, consumed ≥1 drinks in the	<u>Intervention condition:</u> 3 rotating labels with a cancer warning, standard drink information, and national drinking guidelines were affixed to all alcohol containers in 1 liquor store in the intervention site for a total of 5 months. Labels were 5cm x 3cm in size, brightly coloured, included a phone number and website for information or help, and	<b>Support:</b> Participants were asked the extent to which they agree or disagree with the following: "Cans and bottles of alcoholic beverages should be labeled with warnings describing the link between alcohol and diseases, such as cancer"  Responses rated on a 5-point scale and dichotomized as 0=neutral/disagree/strongly disagree/don't know, and 1=agree/strongly agree.	<b>Support:</b> 55.9% of participants agreed or strongly agreed that alcohol containers should be labeled with warning labels including a health warning. There were no significant differences in support between the intervention and comparison conditions.  • Females, and those with adequate health literacy indicated significantly greater support for health warning	Funded by Health Canada, Substance Use and Addictions Program	Moderate (NOS)



Winstock, 2020, <sup>114</sup> International, including 29 countries/ regions	Cross- sectional, online survey	N=75,969	<p>past 30 days, had purchased alcohol at the liquor store, and did not self-report being pregnant or breastfeeding</p> <p><u>Comparison condition:</u> Warning labels cautioning about drinking while pregnant or operating a motor vehicle and a general health message continued to be affixed to all alcohol containers in the 2 liquor stores in the comparison site.</p> <p>Participants were systematically recruited as they exited liquor stores, and independently completed survey on a tablet without interviewer assistance</p>	<p>were affixed on the sides or backs of containers.</p> <p>Participants viewed 7 health warning labels:</p> <ol style="list-style-type: none"> <li>1) Heart disease is a major cause of death among people with heavy alcohol use (negative frame).</li> <li>2) Even people with heavy alcohol use can reduce their risk of liver disease by cutting down by even a small amount (positive frame).</li> <li>3) Drinking less reduces your risk of 7 different sorts of cancer (positive frame)</li> <li>4) A bottle of wine or 6 bottles of beer contain as many calories as a burger and fries (specific)</li> <li>5) Experts recommend having at least 2 alcohol free days per week. This can help you reduce and control your drinking (specific).</li> <li>6) Most people get little or no health benefit from alcohol use, even at low levels of drinking (general)</li> </ol>	<p>Participants were asked:</p> <p><b>Knowledge:</b> If the information was new to them (no/yes)</p> <p><b>Believability:</b> If they believed the information (no/unsure/yes)</p> <p><b>Relevance:</b> If it was personally relevant (1=totally irrelevant, 2=not very relevant, 3=unsure, 4=a bit relevant, 5=very relevant)</p> <p><b>Drinking Intentions:</b> If it would make them change their drinking (no/unsure/maybe/yes)</p>	<p>labels than their counterparts (p&lt;0.05 for both)</p> <p><b>Knowledge:</b> The cancer label had the most participants reporting this information was new to them (61.8%), the violence label had the least participants saying it was new information (11.2%). Females were more likely than males to rate the heart and cancer labels as new (p&lt;0.01 for both), males were more likely than females to report calories, two days off, health myth and violence were new (p&lt;0.001). Ages under 25 were more likely than 25+ to say the information was new (p&lt;0.001). Lower risk drinkers were less likely than higher risk drinkers to report cancer and calorie labels as new.</p> <p><b>Believability:</b> The health myths label had the least participants rating it to be believable (62.3%), the cancer label had the second least (65.2%), and the violence label was believed by most (89.4%). Females believed the calories, health myth, and violence labels more than males; and males believed the other 4</p>	<p>Authors include founder and other members of Global Drug Survey (GDS), which does not accept government or industry funding.</p>	Weak (NOS)



7) Alcohol use increases the risk of violence and abuse (negative frame)

Participants then responded to survey questions.

labels more than females ( $p<0.001$ ). Participants ages 25+ believed all labels more than younger participants ( $p<0.001$ ) except for the heart disease label. Lower risk drinkers believed the health myths and violence labels more than higher risk drinkers.

**Relevance:** Violence followed by cancer labels were rated relevant by the most participants (40.1% and 35.1%), health myth labels were relevant to the least participants (15.1%). Females were more likely than males to report all labels were relevant ( $p<0.001$ ) except for the 2 days off label.

**Drinking Intentions:** The cancer label had the most participants (39.6%) report it would change drinking behaviour; the health myth label had the least (14.2%). Females were more likely than males to say that cancer, calories, health myth and violence would make them think about drinking less ( $p<0.001$ ). Participants under 25 were more likely than those 25+ to say the heart, liver, cancer, health myth and violence labels would make them think about drinking less; 25+ vs under 25 were more likely to say the calories and 2 days off label would make them think about drinking less ( $p<0.001$ ).

#### Qualitative Studies

Coomber, 2018, <sup>117</sup> Australia	Qualitative, focus groups	N=40  University students ages 18-25 who consumed alcohol	Participants were exposed to DrinkWise warning labels applied to alcohol products voluntarily by industry (present on approximately 1 in 3 Australian alcohol products). Warnings depict a "Get the facts" logo encouraging consumers to visit the DrinkWise website	Focus group semi-structured interview questions: 1) What are you overall impressions of the warnings? 2) What messages do you think the warnings are trying to convey? 3) Which warnings would: a) Make you stop and think about your drinking (why/why not)?	<b>Label Noticing and Attention:</b> Some reported seeing the warning labels before, but most reported never noticing them. Those who had seen the warning labels indicated the most memorable warning was the pregnancy pictogram. <b>Message Processing:</b> All participants indicated that the	Funding provided by: Australian Research Council, Australian National Health and Medical	Strong (CASP)
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Coomber, 2017b, <sup>118</sup> Australia	Qualitative focus groups	N=26	4 focus groups were conducted, guided by questions related to the pictorial and graphic health	After viewing the 5 pictorial warning labels, participants were asked to discuss the following (in order):  b) Encourage you to drink less (why/why not)? c) Elicit and emotional response (why/why not)? d) Generate discussion among your friends and/or family about drinking (why/why not)? 4) Did you notice the DrinkWise website in the warning? 5) Would you visit the DrinkWise website (why/why not)?	warnings would not generate discussion with their family or peers as they considered risky alcohol use irrelevant to their social circle, and would not encourage them to seek further information (i.e., from the DrinkWise website)  <b>Perceptions:</b> Participants perceived the warnings as advising consumers about alcohol-related harms, but not intended to deter consumption, and did not include specific consequences about alcohol misuse. Overall message quality was considered “poor” or “weak”, and most participants considered it irrelevant to them. Some perceived the warnings as uninformative or “common knowledge”. Other perceptions of the warning’s purposes were: to advise vulnerable groups (e.g., pregnant women), warning against dangerous alcohol use rather than alcohol use in general, and to legally protect alcohol companies. No participants were aware the DrinkWise warnings were industry funded and controlled, most believed the warnings to be a government initiative.  <b>Preferences:</b> Participants found the warnings’ design, colour scheme, small size, and discreet placement on the back corner of the container rendered it difficult to see, and led them to question the sincerity of the message.  <b>Intentions:</b> Participants consistently affirmed that the DrinkWise warning label would not influence their drinking behaviour.	Research Council, grants from NSW Government National Drug Law Enforcement Research Fund, Foundation for Alcohol Research and Education, Cancer Council Victoria, Queensland Government, Australian Drug Strategy Conference.	Funding received from Australian Research	Strong (CASP)



18-25 years who consumed alcohol	warnings designed for the study.  5 pictorial warnings consisted of a “health warning” heading, then text and a content congruent symbol: 1) Drinking any alcohol can harm your unborn baby 2) Drinking alcohol and driving increases the risk of injury or death 3) Drinking alcohol increases your risk of developing cancers 4) Drinking alcohol damages the young developing brain 5) Drinking alcohol increases the risk of injury	1) What are their initial overall impressions of the warnings? 2) What messages they thought the warnings were trying to convey?  They were then asked whether the warnings, and which warnings in particular, would: 3) make them stop and think about their drinking (and why) 4) elicit an emotional response (and why) 5) encourage them to drink less (and why) 6) generate discussions among family and/or friends about drinking (and why)	their drinking. The labels may prompt them to have discussions about alcohol use with family and friends, but most stated this would likely be small talk and they would not want to have a “serious” discussion in the social context in which they would be drinking.  <b>Perceptions:</b> The use of specific information reporting current statistics was perceived as a novel approach to the warning design, and conveyed information not previously known. Pictorial warnings were observed to “stand out” and were difficult to ignore due to the strong wording and stark appearance of the label. Graphic warnings elicited a stronger response for most participants, produced more feelings of uncomfortableness, shock, concern, and guilt. Some believed the images to be very realistic, whereas others believed them to be “staged” which reduced impact. Participants noted the label would be less effective after consumers were intoxicated and decision-making is affected.	Council, Australian National Health and Medical Research Council, NSW Government, National Drug Law Enforcement Research Fund, Foundation for Alcohol Research and Education, Cancer Council Victoria, Queensland Government and Australian Drug Foundation, Australian Drug Strategy Conference.
	5 graphic warnings consisted of a heading “health warning” on a red background and a full color content congruent photographic image: 1) Over .05? Drink and drive and you’re 30% more likely to be involved in a fatal car crash 2) Drinking any alcohol can harm your unborn baby: There is no safe level of alcohol use during pregnancy 3) Alcohol causes liver damage: Just one big night out can cause fatty liver and alcoholic hepatitis 4) Drinking kills: One in eight deaths of Australians under 25 is related to alcohol 5) Alcohol increases your risk of breast cancer: Each	This process was repeated for the 5 graphic warnings	  <b>Preferences:</b> Participants noted positioning labels on the front of alcohol containers would increase noticing and attention, yet preferred labels on the back of containers to limit exposure to unpleasant messages and reduce negative cognitions and emotions elicited by the messages. Participants suggested using the novel text of the graphic warnings with the images from the pictorial warnings to provide specific information but limit avoidance of the graphic photos.  <b>Intentions:</b> Most reported the pictorial and graphic warnings	



				additional drink per day increases your risk by 10%	would not make them stop drinking, but may cause them to consider drinking less or drinking slower. Some participants believed they may try to avoid either type of warning by transferring the alcohol to another container or choose a product without a warning label.		
Dossou, 2017, <sup>119</sup> France	Qualitative, in-depth interviews	N=26 Young people ages 15-29	26 in-depth individual interviews were conducted. Participants were first asked to recall, unaided, the content of warnings currently displayed on alcohol containers (a pictogram) and advertisements (a text warning). Next, they were shown 4 stimuli depicting the 2 mandatory warnings in France: 1) 2 real bottles of Absolut vodka bearing the mandatory pregnancy warning pictogram: 1 standard bottle and 1 limited edition bottle. 2) 2 print advertisements for Moet & Chandon champagne with the mandatory warning text “Alcohol abuse is harmful. Consume with moderation”: 1 standard ad and 1 design-oriented ad.  Participants were asked questions to explore reactions, perceptions and comprehension of the warnings.	<b>Label Recall:</b> Participants asked to recall, unaided, the current warnings on alcohol containers and advertisements.  After viewing the 4 warning stimuli, participants were asked about: <b>Label Attention, Noticing:</b> 1) The warnings' noticeability and visibility in all stimuli, and asked to list 5 elements they noticed first on each advertisement and bottle. <b>Perceptions, Credibility, Effectiveness:</b> 2) The warnings' credibility 3) Their comprehension of the warnings 4) Their responsiveness to the warnings 5) The warnings' ability to encourage moderate drinking or abstinence during pregnancy	<b>Label Recall:</b> Unaided recall of warnings was higher for the advertisement text warning compared to the container pictogram.  <b>Label Noticing and Attention:</b> The text warning was more noticeable than the pictogram, it was in approximately half of participants' lists of top 5 elements they first noticed, and the pictogram was rarely included in participants' lists. Participants noted the pictogram location (back of bottle), small size, and close proximity to other design elements hindered its visibility. Of the 2 text warnings, the warning was less noticeable in the design-oriented ad which was considered more attractive and included more noticeable elements (gold colour, “Happy New Year” message, brand name) which distracted from the warning, compared to the simpler standard ad. <b>Perceptions:</b> Participants perceived the pictograms easier to understand than the text warning, but believed the pictogram lacked explicitness. The text warning's use of the words “abuse” and “moderation” were considered too subjective. <b>Credibility:</b> Participants perceived alcohol health warnings to lack credibility, and questioned whether the warnings were a government or industry-driven initiative.	Supported by a grant from the French National Cancer Institute, the Inter-Ministerial Mission for Combatting Drugs and Addictive Behaviours (MILDECA) and the University of Paris XIII	Moderate (CASP)



Vallance, 2018, <sup>120</sup> Canada (Yukon)	Qualitative, focus groups	Total N=45	5 focus groups were conducted. All participants viewed 2 versions of enhanced alcohol container labels on empty beer, wine, and spirits bottles. Both versions contained: 1) A health message: "To reduce your risk of serious disease, such as cancer, follow the Low-Risk Drinking Guidelines" 2) Standard drink information: "Bottle contains: 5.4 standard drinks" (with wine bottle symbol) 3) A pregnancy warning symbol 4) Low-Risk Drinking Guidelines (LRDG): "Drink no more than (2/3) standard drinks on most days, and no more than (10/15) standard drinks per week" (women/men)	<b>Perceptions:</b> Participants were asked to review labels one at a time and reflect on: 1) What they noticed about the labels 2) If the label information was clear and easy to understand 3) If the label information made them think about the health risks of drinking alcohol 4) If the label information was sufficient enough to potentially impact drinking behaviors 5) If they thought there was any relevant information missing from the label <b>Preferences:</b> Participants were asked to choose which of the two labels was more effective for conveying a health message, standard drink information, the LRDG, and the pregnancy warning and explain why. Participants responded to questions about the preferred size and locations of the labels on alcohol containers <b>Support:</b> Participants' support for labels emerged through group discussion.	<b>Effectiveness:</b> Most participants did not believe the warnings would effectively change behaviours citing several reasons: <ul style="list-style-type: none"><li>• People are desensitized, do not notice warnings, or are annoyed by warnings</li><li>• Warnings are insufficient to tackle significant alcohol abuse</li></ul> <b>Perceptions:</b> Enhanced labels were perceived as new, useful, important, and having potential to impact consumer behaviour. Participants discussed consumers' right to know alcohol-related risks and believed enhanced labels would allow consumers to be better informed. All participants agreed that the health warnings, specifically the warning about increased risk of cancer, were an important element of the enhanced labels. Stakeholders highlighted resistance from industry, and logistical factors such as shapes of the bottles and manufacturers' labels limiting available options for label placement. <b>Preferences:</b> Stakeholders and general public participants preferred a larger label size because it was easier to read and would draw more attention. <b>Support:</b> Participants voiced strong support for the enhanced labels on alcohol container, no participants expressed opposition to the labels.	Not reported	Strong (CASP)
		Stakeholders: N=9 Community stakeholders working in roles that intersected health and alcohol such as social work, health promotion, alcohol and drug services, and marketing and social responsibility for local liquor corporations	Label versions varied by LRDG format: <u>Version 1:</u> LRDG chart <u>Version 2:</u> LRDG pictogram	Participants were provided with background information about standard drinks, LRDG, and acute and chronic harms related to alcohol, then asked questions in a semi-structured interview.			



Table 3: Characteristics of Included Studies Examining Labels with Standard Drink Information

First Author, Year, Study Location	Study Design	Sample Size & Characteristics	Methods, Label Characteristics	Outcome Measures	Key Results	Funding Source	Quality Rating (Appraisal Tool)
<b>Experimental and Quasi-experimental Studies</b>							
Blackwell, 2018, <sup>64</sup> United Kingdom	Between-subjects experiment, conducted online	N=1,884  Adults ages 18+ who lived in the United Kingdom and reported drinking alcohol  Participants recruited from online marketing panel	Two tasks to examine impact of labels:  <u>Unit information task:</u> Participants viewed, one at a time, a container of wine, beer, vodka, and cider adjacent to a label designed according to assigned label condition.  Participants were randomized to 1 of 4 label conditions: 1) Industry standard alcohol by volume (ABV) label 2) Industry standard Responsibility Deal label with total units per bottle 3) Food label equivalent with number of units per serving as a percentage of national guideline weekly amount (14 units) 4) Pie chart label with number of units per serving as a visual proportion of the national guideline weekly amount (14 units)  *ABV information displayed on labels in conditions 2-4.  <u>Health information task:</u> Participants were randomized to view 1 of 8 labels varying by health message content, specificity, and framing. Details of labels and results provided in Table 1.  Support for label policies was assessed using a 2 (pre, post) x 3 (information type: unit	<b>Estimation:</b> Participants were asked how many [XX ml] of this [wine/beer/cider/vodka] could you have in a week before reaching the recommended limit of 14 units per week?  <b>Intentions:</b> Participants were presented with images of 3 bottles of beer of different strengths (4%, 5%, 6%) and asked which they would choose to drink.  <b>Support:</b> Participants were asked to what extent they agree with the following statements: 1) Alcoholic beverages should include more information about alcohol strength (i.e., unit information) 2) Alcoholic beverages should have information about the health impact of drinking (i.e., health warning labels) 3) Alcoholic beverages should include more nutritional information (i.e., calorie information)  Responses were rated on a 100-point visual analog scale with the anchors Strongly disagree and Strongly agree.	<b>Estimation:</b> Main effect of unit label condition detected ( $F(3,1880)=22.16$ $p<0.001$ ). Post hoc tests show food label equivalent and pie chart labels resulted in more accurate estimates than the industry standard labels ( $p<0.001$ ). No significant differences between the 2 novel labels, or between the 2 industry labels found. On average, participants in all 4 label conditions underestimated the number of drinks they could consume before reaching the guideline weekly amount of 14 units.  <b>Intentions:</b> No evidence that any of the 4 conditions increased odds of choosing higher strength beer ( $p=0.86$ )  <b>Support:</b> There were small increases in participant support for labels with: <ul style="list-style-type: none"><li>• Standard drink information: pre: <math>M=66.8</math>, <math>SD=26.8</math> post: <math>M=69.7</math>, <math>SD=26.3</math>, <math>p&lt;0.001</math></li><li>• Nutrition information: pre: <math>M=66.0</math>, <math>SD=28.1</math>, post: <math>M=67.2</math>, <math>SD=28.0</math>, <math>p&lt;0.001</math></li></ul> There was no significant change in support for labels with: <ul style="list-style-type: none"><li>• Health messages: pre: <math>M=61.3</math>, <math>SD=27.9</math>, post: <math>M=61.7</math>, <math>SD=28.9</math>, <math>p=0.36</math></li></ul>	Supported by an Alcohol Research UK grant and an ESRC New Investigator Grant, both awarded by the Medical Research Council Integrative Epidemiology Unit at the University of Bristol.	Weak (EPHPP)



			information, health warning, calorie information) design.			
Brunk, 2020, <sup>128</sup> United States (USA)	Within-subjects experiment, 3 (alcohol types: beer, wine, spirits) x2 (label types: ABV, standard drinks per container) x2 (alcohol strength: high, low)	N=84  Undergraduate university students ages 18+	Participants completed outcome measures post-exposure, except support measures were assessed pre- and post-exposure.  Each participant engaged in a series of 24 pouring tasks, in 2 blocks of 12 conditions: <u>Alcohol type</u> : beer, wine, spirits <u>Label type</u> : ABV, number of standard drinks per container <u>Concentration</u> : high, low for each alcohol type (beer: 5%, 10%; wine: 10%, 15%; spirits: 20%, 40%)  Participants were instructed to “Pour a standard drink into the glass in front of you. Feel free to use any information present on the bottle to help inform your pour”.	<b>Estimation:</b> The volume each participant poured was measured for every trial and used to determine: 1) Mean pour volume: average volume (ml) of the 2 pours within a condition for each subject 2) Standardized pour error (SPE): subtracted the accurate standard drink volume for a given condition from each subject's mean pour volume for that condition, and divided the result by the accurate volume representing a standard drink, converting the pour errors into standard drink units. Positive standardize pour errors represent over-pours, while negative values represent under-pours.	<b>Estimation:</b> No main effect of label type, but significant effects when analysed by concentration, label type, and alcohol type. <ul style="list-style-type: none"><li>• High concentration beer: Standard drink labels resulted in significantly more accurate pours than ABV% labels (<math>p&lt;0.001</math>)</li><li>• Low concentration beer, wine and liquor: Standard drink labels resulted in significantly more accurate pours than ABV% label (<math>p&lt;0.001</math>)</li><li>• High concentration wine and spirits: no significant effect of label type</li></ul> <p>There was an overall tendency to over-pour high concentration drinks and under-pour low concentration drinks, meaning the increased accuracy of the standard drink labels in low concentration drinks led to pouring more alcohol.</p>	Partially funded through proceeds developed by a lab conference, and partially through a grant from the College of Agriculture and Natural Resources that intends to enable undergrad students to engage in research projects
Gold, 2021, <sup>94</sup> United Kingdom	Between-subjects experiment, conducted online	N=7,516  Adults ages 18+ who drank alcohol  Participants recruited through online panel	Participants were randomized to view 1 of 7 label designs: 1) Control: current industry standard with units per container; 2) Food label – serving: units and % of low-risk drinking guideline per serving; 3) Food label – serving and container: units and low-risk drinking guideline per serving and per container; 4) Pictograph – serving: proportion of low-risk drinking guideline per serving;	<b>Knowledge/Estimation:</b> 1) Participants were asked: “The government’s low risk drinking guideline recommends that people not regularly drink more than a certain number of alcohol units per week. What do you think the low risk drinking guideline is?” (free text numeric response; correct/ incorrect) 2) 10 understanding questions for beer, wine, and spirits, presented in a random order: “How many [servings/containers of this size (in ml)] of [beverage]	<b>Knowledge/Estimation:</b> All 6 custom labels increased knowledge of the low risk drinking guideline compared to the control (all $p<0.001$ ) <b>Per Serving:</b> Overall, more participants underestimated than overestimated the number of servings to reach guideline: <ul style="list-style-type: none"><li>• Least accurate: control condition underestimated by <math>M=-4.64</math> servings, 95% CI: -4.85,-4.44</li></ul>	Funded by Public Health England



	5) Pictograph - container: low-risk drinking guideline per serving; 6) Pie chart – serving: proportion of low-risk drinking guideline per serving; 7) Risk gradient – serving: units per and low-risk drinking guideline per serving marked on coloured gradient from 0-35 units.	could you have before reaching 14 units?" (free text numeric response; responses grouped by servings and containers) <b>Risk Perception:</b> 1) To what extent do you think that cutting down on your drinking would reduce your own risk of alcohol related disease? (1=Not at all likely, 2=Not very likely, 3=Somewhat likely, 4=Quite likely, 5=Extremely likely) 2) How many units of alcohol do you personally think a person would need to regularly drink per week to seriously damage their health? (free text response). <b>Intentions:</b> Earlier, you saw the following alcohol label [image of beer label displayed]. To what extent do you agree or disagree with the following statement: This information makes me feel motivated to drink less. (1 =Strongly disagree, 2=Disagree, 3=Neither agree nor disagree, 4=Agree, 5=Strongly agree)	• Most accurate: pictograph per serving condition underestimated by $M=-0.93$ servings, 95% CI: -1.06, -0.80 • All label conditions were significantly more accurate than the control ( $p<0.001$ ) <b>Per Container:</b> Overall, more participants overestimated than underestimated containers to reach guideline: • Least accurate: food label - per serving overestimated by $M=1.10$ containers, 95% CI: 1.02, 1.17 • Most accurate: control group overestimated by $M=0.09$ containers, 95% CI: 0.03, 0.16 • All label conditions were significantly less accurate than the control ( $p<0.001$ ) Participants across all conditions were more accurate in estimates for beer, and less accurate for wine and spirits. <b>Risk Perception:</b> Participants in all conditions thought on average it was "quite likely" that cutting down on alcohol consumption would reduce risk of disease ( $M=3.88$ , $SD=1.22$ ), and on average overestimated the number of units needed to consume in a week to seriously damage health ( $M=26.24$ , $SD=62.60$ ). Experimental label designs had no significant effect on perception responses (all $p>0.3$ ). <b>Intentions:</b> Experimental labels associated with decreased motivation to drink less vs the control ( $p<.001$ for all), albeit by a very small amount (0.1 - 0.3 points on a 5-point scale)
	500 participants (~70 per condition) were randomized to see a health warning underneath the assigned label condition which read "Warning: Alcohol causes cancer" in bold with a red border.		
	Participants completed a survey with measures assessing knowledge/ estimation, risk perceptions, and intentions.		



<p>Hobin, 2020b,<sup>80</sup> Canada (Yukon, NWT)  Article from single labelling study conducted in Yukon/NWT, Canada</p>	<p>Quasi-experiment, prospective cohort conducted using 3 waves of surveys (1 pre-, 2 post-intervention)</p>	N=2,049	<p><b>Intervention condition:</b> 3 rotating labels with a cancer warning, standard drink information, and national drinking guidelines were affixed to all alcohol containers in 1 liquor store in the intervention site for a total of 5 months. Labels were 5cm x 3cm in size, brightly coloured, included a phone number and website for information or help, and were affixed on the sides or backs of containers.</p> <p><b>Comparison condition:</b> Warning labels cautioning about drinking while pregnant or operating a motor vehicle and a general health message continued to be affixed to all alcohol containers in the 2 liquor stores in the comparison site.</p> <p>Participants were systematically recruited as they exited liquor stores, and independently completed survey on a tablet without interviewer assistance. In follow-up waves, repeat participants were emailed the survey, and identical procedures to recruit new participants in Wave 1 were used in follow-up waves.</p>	<p><b>Label Noticing:</b> Participants were asked if they had seen any warning labels on bottles or cans of beer, wine, hard liquor, coolers or ciders (yes/no/don't know/prefer not to say). Those who reported seeing warning labels were asked if they had noticed any changes to warning labels on bottles or cans of beer, wine, hard liquor, coolers or ciders (yes vs no/ don't know).</p> <p><b>Message Processing:</b></p> <ul style="list-style-type: none"> <li>1) How often have you read or looked closely at the warning labels on bottles and cans of beer, wine, liquor, coolers, or ciders?</li> <li>2) How often have you thought about the warning labels on bottles and cans of beer, wine, hard liquor, coolers, or ciders?</li> <li>3) How often have you talked about the warning labels on bottles or cans of beer, wine, hard liquor, coolers, or ciders with others?</li> </ul> <p>(1=never, 2=rarely, and 'don't know' versus 3=sometimes, 4=often, and 5=very often)</p> <p><b>Behaviour:</b> Has the amount of alcohol you are drinking changed as a result of the warning labels on bottles or cans of beer, wine, hard liquor, coolers, or ciders? (less/same amount/more/ don't know/prefer not to say)</p>	<p><b>Label Noticing:</b> Greater increases in noticing changes to warning labels between waves 1 and 3 in intervention vs comparison condition (+31.1% vs -3.4%, AOR=17.2, 95% CI: 8.2, 36.2)</p> <p><b>Message Processing:</b> Greater increases in all 3 measures of message processing between waves 1 and 3 in intervention vs comparison condition:</p> <ul style="list-style-type: none"> <li>• Reading labels closely (+6.8% vs -15.7%, AOR=2.6, 95% CI: 1.8, 3.7)</li> <li>• Thinking about labels: (+11.6% vs -6.3%, AOR=2.7, 95% CI: 1.8, 4.0)</li> <li>• Talking with others about the labels: (+9.5% vs -3.3%, AOR=3.4, 95% CI: 1.9, 5.9)</li> </ul> <p><b>Behaviour:</b> Participants in the intervention condition had higher odds of reporting drinking less alcohol due to labels between waves 1 and 3 vs the comparison condition: (+3.0% vs -8.0%, AOR=3.7, 95% CI: 2.0, 7.0).</p>	<p>Project funding from Health Canada; 1 author received funds from Swedish and Finnish government retail alcohol monopolies; 1 author received partial funds from Educ'alcool from 2008-2014</p>
<p>Hobin, 2018,<sup>121</sup> Canada (Ontario)</p>	<p>Between-groups experiment, 3 (beer, wine, spirits) x6 (label message variants) factorial design</p>	N=2,016	<p>Participants were randomized to view 1 of 6 alcohol container back</p> <p><b>label conditions:</b></p> <ul style="list-style-type: none"> <li>1) ABV% (control)</li> <li>2) Pictogram of Low risk drinking guidelines (LRDG)</li> <li>3) Chart of LRDG</li> <li>4) Standard drinks per container</li> <li>5) Standard drinks per container and pictogram of LRDG</li> </ul>	<p><b>Estimation:</b></p> <ul style="list-style-type: none"> <li>1) Estimate the amount of alcohol in a standard drink (e.g., If you were drinking this bottle of wine, how many ounces or millilitres of wine are in a standard drink?)</li> <li>2) Estimate the number of standard drinks in an alcohol container (e.g., How many standard drinks are in this bottle of wine?)</li> </ul>	<p><b>Estimation:</b></p> <p>For wine and spirits:</p> <ul style="list-style-type: none"> <li>• Standard drink labels, and standard drink plus LRDG labels (conditions 4,5,6) increased accuracy of estimating alcohol in a standard drink, and number of standard drinks in a container vs the control label (<math>p&lt;0.05</math> for all).</li> </ul>	<p>Not reported</p> <p>Moderate (EPHPP)</p>



			6) Standard drinks per container and chart of LRDG	Each participant viewed their allocated label condition on 3 containers (wine, beer, and spirits). The 5 experimental labels were further stratified by size: small (50% of label), or large (100% of label).	After viewing the label conditions, participants answered questions about estimation, perceptions, and support.	3) estimate the number of standard drinks to consume before reaching the recommended daily limit in Canada's LRDG for men and women (e.g., If you were drinking this bottle of wine, how many 5 oz glasses would you need to consume to reach the daily limit in Canada's LRDGs?) <b>Perceptions:</b> To what extent, if at all, would labels with LRDGs on alcohol containers make you think about the number of drinks you consume? (very much/somewhat/neutral/not much/not at all) <b>Support:</b> Do you think cans and bottles of alcoholic drinks should be labelled with the number of SDs they contain? (strongly support/support/unsure/oppose/strongly oppose)	• LRDG labels, and standard drink plus LRDG labels (conditions 2,3,5,6) increased accuracy of estimating number of drinks to reach the recommended limit vs the control label ( $p<0.05$ for all). For beer: • Standard drink labels, and standard drink plus LRDG labels (conditions 4,5,6) increased accuracy of estimating alcohol in a standard drink, and number of standard drinks in a container vs the control label ( $p<0.05$ for all). • Standard drink plus LRDG labels (conditions 5,6) increased accuracy of estimating number of drinks to reach recommended limits ( $p<0.05$ for all) Size: larger vs smaller standard drink plus LRDG (conditions 5,6) increased accuracy of all 3 estimation outcomes. Chart vs pictogram: no significant difference. <b>Perceptions:</b> 50.9% of males and 59.1% of females indicated LRDG labels would somewhat or very much make them think about the number of drinks they consumed. <b>Support:</b> 59.7% of males and 72.3% of females supported or strongly supported alcoholic drinks being labelled with the number of standard drinks they contain.	Supported by the Medical Research Council Integrative Epidemiology Unit at the	Moderate (EPHPP)
Maynard, 2018, <sup>68</sup> United Kingdom	2x2 between-subjects experiment, <i>ad libitum</i> test presented to participants	N=264	Participants were randomized to be exposed to 1 of 2 label information conditions: 1) Treatment: a place card with calorie per serving and/or unit information (128 calories, 1.4 units) and product information	After the beer and place cards were removed: <b>Consumption:</b> Researchers measured the volume of beer remaining in participants' glasses.			<b>Consumption:</b> There was no significant difference in consumption between the treatment condition ( $M=50\%$ consumed, $SD=27\%$ ) and control ( $M=47\%$ consumed, $SD=27\%$ , $p=0.42$ ).		



as a “taste test”	2 (calorie information, no calorie information) x2 (unit information, no unit information)	2) Control: a place card with product information only (e.g., “most popular beer in the UK”), no calorie or unit information.	<b>Unit Estimation:</b> Participants were asked to estimate the number of units and calories in the beer. <b>Intentions:</b> Participants were asked to indicate, in the event they could only consume beer for an evening, how many half-pints they would choose to consume.	<b>Unit Estimation:</b> A greater percentage of participants in the treatment condition were able to accurately estimate unit content within 15% of the true value (41.4%) vs the control (17.6%). 14.3% of participants in the treatment condition estimated the exact unit content, compared to 0% in control. Statistically significant differences were not tested for these outcomes. <b>Intentions:</b> There was no significant difference between participants in treatment ( $M=4.45$ ) and control ( $M=4.50$ ) conditions on reported intentions to drink ( $p=0.87$ ).	University of Bristol	
Osiowy, 2015, <sup>129</sup> Canada, (British Columbia)	Between-subjects experiment, 2 (ABV or standard drink) x3 (alcohol type) x3 (alcohol strength) design	N=301  Liquor store patrons, ages 19+ who: a) consumed at least one drink of alcohol in the past 30 days b) usually consume beer, wine or spirits (not coolers or cider) c) correctly answered three standard drink comprehension questions	Each participant was viewed 6 differently labelled containers of their preferred alcoholic beverage.  Label conditions: <u>Preferred alcohol:</u> beer, wine, or spirits <u>Labels:</u> ABV%, or standard drink content <u>Alcohol strength:</u> Beverage strengths per alcohol type. Beer: 3%, 5%, 8% Wine: 8%, 12%, 14% Spirits: 21%, 40%, 75.5%  After viewing each label, participants were asked to estimate the standard drink content.  After completion of the experiment, participants answered questions related to their perceptions and support of standard drink labels.	<b>Estimation:</b> After viewing each label, participants were asked how many standard drinks they would have consumed if they drank [3 beers; half bottle of wine; quarter bottle of spirits]. (open response)  <b>Perceptions:</b> Participants were asked if they would use standard drink labels for: 1) Calculating the amount of alcohol to buy for a function 2) Comparing brands to get the least expensive alcohol 3) Helping themselves or someone else to stay below the legal limit before driving 4) Helping themselves or someone else to follow Canada’s drinking guidelines  <b>Support:</b> Participants were asked if they support the introduction of standard drink labels on alcohol containers in Canada (yes/no/don’t know)	<b>Estimation:</b> Exposure to standard drink labels resulted in significantly more accurate estimate vs ABV% labels for all beverage types and strengths ( $p<0.001$ ) except regular strength beer. Wine and spirits estimates were significantly less accurate than beer estimates ( $p<0.001$ ). Participants were significantly less accurate at estimating low strength beverages than moderate or high strengths ( $p<0.001$ ). Higher educated participants (>high school) were more likely to provide accurate estimates vs those with only high school education ( $p<0.01$ ).  <b>Perceptions:</b> <ul style="list-style-type: none"><li>• 74.3% intended to use standard drink labels to help them or others to stay below the legal limit before driving</li><li>• 68.3% intended to use labels to consume within drinking guidelines</li></ul>	Not reported  Weak (EPHPP)



Schoueri-Mychasiw, 2020b, <sup>83</sup> Canada (Yukon, NWT)  Article from single labelling study conducted in Yukon/NWT, Canada	Quasi-experiment, prospective cohort conducted using 3 waves of surveys (1 pre-, 2 post-intervention)	N=2,049	<p><b>Intervention condition:</b> 3 rotating labels with a cancer warning, standard drink information, and national drinking guidelines were affixed to all alcohol containers in 1 liquor store in the intervention site for a total of 5 months. Labels were 5cm x 3cm in size, brightly coloured, included a phone number and website for information or help, and were affixed on the sides or backs of containers.</p> <p><b>Comparison condition:</b> Warning labels cautioning about drinking while pregnant or operating a motor vehicle and a general health message continued to be affixed to all alcohol containers in the 2 liquor stores in the comparison site.</p> <p>Participants were systematically recruited as they exited liquor stores, and independently completed survey on a tablet without interviewer assistance. In follow-up waves, repeat participants were emailed the survey, and identical procedures to recruit new participants in Wave 1 were used in follow-up waves.</p>	<ul style="list-style-type: none"> <li>46.4% intended to use labels to purchase the strongest alcohol for the least amount of money.</li> </ul> <p><b>Support:</b> 82.7% of participants expressed support for standard drink labels on alcohol containers.</p>	<p><b>Label Noticing:</b> Noticing was high in all 3 waves in both conditions (&gt;75% for all).</p> <p><b>Label Recall:</b> Greater increases in recall of the standard drink label message between waves 1 and 3 in the intervention vs comparison condition:</p> <ul style="list-style-type: none"> <li>Unprompted recall (+11.9% vs +0.3%)</li> <li>Prompted recall (+32.6% vs +3.2%, AOR=5.69, 95% CI: 3.02, 10.71).</li> </ul> <p><b>Estimation:</b> Greater increases in accurate standard drink between waves 1 and 3 in the intervention vs comparison condition (+6.3% vs +5.5%, AOR=1.06, 95% CI: 0.59, 1.93). Those who preferred higher concentrations drinks (i.e., spirits) had lower odds of accurately estimating vs those who preferred lower concentration drinks (AOR=0.23, 95% CI: 0.14, 0.37).</p> <p><b>Intentions:</b> Greater increases in intending to use standard drink labels to stay within the low risk drinking guidelines in the intervention vs comparison condition (+2.9% vs +0.3%, AOR=1.04, 95% CI: 0.75, 1.46). Females vs males (<math>p&lt;0.0001</math>) and those with higher education vs lower education (<math>p&lt;0.05</math>) were more likely to use labels to stay within guideline limits.</p>	<p>1 author received funds from Swedish and Finnish government retail alcohol monopolies; 1 author's research partially supported by the National Alcohol Beverage Control Association</p>	Weak (EPHPP)



				<p><b>Intentions:</b></p> <p>1) If the number of standard drinks were displayed on bottles and cans of alcoholic beverages, would you ever use the information to help yourself or someone else stay within the daily drink limit advised in the low-risk drinking guidelines?</p> <p>2) If the number of standard drinks were displayed on bottles and cans of alcoholic beverages, would you ever use the information to compare brands to get the most alcohol for the least amount of money? (yes/no/don't know/prefer not to say).</p> <p><b>Support:</b> Participants were asked to report the extent to which they disagree or agree that cans and bottles of alcoholic beverages should be labelled with the number of SDs per container (1=Strongly disagree to 5=Strongly agree). Responses dichotomised as Agree/Strongly agree versus all other responses.</p>	<p>Ages 25+, vs 24 and younger (<math>p&lt;0.05</math>) and those with higher alcohol consumption levels vs low consumption levels (<math>p&lt;0.05</math>) were less likely to use the labels to stay within guideline limits.</p> <p>Greater decreases in intending to use labels to get more alcohol for the least cost between waves 1 and 3 in the intervention vs comparison condition (-5.7% vs +2.5%, AOR=0.65, 95% CI: 0.45, 0.93).</p> <p><b>Support:</b> Greater increases in support for standard drink labels between waves 1 and 3 in the intervention vs comparison condition (+14.2% vs +5.1%, AOR 1.49, 95% CI: 1.04, 2.12).</p>	
Zhao, 2020, <sup>86</sup> Canada (Yukon, NWT)	Interrupted time series  <i>Article from single labelling study conducted in Yukon/NWT, Canada</i>	N=NR  <i>Yukon and NWT population-level data collected for people ages 15+</i>	<p><b>Intervention condition:</b> 3 rotating labels with a cancer warning, standard drink information, and national drinking guidelines were affixed to all alcohol containers in 1 liquor store in the intervention site for a total of 5 months. Labels were 5cm x 3cm in size, brightly coloured, included a phone number and website for information or help, and were affixed on the sides or backs of containers.</p> <p><b>Comparison condition:</b> Warning labels cautioning about drinking while pregnant or operating a motor vehicle and a general health message</p>	<p><b>Behaviour:</b> Alcohol consumption during the quasi-experimental intervention labelling period was compared with consumption during the period without the intervention labels. Data was collected for 28 months before, and 14 months after the intervention condition labels were applied in the Yukon intervention liquor store site.</p> <p>Monthly retail alcohol sales data for all of Yukon were converted to pure alcohol in standard drinks, and used to calculate monthly per capita alcohol consumption for people ages 15+. This was compared to</p>	<p><b>Behaviour:</b> Relative to the comparison sites, the labelling intervention condition site was associated with:</p> <ul style="list-style-type: none"><li>• a 6.31% reduction in alcohol consumption during the treatment period, Nov 2017-Jul 2018 (<math>p=0.0001</math>)</li><li>• a 9.97% reduction in alcohol consumption during the post-treatment months, Aug-Dec 2018 (<math>p=0.0001</math>)</li></ul> <p>Significant reductions in consumption were observed only in relation to alcohol products with the enhanced labels in the treatment site, not</p>	Project funding from Health Canada- Substance Use and Addictions Program  Moderate (NOS)



Mixed-Methods Studies							
Clarke, 2020, <sup>115</sup> United Kingdom	Mixed methods: <i>ad libitum</i> between-groups/pairs experiment in bar laboratory; focus groups	Experiment: N=162 2 focus groups: N=17  Young adults who drank alcohol at least weekly	<p><b>Experiment:</b> Participants were recruited as pairs (i.e., friends). Pairs sat together and drank the same beverage type, either beer (4%) provided in 880mL jug, or wine (5.5%) provided in a 500mL carafe. Participants were given glasses to drink from, and were directed to pour and consume as much as they like. The <i>ad libitum</i> drinking period lasted 20 minutes. Each pair was randomly assigned to receive glasses according to 1 of 2 label conditions:</p> <p><b>Control:</b> generic unlabelled glasses</p> <p><b>Intervention:</b> labelled glass with DrinkWise logo, number of units in common drinks of various ABV%, daily limit guidelines for men (3-4 units) and women (2-3 units), and a health warning “Regularly exceeding these guidelines could lead to serious health problems”</p> <p>Participants completed survey measures post-experiment (with the exception of intention measures assessed pre- and post), only those in the label conditions responded to label-specific measures.</p> <p><b>Focus groups:</b> Participants who did not participate in the experiment were presented with</p>	<p><b>Consumption:</b> Amount of alcohol consumed after 20 minutes was measured in ml and converted to units</p> <p><b>Label Noticing:</b></p> <ol style="list-style-type: none"> <li>1) Did you notice the unit and warning label? (yes/no/unsure)</li> <li>2) Do you think it had an effect on how much alcohol you consumed? (yes/no/unsure)</li> <li>3) Do you think these glasses could be useful in getting people to drink less? (yes/no/unsure)</li> </ol> <p>Participants were also given the opportunity to provide open-ended feedback.</p> <p><b>Intentions:</b> Pre- and post-experiment, all participants completed the Alcohol Urge Questionnaire which assessed current urges and desires, intent, anticipation of positive affect, and relief of negative affect. Each question is scored on 7-point scale, higher scores indicating higher urge.</p> <p>Focus groups participants were asked to share their opinions on the acceptability and perceived effectiveness of the labelled glasses.</p>	<p><b>Consumption:</b> No significant main effect by label condition (1.61 units vs 1.69 units, p=0.35), even after controlling for gender and drinking characteristics.</p> <p><b>Intentions:</b> No significant main effect on change in urge to drink scores by label condition (4.48 vs 4.86, p=0.41), even after controlling for gender and drinking characteristics.</p> <p><b>Label Noticing:</b> Of those exposed to labelled glasses, 85% reported noticing the unit and health warning labels.</p> <p><b>Perceptions:</b> Of those exposed to labelled glasses, 80% did not believe the glasses influenced their drinking. 35% believed they could be useful in getting people to drink less, 30% did not, 17.5% were unsure, and 17.5% believed they would be useful for certain people.</p> <p><b>Open-ended feedback</b> provided by participants after the experiment and provided by the focus group participants: Glasses were likely to be ineffective because they were not visually appealing, contained too much information, would have decreased effectiveness after drinking had begun, and could be used for unintended purposes (i.e., maximizing alcohol content). Participants</p>	Funded by The Economic and Social Research Council (ESRC) through a PhD CASE studentship (case partner is the charity Alcohol Research UK, now merged with Alcohol Concern and called Alcohol Change UK).	Moderate (MMAT)



				the same labelled drinking glasses used in the experiment.			
de Visser, 2017, <sup>87</sup> United Kingdom	Mixed methods: between- and within-subjects quasi-experiment; qualitative in-depth telephone interviews	N=450 (quasi-experiment) N=13 (in-depth interview)	<b>Quasi-experiment:</b> Participants were allocated to control or intervention condition based on their workplace: 6 control workplaces, 8 intervention workplaces. <b>Intervention condition:</b> Participants received 3 unit-marked glasses indicating the alcohol content of spirits, wine, and beers of different strengths and volumes; and the national drink limit guidelines by sex. Participants were instructed to use the glasses for all alcoholic and non-alcoholic drinks for 1 month. <b>Control condition:</b> Did not receive any glasses.  <b>In-depth interviews:</b> Focused on reactions to the labelled glasses, the experience of using, the perceived impact on alcohol consumption, and suggestions for how to improve the intervention.	<b>Knowledge:</b> 1) 4 items assessed knowledge of guidelines, including recommended daily drink limits, and the recommended number of dry days per week by sex. Correct responses were summed to give final score from 0-4. 2) 10 items assessed knowledge of unit content per drink. Images of 10 drinks were accompanied by descriptions [e.g., pint (568 ml) of regular strength beer]. Unit estimates were considered correct if within 10% of the actual unit content, and summed to give final score from 0-10. <b>Awareness:</b> How familiar are you with the concept of units? (1=not at all to 10=extremely) <b>Perceived effectiveness:</b> How useful to you is the concept of units? (1=not at all to 10=extremely) <b>Behaviour:</b> 1) How often do you count the number of units of alcohol that you drink? (1=never to 10=always) 2) Participants viewed a pictorial guide of the unit content of various drinks to report how many units they consumed each day in the previous week. Responses were used to create 3 variables:	indicated the labelled glass may be helpful to monitor how many drinks have been consumed, but would not likely be used to consume within the guidelines. Some participants believed the guidelines were not relevant to their drinking, only to heavier drinkers, people with health concerns or older people.  Control and intervention groups were comparable at baseline. At follow-up: <b>Knowledge:</b> Knowledge of guidelines was greater in the intervention ( $M=3.08$ ) vs control ( $M=2.53$ , $p<0.01$ ). Accuracy of unit content per drink was greater in the intervention ( $M=3.86$ ) vs control ( $M=3.08$ , $p<0.01$ ). <b>Awareness:</b> Familiarity with units was greater in the intervention ( $M=7.14$ ) vs control ( $M=5.96$ , $p<0.01$ ). <b>Perceived effectiveness:</b> Perceived usefulness of unit information was greater in the intervention ( $M=6.36$ ) vs control ( $M=5.42$ , $p<0.01$ ). <b>Behaviour:</b> Frequency of counting units was greater in the intervention ( $M=4.07$ ) vs control ( $M=3.33$ , $p<0.01$ ). All 3 alcohol consumption measures were not significantly different between the intervention and control groups.  Intervention group only: <ul style="list-style-type: none"><li>• Frequency of using glasses: (<math>M=9.06</math>, <math>SD=4.586</math>)</li><li>• Helpfulness of glasses for understanding the</li></ul>	Research supported by the European Foundation for Alcohol Research	Moderate (MMAT)



				i) days in the last week when intake was over the recommended maximum ii) dry days during the last week iii) total number of units consumed in the last week	government guidelines: (M=7.51, SD=2.52) • Ease of using glasses: (M=7.58, SD=2.73) • Glasses made participants think a lot about their alcohol intake (M=6.85, SD=2.92)	
Roderique-Davies, 2020, <sup>76</sup> United Kingdom	Mixed methods: Mock shopping task with eye tracking technology; qualitative focus groups	N=25 (mock shopping task with eye tracking technology) N=10 (focus group)  University students and staff, ages 18+,	<b>Mock shopping task:</b> Participants “purchased” items from a shelving unit with various alcohol products (beer, cider, wine, liquor). Shelving signs contained information related to the product, prices and health risks.  <b>Label Attention:</b> Alcohol container labels included brand, alcohol by volume, liquid measurement, units and health	<i>Follow-up measures for intervention group only (n=229):</i> 1) Frequency of use of the unit-marked glasses in 3 locations: home, work, elsewhere (1=never to 10=always) 2) How helpful were glasses for understanding government guidelines for alcohol use? (1=not at all to 10=extremely) 3) How easy were glasses to use? (1=not at all to 10=extremely) 4) How much did the glasses make you think about your alcohol intake? (1=not at all to 10=extremely)	<i>In-depth interviews:</i> <b>First impressions:</b> <ul style="list-style-type: none"><li>• Overall positive opinions, useful for learning guidelines, clarified understanding of units</li><li>• Some approved of the design, others found it cluttered/medical/unappealing</li></ul> <b>Influence on thinking:</b> <ul style="list-style-type: none"><li>• Increased thinking about guidelines, unit information, and consumption</li></ul> <b>Experience of using glasses</b> <ul style="list-style-type: none"><li>• Some were embarrassed, reduced enjoyment of drinking</li><li>• Suggested tailored glasses for different alcohol types</li></ul> <b>Impact on own or others' drinking:</b> <ul style="list-style-type: none"><li>• Led to reduced intake for some, but effect was not lasting. Others were not concerned about health effects</li><li>• Sparked conversations with others about alcohol consumption</li></ul>	<b>Label Attention, Recall and Recognition:</b> Little attention was paid to the units and health information (0.25 milliseconds) on container labels compared to brand/ logo information (27.24 milliseconds) and the product description (6.18 milliseconds). In the post-task questionnaire, Supported by Alcohol Concern Cymru (now Alcohol Change UK) Moderate (MMAT)



who regularly consumed alcohol	information (not specified), product description, ingredients, and sell by date.  <b>Focus group:</b> Participants who did not take part in the mock shopping task were shown bottles with 4 different labels. <b>Label Conditions:</b> 1) Real label: current industry standard, details not provided 2) Back label with units per serving and container, liquid measurements, alcohol by volume, calories (not specified if per serving or container), drink limit guidelines, the National Health Service's Choices website, and symbols representing age restrictions, warnings cautioning about drinking when pregnant and driving 3) Back label with the same information as condition 2, but with larger drink limit recommendations moved to front label 4) Label with the same information as condition 3 but with health warnings moved to front label	"think aloud" as they made their choices.  <b>Perceptions:</b> In the focus group, alcohol products (alcohol/container type not specified) with the four different labels were revealed to participants, starting with the real label, followed by the three study-designed labels. Participants were asked to share their opinions on the labels in a semi-structured interview.	68% of participants recalled noticing the unit information on the alcohol labels, 84% recalled noticing the alcohol volume. Statistical significance was not tested for gaze times or questionnaire responses.  <b>Preferences:</b> Focus group participants perceived the unit information on the real label as beneficial, and preferred detailed text-based information over symbols. Negative perceptions of the real label included information being useful but poorly placed and inadequate in size. Of the study-designed labels, participants preferred the design with unit information on the front label more than the back label.
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#### Cross-Sectional Studies

Coomber, 2017c, <sup>130</sup> Australia	Cross-sectional, online survey	N=1,061	First, participants were asked if they had heard of a standard drink of alcohol. They were then shown examples of the Australian standard drink logos, and asked if they had seen logos on alcohol products.  Next, participants were presented with a written definition of a standard drink (10 g of alcohol) and pictorial representations of the number of standard drinks in 7 commonly consumed alcoholic beverages, then asked questions testing	<b>Label Awareness:</b> Have you ever heard of a standard drink of alcohol? (yes/no)  Have you seen standard drink logos like this on any alcohol products? (yes/no)  <b>Knowledge:</b> 1) How many standard drinks do you believe an adult [male/female] could drink every day for many years without adversely affecting [his/her] health? 2) How many standard drinks do you believe an adult [male/female] could drink in a	<b>Label Awareness:</b> 95.8% had heard of a standard drink, factors associated with higher odds of awareness included mid-SES vs low-SES, lives in rural/regional vs metropolitan area, high-risk vs low-risk drinker.  80% recognized the standard drink logos, ages 35-45 vs 18-24 were associated with lower odds of recognition.  <b>Knowledge:</b> Estimates for standard drink limits for men were significantly higher than	Not reported	Strong (NOS)
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Dekker, 2020, <sup>75</sup> Australia, Canada, China, India, New Zealand, United Kingdom, United States	Cross- sectional, online survey	N=7,545  Adults of the general population ages 18+	Participants were asked to complete survey measures rating support for 14 alcohol control initiatives	<p>their knowledge of standard drinks.</p> <p>Participants were asked to what extent they supported the use of drink guideline labels.</p> <p>six-hour period without adversely affecting [his/her] health? Accurate responses were defined as:</p> <ul style="list-style-type: none"> <li>• estimating the exact number of drinks as specified in the guidelines</li> <li>• estimating at or below the number of drinks specified in the guidelines.</li> </ul> <p>for women (male M=3.80, female M=2.9, p&lt;0.001).</p> <ul style="list-style-type: none"> <li>• 60%/75% estimated at or below the standard drink limit to reduce short term harm for men/women.</li> <li>• 70%/81% correctly estimated the standard drinks limit to reduce long term risk for men/women.</li> <li>• 29%/14% overestimated the limit to prevent short term harm in men/women</li> <li>• 20%/9% overestimated the limit to prevent long term harm for men/women</li> </ul> <p>High-risk drinkers had lower odds of providing accurate estimates vs low-risk drinkers (p&lt;0.05).</p>	<p><b>Support:</b> Participants were asked “To what extent do you agree or disagree with each of the following...?” and presented with 14 different alcohol control policies, including 1 relevant to standard drink labels: 1) Standard drink quantity information should be more prominent on alcohol packages. Responses were rated on a 5- point scale (1=Strongly disagree to 5=Strongly agree) Authors considered responses of 4=Agree or 5=Strongly agree as support.</p> <p><b>Support:</b> 72% (M=4.03, SD=0.99) supported standard drink quantity information on alcohol packages. Across all 14 policies assessed, support was highest for labelling requirements. Across all countries and 14 alcohol policies, age (p≤0.001), female gender (p≤0.001), and higher income (p=0.028) were positively associated with support. Being a drinker (p≤0.001) and drinking 5+ days per week (p≤0.001) were negatively associated with policy support.</p>	Not reported	Moderate (NOS)
Kongats, 2020, <sup>111</sup> Canada (Alberta, Quebec)	Cross- sectional, survey	N=2,400 general public: recruited through random- digit dialing  N=302 policy influencers: provincial and municipal bureaucrats, senior executives	Survey participants were asked to rate their support for 1 standard drink labelling policy: 1) Label alcoholic beverages to display quantity relative to standard number of drinks.	<p><b>Support:</b> Participants were asked to rate their support for various alcohol control policies (1 relevant to standard drink labels) on a 4 point scale (1=strongly oppose, 2=oppose, 3=support, 4=strongly support).</p> <p>Analysis of responses was done by calculating differences in proportions of those who</p>	<p><b>Support:</b> Participants were asked to rate their support for various alcohol control policies (1 relevant to standard drink labels) on a 4 point scale (1=strongly oppose, 2=oppose, 3=support, 4=strongly support).</p> <p>Analysis of responses was done by calculating differences in proportions of those who</p>	<p>Survey was part of the project funded by the Canadian Partnership Against Cancer's Coalitions Linking Action &amp; Science for Prevention</p>	Moderate (NOS)



Rosseheim, 2020, <sup>131</sup> United States (Florida, Montana, Virginia)	Cross- sectional, in-class surveys	N=833	and health- related management staff of companies with >500 employees, school board members and chairs, print media editors, health reporters	"supported" (1=strongly support or 2=somewhat support) a given alcohol policy between different levels given different covariates (i.e., public/policy influencer category, province, gender, age, education, and income).	significantly more support for this policy (92.9% vs 74.7%, $p<0.05$ ) • No significant differences in support by age among policy makers General public: • Support for standard drink labels not reported for the general public	(CLASP) (in partnership with Coalition Poids [Weight Coalition] in Quebec)		



Vallance, 2020, <sup>84</sup> Canada (Yukon, NWT)	Cross-sectional survey	N=836  <i>Article from single labelling study conducted in Yukon/NWT, Canada</i>	<p><b>Intervention condition:</b> 3 rotating labels with a cancer warning, standard drink information, and national drinking guidelines were affixed to all alcohol containers in 1 liquor store in the intervention site for a total of 5 months. Labels were 5cm x 3cm in size, brightly coloured, included a phone number and website for information or help, and were affixed on the sides or backs of containers.</p> <p><b>Comparison condition:</b> Warning labels cautioning about drinking while pregnant or operating a motor vehicle and a general health message continued to be affixed to all alcohol containers in the 2 liquor stores in the comparison site.</p> <p>Participants were systematically recruited as they exited liquor stores, and independently completed survey on a tablet without interviewer assistance</p>	<p><b>Support:</b> Participants were asked the degree to which they agree or disagree with the following: Cans and bottles of alcoholic beverages should be labeled with the number of standard drinks per container. Responses rated on a 5-point scale and dichotomized as 0=neutral/disagree/strongly disagree/don't know, and 1=agree/strongly agree.</p> <p>underage participants who had also tried the product (<math>p=0.020</math>)</p>	<p><b>Support:</b> 51.4% of participants agreed or strongly agreed alcohol containers should be labeled with standard drink information. There were no significant differences in support between the intervention and comparison conditions.</p> <ul style="list-style-type: none"> <li>• Females, those with greater than high school education, and those with adequate health literacy indicated significantly greater support than their counterparts (<math>p&lt;0.05</math> for all)</li> <li>• Those who consume more alcohol than the weekly guidelines recommend indicated significantly less support than those who consume alcohol at or below the recommended limits (<math>p&lt;0.01</math>)</li> </ul>	Funded by Health Canada, Substance Use and Addictions Program	Moderate (NOS)
Vallance, 2018, <sup>120</sup> Canada (Yukon)	Qualitative, focus groups	Total N=45  Stakeholders: N=9 Community stakeholders working in roles that intersected health and alcohol such as social work, health promotion, alcohol and drug services, and marketing and social	5 focus groups were conducted. All participants viewed 2 versions of enhanced alcohol container labels on empty beer, wine, and spirits bottles. Both versions contained: <ul style="list-style-type: none"> <li>1) A health message: "To reduce your risk of serious disease, such as cancer, follow the Low-Risk Drinking Guidelines"</li> <li>2) Standard drink information: "Bottle contains: 5.4 standard drinks" (with wine bottle symbol)</li> <li>3) A pregnancy warning symbol</li> <li>4) Low-Risk Drinking Guidelines (LRDG): "Drink no more than</li> </ul>	<p><b>Perceptions:</b> Participants were asked to review labels one at a time and reflect on:</p> <ol style="list-style-type: none"> <li>1) What they noticed about the labels</li> <li>2) If the label information was clear and easy to understand</li> <li>3) If the label information made them think about the health risks of drinking alcohol</li> <li>4) If the label information was sufficient enough to potentially impact drinking behaviors</li> <li>5) If they thought there was any relevant information missing from the label</li> </ol>	<p><b>Perceptions:</b> Enhanced labels were perceived as new, useful, important, and having potential to impact consumer behaviour. Participants discussed consumers' right to know alcohol-related risks and believed enhanced labels would allow consumers to be better informed. Both standard drink information and LRDG on alcohol container labels were perceived as important to fully understand and potentially modify behaviour. Some initial difficulty interpreting the</p>	Not reported	Strong (CASP)



responsibility for local liquor corporations	(2/3) standard drinks on most days, and no more than (10/15) standard drinks per week" (women/men)	<b>Preferences:</b> Participants were asked to choose which of the two labels was more effective for conveying a health message, standard drink information, the LRDG, and the pregnancy warning and explain why. Participants responded to questions about the preferred size and locations of the labels on alcohol containers. <b>Support:</b> Participants' support for labels emerged through group discussion.	standard drink and LRDG information resolved as participants grew familiar with the labels. Stakeholders highlighted resistance from industry, and logistical factors such as shapes of the bottles and manufacturers' labels limiting available options for label placement. <b>Preferences:</b> Stakeholders and general public participants preferred a larger label because it was easier to read and would draw more attention. Participants felt a combination of the pictogram and the chart would be the most effective way to present the LRDG. <b>Support:</b> Participants voiced strong support for the enhanced labels on alcohol container, no participants expressed opposition to the labels.
General public: N=36 Individuals ages 19–65 who consumed at least one alcoholic drink in the past 30 days	Label versions varied by LRDG format: <u>Version 1:</u> LRDG chart <u>Version 2:</u> LRDG pictogram	Participants were provided with background information about standard drinks, LRDG, and acute and chronic harms related to alcohol, then asked questions in a semi-structured interview.	



Table 4: Characteristics of Included Studies Examining Labels with Drink Limit Guidelines

First Author, Year, Study Location	Study Design	Sample Size & Characteristics	Methods, Label Characteristics	Outcome Measures	Key Results	Funding Source	Quality Rating (Appraisal Tool)
<b>Experimental and Quasi-experimental Studies</b>							
Gold, 2021, <sup>94</sup> United Kingdom	Between-subjects experiment, conducted online	N=7,516  Adults ages 18+ who drank alcohol  Participants recruited through online panel	Participants were randomized to view 1 of 7 label designs: 1) Control: current industry standard with units per container; 2) Food label – serving: units and % of low-risk drinking guideline per serving; 3) Food label – serving and container: units and low-risk drinking guideline per serving and per container; 4) Pictograph – serving: proportion of low-risk drinking guideline per serving; 5) Pictograph - container: low-risk drinking guideline per serving; 6) Pie chart – serving: proportion of low-risk drinking guideline per serving; 7) Risk gradient – serving: units per and low-risk drinking guideline per serving marked on coloured gradient from 0-35 units.  500 participants (~70 per condition) were randomized to see a health warning underneath the assigned label condition which read “Warning: Alcohol causes cancer” in bold with a red border.  Participants completed a survey with measures assessing knowledge/ estimation, risk perceptions, and intentions.	<b>Knowledge/Estimation:</b> 1) Participants were asked: “The government’s low-risk drinking guideline recommends that people not regularly drink more than a certain number of alcohol units per week. What do you think the low-risk drinking guideline is?” (free text numeric response; correct/ incorrect) 2) 10 understanding questions for beer, wine, and spirits, presented in a random order: “How many [servings/containers of this size (in ml)] of [beverage] could you have before reaching 14 units?” (free text numeric response; responses grouped by servings and containers) <b>Risk Perception:</b> 1) To what extent do you think that cutting down on your drinking would reduce your own risk of alcohol related disease? (1=Not at all likely, 2=Not very likely, 3=Somewhat likely, 4=Quite likely, 5=Extremely likely) 2) How many units of alcohol do you personally think a person would need to regularly drink per week to seriously damage their health? (free text response). <b>Intentions:</b> Earlier, you saw the following alcohol label [image of beer label displayed]. To	<b>Knowledge/Estimation:</b> All 6 custom labels increased knowledge of the low-risk drinking guideline compared to the control (all p<0.001) Per Serving: Overall, more participants underestimated than overestimated the number of servings to reach guideline: <ul style="list-style-type: none"><li>Least accurate: control condition underestimated by M=-4.64 servings, CI:-4.85,-4.44</li><li>Most accurate: pictograph per serving condition underestimated by M=-0.93 servings, CI: -1.06, -0.80</li><li>All label conditions were significantly more accurate than the control (p&lt;0.001)</li></ul> Per Container: Overall, more participants overestimated than underestimated containers to reach guideline: <ul style="list-style-type: none"><li>Least accurate: food label - per serving overestimated by M=1.10 containers, CI: 1.02, 1.17</li><li>Most accurate: control group overestimated by M=0.09 containers, CI: 0.03, 0.16</li><li>All label conditions were significantly less accurate than the control (p&lt;0.001)</li></ul> Participants across all conditions were more accurate in estimates for beer, and less accurate for wine and spirits. <b>Risk Perception:</b> Participants in all conditions thought on average it	Funded by Public Health England	Moderate (EPHPP)



Hobin, 2018, <sup>121</sup> Canada (Ontario)	Between-groups experiment, 3 (beer, wine, spirits) x6 (label message variants) factorial design	N=2,016  Adults ages 19- 75 who reported drinking at least one alcoholic beverage in the past 12 months	Participants were randomized to view 1 of 6 alcohol container back <b>label conditions:</b> 1) ABV% (control) 2) Pictogram of low-risk drinking guidelines (LRDG) 3) Chart of LRDG 4) Standard drinks per container 5) Standard drinks per container and pictogram of LRDG 6) Standard drinks per container and chart of LRDG  Each participant viewed their allocated label condition on 3 containers (wine, beer, and spirits). The 5 experimental labels were further stratified by size: small (50% of label), or large (100% of label).  After viewing the label conditions, participants answered questions about estimation, perceptions, and support.	what extent do you agree or disagree with the following statement: This information makes me feel motivated to drink less. (1 =Strongly disagree, 2=Disagree, 3=Neither agree nor disagree, 4=Agree, 5=Strongly agree)	was "quite likely" that cutting down on alcohol consumption would reduce risk of disease ( $M=3.88$ , $SD=1.22$ ), and on average overestimated the number of units needed to consume in a week to seriously damage health ( $M=26.24$ , $SD=62.60$ ). Experimental label designs had no significant effect on perception responses (all $p>0.3$ ). <b>Intentions:</b> Experimental labels associated with decreased motivation to drink less vs the control ( $p<.001$ for all), albeit by a very small amount (0.1 - 0.3 points on a 5-point scale)	<b>Estimation:</b> 1) Estimate the amount of alcohol in a standard drink (e.g., If you were drinking this bottle of wine, how many ounces or millilitres of wine are in a standard drink?) 2) Estimate the number of standard drinks in an alcohol container (e.g., How many standard drinks are in this bottle of wine?) 3) estimate the number of standard drinks to consume before reaching the recommended daily limit in Canada's LRDG for men and women (e.g., If you were drinking this bottle of wine, how many 5 oz glasses would you need to consume to reach the daily limit in Canada's LRDGs?) <b>Perceptions:</b> To what extent, if at all, would labels with LRDGs on alcohol containers make you think about the number of drinks you consume? (very much/ somewhat/neutral/not much/not at all) <b>Support:</b> Do you think cans and bottles of alcoholic drinks	<b>Estimation:</b> For wine and spirits: <ul style="list-style-type: none"><li>• Standard drink labels, and standard drink plus LRDG labels (conditions 4,5,6) increased accuracy of estimating alcohol in a standard drink, and number of standard drinks in a container vs the control label (<math>p&lt;0.05</math> for all).</li><li>• LRDG labels, and standard drink plus LRDG labels (conditions 2,3,5,6) increased accuracy of estimating number of drinks to reach the recommended limit vs the control label (<math>p&lt;0.05</math> for all).</li></ul> For beer: <ul style="list-style-type: none"><li>• Standard drink labels, and standard drink plus LRDG labels (conditions 4,5,6) increased accuracy of estimating alcohol in a standard drink, and number of standard drinks in a container vs the control label (<math>p&lt;0.05</math> for all).</li><li>• Standard drink plus LRDG labels (conditions 5,6) increased accuracy of estimating number of drinks to reach recommended limits (<math>p&lt;0.05</math> for all)</li></ul> <b>Size:</b> larger vs smaller standard drink plus LRDG (conditions 5,6)	Not reported	Moderate (EPHPP)



				should be labelled with the number of SDs they contain? (strongly support/support/unsure/oppose/strongly oppose)	increased accuracy of all 3 estimation outcomes. Chart vs pictogram: no significant difference.		
Hobin, 2020b, <sup>80</sup> Canada (Yukon, NWT)  Article from single labelling study conducted in Yukon/NWT, Canada	Quasi-experiment, prospective cohort conducted using 3 waves of surveys (1 pre-, 2 post-intervention)	N=2,049	<p><b>Intervention condition:</b> 3 rotating labels with a cancer warning, standard drink information, and national drinking guidelines were affixed to all alcohol containers in 1 liquor store in the intervention site for a total of 5 months. Labels were 5cm x 3cm in size, brightly coloured, included a phone number and website for information or help, and were affixed on the sides or backs of containers.</p> <p><b>Comparison condition:</b> Warning labels cautioning about drinking while pregnant or operating a motor vehicle and a general health message continued to be affixed to all alcohol containers in the 2 liquor stores in the comparison site.</p> <p>Participants were systematically recruited as they exited liquor stores, and independently completed survey on a tablet without interviewer assistance. In follow-up waves, repeat participants were emailed the survey, and identical procedures to recruit new participants in Wave 1 were used in follow-up waves.</p>	<p><b>Label Noticing:</b> Participants were asked if they had seen any warning labels on bottles or cans of beer, wine, hard liquor, coolers or ciders (yes/no/don't know/prefer not to say). Those who reported seeing warning labels were asked if they had noticed any changes to warning labels on bottles or cans of beer, wine, hard liquor, coolers or ciders (yes vs no/don't know).</p> <p><b>Message Processing:</b></p> <ol style="list-style-type: none"><li>How often have you read or looked closely at the warning labels on bottles and cans of beer, wine, liquor, coolers, or ciders?</li><li>How often have you thought about the warning labels on bottles and cans of beer, wine, hard liquor, coolers, or ciders?</li><li>How often have you talked about the warning labels on bottles or cans of beer, wine, hard liquor, coolers, or ciders with others?</li></ol> <p>(1=never, 2=rarely, and 'don't know' versus 3=sometimes, 4=often, and 5=very often)</p> <p><b>Behaviour:</b> Has the amount of alcohol you are drinking changed as a result of the warning labels on bottles or</p>	<p><b>Perceptions:</b> 50.9% of males and 59.1% of females indicated LRDG labels would somewhat or very much make them think about the number of drinks they consumed.</p> <p><b>Support:</b> 59.7% of males and 72.3% of females supported or strongly supported alcoholic drinks being labelled with the number of standard drinks they contain.</p> <p><b>Label Noticing:</b> Greater increases in noticing changes to warning labels between waves 1 and 3 in intervention vs comparison condition (+31.1% vs -3.4%, AOR=17.2, 95% CI: 8.2, 36.2)</p> <p><b>Message Processing:</b> Greater increases in all 3 measures of message processing between waves 1 and 3 in intervention vs comparison condition:</p> <ul style="list-style-type: none"><li>Reading labels closely (+6.8% vs -15.7%, AOR=2.6, 95% CI: 1.8, 3.7)</li><li>Thinking about labels: (+11.6% vs -6.3%, AOR=2.7, 95% CI: 1.8, 4.0)</li><li>Talking with others about the labels: (+9.5% vs -3.3%, AOR=3.4, 95% CI: 1.9, 5.9)</li></ul> <p><b>Behaviour:</b> Participants in the intervention condition had higher odds of reporting drinking less alcohol due to labels between waves 1 and 3 vs the comparison condition: (+3.0% vs -8.0%, AOR=3.7, 95% CI: 2.0, 7.0).</p>	Project funding from Health Canada; 1 author received funds from Swedish and Finnish government retail alcohol monopolies; 1 author received partial funds from Educ'alcool from 2008-2014	Weak (EPHPP)



Hobin, 2020c, <sup>79</sup> Canada (Yukon, NWT)  Article from single labelling study conducted in Yukon/ NWT, Canada	Quasi-experiment, prospective cohort conducted using 2 waves of surveys (1 pre-, 1 post-intervention)	N=1,647	<p><b>Intervention condition:</b> 3 rotating labels with a cancer warning, standard drink information, and national drinking guidelines were affixed to all alcohol containers in 1 liquor store in the intervention site for a total of 5 months. Labels were 5cm x 3cm in size, brightly coloured, included a phone number and website for information or help, and were affixed on the sides or backs of containers.</p> <p><b>Comparison condition:</b> Warning labels cautioning about drinking while pregnant or operating a motor vehicle and a general health message continued to be affixed to all alcohol containers in the 2 liquor stores in the comparison site.</p> <p>Participants were systematically recruited as they exited liquor stores, and independently completed survey on a tablet without interviewer assistance. In follow-up waves, repeat participants were emailed the survey, and identical procedures to recruit new participants in Wave 1 were used in follow-up waves.</p>	<p>cans of beer, wine, hard liquor, coolers, or ciders? (less, same amount, more, don't know or prefer not to say)</p> <p><b>Label Noticing:</b> Participants were asked if they have seen any warning labels on bottles or cans of beer, wine, hard liquor, coolers, or ciders (yes/no/do not know).</p> <p><b>Label Recall:</b> Participants were asked to indicate what messages they had seen on warning labels on bottles or cans of beer, wine, or liquor (unprompted, open response). Any mention of "cancer" or "drinking guidelines" were coded yes for unprompted recall of cancer and drinking guideline labels.</p> <p><b>Message Processing:</b></p> <ol style="list-style-type: none"><li>How often, if at all, have you read or looked closely at the warning labels on bottles and cans of beer, wine, hard liquor, coolers, or ciders?</li><li>How often, if at all, have you thought about the warning labels on bottles and cans of beer, wine, hard liquor, coolers, or ciders?</li><li>How often have you talked about the warning labels on bottles or cans of beer, wine, hard liquor, coolers, or ciders with others?</li></ol> <p>(1=never and 2=rarely versus 3=sometimes, 4=often, and 5=very often)</p> <p><b b="" intentions:<=""> To what extent, if at all, have warning labels on bottles or cans of beer, wine, hard liquor, coolers, or ciders influenced you to cut down your drinking? (1=no influence to 5=main influence)</b></p> <p><b b="" behaviour:<=""> Has the amount of alcohol you are drinking</b></p>	<p><b>Label Noticing:</b> Noticing was high in both waves and both conditions (&gt;75% for all).</p> <p><b b="" label="" recall:<=""> Recall of drink limit guideline labels increased but not to a significant extent between waves 1 and 2 in the intervention vs comparison condition (+7.3% vs +0.7%, AOR=2.7, 95% CI: 0.2, 31.8, p&gt;0.05).</b></p> <p><b b="" message="" processing:<=""> Greater increases in message processing between waves 1 and 2 in intervention vs comparison condition:</b></p> <ul style="list-style-type: none"><li>Reading labels closely (+5.3% vs -8.8%, AOR=1.8, 95% CI: 1.3, 2.5, p&lt;0.05)</li><li>Thinking about labels (+11.2% vs -1.5%, AOR=2.0, 95% CI: 1.4, 2.9, p&lt;0.05)</li><li>Talking with others about labels (+11.5% vs +1.9%, AOR=2.1, 95% CI: 1.3, 3.6, p&lt;0.05)</li></ul> <p>Females were more likely than males to closely read the label (AOR=1.2, 95% CI: 1.0, 1.5, p&lt;0.05), and participants ages 45+ were less likely to talk about the labels compared to those ages 19 to 25 (AOR=0.6, 95% CI: 0.4, 0.9, p&lt;0.05).</p> <p><b b="" intentions:<=""> Greater increases in intentions to cut down drinking between waves 1 and 2 in the intervention vs comparison condition (+4.0% vs -0.5%, AOR=2.5, 95% CI: 1.3, 4.7, p&lt;0.05).</b></p> <ul style="list-style-type: none"><li>Females were more likely than males to report cutting down drinking (AOR=1.5, 95% CI: 1.0, 2.1, p&lt;0.05)</li></ul>	Project funding from Health Canada, Substance Use and Addiction Program. 1 author was supported by a NIAAA grant	Weak (EPHPP)



changed as a result of the warning labels on bottles or cans of beer, wine, hard liquor, coolers, or ciders? ("less" vs "same amount" or "more").

**Intentions:** To what extent, if at all, have warning labels on bottles or cans of beer, wine, hard liquor, coolers, or ciders influenced you to cut down your drinking? (1=no influence to 5=main influence)

**Behaviour:** Has the amount of alcohol you are drinking changed as a result of the warning labels on bottles or cans of beer, wine, hard liquor, coolers, or ciders? (less, same amount, more)

- Those with medium ( $AOR=0.5$ , 95% CI: 0.3, 0.8) and high income ( $AOR=0.6$ , 95% CI: 0.4, 1.0) were less likely to report cutting down drinking vs those with low income ( $p<0.05$ )

- Those with possibly limited ( $AOR=0.5$ , 95% CI: 0.3, 0.8) or adequate ( $AOR=0.3$ , 95% CI: 0.2, 0.4) health literacy were less likely to report cutting down drinking vs those with limited health literacy ( $p<0.05$ )

**Behaviour:** Greater increases in self-reported drinking less between waves 1 and 2 in the intervention vs comparison condition (+3.7% vs -3.3%,  $AOR=2.4$ , 95% CI: 1.3, 4.3,  $p<0.05$ ).

- Females were more likely than males to report drinking less ( $AOR=1.4$ , 95% CI: 1.1, 1.9,  $p<0.05$ )

- Those with higher education were less likely than those with lower education (high school) to report drinking less ( $AOR=0.5$ , 95% CI: 0.3, 0.8,  $p<0.05$ )

- Those with adequate health literacy were less likely than those with limited literacy to report drinking less ( $AOR=0.5$ , 95% CI: 0.4, 0.8,  $p<0.05$ )

Schoueri-Mychasiw, 2020a, <sup>82</sup> Canada (Yukon, NWT) <i>Article from single labelling study conducted in Yukon/NWT, Canada</i>	Quasi-experiment, prospective cohort conducted using 3 waves of surveys (1 pre-, 2 post-intervention)	N=2,049	<b>Intervention condition:</b> 3 rotating labels with a cancer warning, standard drink information, and national drinking guidelines were affixed to all alcohol containers in 1 liquor store in the intervention site for a total of 5 months. Labels were 5cm x 3cm in size, brightly coloured, included a phone number and website for information or help, and were affixed on the sides or backs of containers.	<b>Label Noticing:</b> Participants were asked if they had seen any warning labels on bottles or cans of beer, wine, hard liquor, coolers or ciders (yes/no/don't know). <b>Label Recall:</b> 1) Participants who reported noticing warning labels were asked to indicate what messages they had seen on warning labels on bottles or cans of beer, wine, or liquor (unprompted, open response). Any mention of "cancer" or	<b>Label Noticing:</b> Noticing was high in all 3 waves in both conditions (>75% for all). <b>Label Recall:</b> Greater increases in recall of the drinking guidelines label message between waves 1 and 3 in the intervention vs comparison condition: <ul style="list-style-type: none"> <li>• Unprompted recall (+19.5% vs +0.8%, <math>AOR=10.8</math>, 95% CI: 0.9, 127.6)</li> <li>• Prompted recall (+25.2% vs +1.1%, <math>AOR=7.0</math>, 95% CI: 3.3, 14.9)</li> </ul>	Project funded from Health Canada, Substance Use and Addictions Program; 1 author supported by a US National Institute on Alcohol Abuse and	Weak (EPHPP)
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	alcohol at the liquor store, and did not self-report being pregnant or breastfeeding	<b>Comparison condition:</b> Warning labels cautioning about drinking while pregnant or operating a motor vehicle and a general health message continued to be affixed to all alcohol containers in the 2 liquor stores in the comparison site.  Participants were systematically recruited as they exited liquor stores, and independently completed survey on a tablet without interviewer assistance. In follow-up waves, repeat participants were emailed the survey, and identical procedures to recruit new participants in Wave 1 were used in follow-up waves.	"drinking guidelines" were coded yes for unprompted recall of cancer and drinking guideline labels. 2) Participants were asked if they saw any of the following messages and prompted to check all that apply (alcohol and cancer, low-risk drinking guidelines, number of standard drinks in bottles or cans, alcohol may be an addictive drug, alcohol and liver disease, alcohol and trauma, alcohol and fetal alcohol spectrum disorder, and drinking alcohol and driving a car or operating machinery). <b>Knowledge:</b> 1) Were you aware of Canada's Low-Risk Drinking Guidelines before today? (yes/no/don't know) 2) What is the daily limit of 'standard drinks' recommended for males/females (depending on identified sex) in Canada's Low-Risk Drinking Guidelines? (open response) 3) What is the weekly limit of 'standard drinks' recommended for males/females (depending on identified sex) in Canada's Low-Risk Drinking Guidelines? <b>Support:</b> Participants were asked if cans and bottles of alcoholic beverages should be labeled with Canada's low-risk drinking guidelines. Responses rated on a 5-point scale (1=strongly disagree to 5=strongly agree).	<b>Knowledge:</b> Greater increases in knowledge between waves 1 and 3 in the intervention vs comparison condition: <ul style="list-style-type: none"><li>• Awareness of the guidelines (+36.2% vs +12.7%, AOR=2.9, 95% CI: 2.0, 4.3)</li><li>• Knowledge of recommended daily drink limits (+20.1% vs +14.7%, AOR=1.5, 95% CI: 1.0, 2.1)</li><li>• Knowledge of recommended weekly drinking limits (+14.0% vs +7.9%, AOR=1.4, 95% CI: 1.0, 2.0)</li></ul> <b>Support:</b> The majority of participants were neutral to strongly supportive of drinking guideline labels, and support increased between waves 1 and 3 in both sites. Intervention: wave 1=71.7%, wave 2=77.3%, wave 3=79.1% Comparison: wave 1=67.1%, wave 2=68.1%, wave 3=73.2%	Alcoholism grant
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#### Interrupted Time-Series Study

Zhao, 2020, <sup>86</sup>	Interrupted time series	N=NR	<b>Intervention condition:</b> 3 rotating labels with a cancer warning, standard drink information, and	<b>Behaviour:</b> Alcohol consumption during the quasi-experimental intervention	<b>Behaviour:</b> Relative to the comparison sites, the labelling	Project funding from Health	Moderate (NOS)
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Canada (Yukon, NWT)  Article from single labelling study conducted in Yukon/ NWT, Canada	Yukon and NWT population-level data collected for people ages 15+	<p>national drinking guidelines were affixed to all alcohol containers in 1 liquor store in the intervention site for a total of 5 months. Labels were 5cm x 3cm in size, brightly coloured, included a phone number and website for information or help, and were affixed on the sides or backs of containers.</p> <p><b>Comparison condition:</b> Warning labels cautioning about drinking while pregnant or operating a motor vehicle and a general health message continued to be affixed to all alcohol containers in the 2 liquor stores in the comparison site.</p>	<p>labelling period was compared with consumption during the period without the intervention labels. Data was collected for 28 months before, and 14 months after the intervention condition labels were applied in the Yukon intervention liquor store site.</p> <p><b>Monthly retail alcohol sales data</b> for all of Yukon were converted to pure alcohol in standard drinks, and used to calculate monthly per capita alcohol consumption for people ages 15+. This was compared to monthly retail alcohol sales data for the intervention condition liquor store, to the NWT, and to surrounding rural areas of Yukon.</p>	<p>intervention condition site was associated with:</p> <ul style="list-style-type: none"> <li>• a 6.31% reduction in alcohol consumption during the treatment period, Nov 2017-Jul 2018 (<math>p=0.0001</math>)</li> <li>• a 9.97% reduction in alcohol consumption during the post-treatment months, Aug-Dec 2018 (<math>p=0.0001</math>)</li> </ul>	Canada, Substance Use and Addictions Program
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### Mixed-Methods Studies

Clarke, 2020, <sup>115</sup> United Kingdom	Mixed methods: <i>ad libitum</i> between- groups/pairs experiment in bar laboratory; focus groups	<p>Experiment: N=162 2 focus groups: N=17</p> <p>Young adults who drank alcohol at least weekly</p>	<p><b>Experiment:</b> Participants were recruited as pairs (i.e. friends). Pairs sat together and drank the same beverage type, either beer (4%) provided in 880mL jug or wine (5.5%) provided in a 500mL carafe. Participants were given glasses to drink from, and were directed to pour and consume as much as they like. The <i>ad libitum</i> drinking period lasted 20 minutes. Each pair was randomly assigned to receive glasses according to 1 of 2 label conditions:</p> <p><b>Control:</b> generic unlabelled glasses</p> <p><b>Intervention:</b> labelled glass with DrinkWise logo, number of units in common drinks of various ABV%, daily limit guidelines for men (3-4 units) and women (2-3</p>	<p><b>Consumption:</b> Amount of alcohol consumed after 20 minutes was measured in ml and converted to units</p> <p><b>Label Noticing:</b></p> <ol style="list-style-type: none"> <li>1) Did you notice the unit and warning label? (yes/no/unsure)</li> </ol> <p><b>Perceptions:</b></p> <ol style="list-style-type: none"> <li>2) Do you think it had an effect on how much alcohol you consumed? (yes/no/unsure)</li> <li>3) Do you think these glasses could be useful in getting people to drink less? (yes/no/unsure)</li> </ol> <p>Participants were also given the opportunity to provide open-ended feedback.</p> <p><b>Intentions:</b> Pre- and post-experiment, all participants completed the Alcohol Urge Questionnaire which assessed</p>	<p><b>Consumption:</b> No significant main effect by label condition (1.61 units vs 1.69 units, <math>p=0.35</math>), even after controlling for gender and drinking characteristics.</p> <p><b>Intentions:</b> No significant main effect on change in urge to drink scores by label condition (4.48 vs 4.86, <math>p=0.41</math>), even after controlling for gender and drinking characteristics.</p> <p><b>Label Noticing:</b> Of those exposed to labelled glasses, 85% reported noticing the unit and health warning labels.</p> <p><b>Perceptions:</b> Of those exposed to labelled glasses, 80% did not believe the glasses influenced their drinking. 35% believed they could be useful in getting people to drink less, 30% did not, 17.5% were</p>	Funded by The Economic and Social Research Council (ESRC) through a PhD CASE studentship (case partner is the charity Alcohol Research UK, now merged with Alcohol Concern and called Alcohol Change UK).	Moderate (MMAT)
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de Visser, 2017, <sup>87</sup> United Kingdom	Mixed methods: between- and within- subjects quasi- experiment; qualitative in - depth telephone interviews	N=450 (quasi- experiment) N=13 (in-depth interview)	<p><b>Quasi-experiment:</b> Participants were allocated to control or intervention condition based on their workplace: 6 control workplaces, 8 intervention workplaces.</p> <p><b>Intervention condition:</b> Participants received 3 unit-marked glasses indicating the alcohol content of spirits, wine, and beers of different strengths and volumes; and the national drink limit guidelines by sex.</p> <p><b>Control condition:</b> Did not receive any glasses.</p> <p><b>In-depth interviews:</b> Focused on reactions to the labelled glasses,</p>	<p><b>Knowledge:</b> 1) 4 items assessed knowledge of guidelines, including recommended daily drink limits, and the recommended number of dry days per week by sex. Correct responses were summed to give final score from 0-4. 2) 10 items assessed knowledge of unit content per drink. Images of 10 drinks were accompanied by descriptions [e.g., pint (568 ml) of regular strength beer]. Unit estimates were considered correct if within 10% of the actual unit content, and summed to give final score from 0-10.</p> <p><b>Awareness:</b> How familiar are you with the concept of units? (1=not at all to 10=extremely)</p> <p><b>Perceived effectiveness:</b></p>	<p>current urges and desires, intent, anticipation of positive affect, and relief of negative affect. Each question is scored on 7-point scale, higher scores indicating higher urge.</p> <p>Focus groups participants were asked to share their opinions on the acceptability and perceived effectiveness of the labelled glasses.</p>	<p>unsure, and 17.5% believed they would be useful for certain people.</p> <p><b>Open-ended feedback</b> provided by participants after the experiment and provided by the focus group participants: Glasses were likely to be ineffective because they were not visually appealing, contained too much information, would have decreased effectiveness after drinking had begun, and could be used for unintended purposes (i.e., maximizing alcohol content).</p> <p>Participants indicated the labelled glass may be helpful to monitor how many drinks have been consumed, but would not likely be used to consume within the guidelines. Some participants believed the guidelines were not relevant to their drinking, only to heavier drinkers, people with health concerns or older people.</p>	<p>Control and intervention groups were comparable at baseline. At follow-up:</p> <p><b>Knowledge:</b> Knowledge of guidelines was greater in the intervention (<math>M=3.08</math>) vs control (<math>M=2.53</math>, <math>p&lt;0.01</math>). Accuracy of unit content per drink was greater in the intervention (<math>M=3.86</math>) vs control (<math>M=3.08</math>, <math>p&lt;0.01</math>).</p> <p><b>Awareness:</b> Familiarity with units was greater in the intervention (<math>M=7.14</math>) vs control (<math>M=5.96</math>, <math>p&lt;0.01</math>).</p> <p><b>Perceived effectiveness:</b> Perceived usefulness of unit information was greater in the intervention (<math>M=6.36</math>) vs control (<math>M=5.42</math>, <math>p&lt;0.01</math>).</p> <p><b>Behaviour:</b> Frequency of counting units was greater in the intervention (<math>M=4.07</math>) vs control (<math>M=3.33</math>, <math>p&lt;0.01</math>).</p>	<p>Research supported by the European Foundation for Alcohol Research</p>	Moderate (MMAT)



the experience of using, the perceived impact on alcohol consumption, and suggestions for how to improve the intervention.

How useful to you is the concept of units? (1=not at all to 10=extremely)

**Behaviour:**

- 1) How often do you count the number of units of alcohol that you drink? (1=never to 10=always)
- 2) Participants viewed a pictorial guide of the unit content of various drinks to report how many units they consumed each day in the previous week. Responses were used to create 3 variables:
  1. days in the last week when intake was over the recommended maximum
  2. dry days during the last week
  3. total number of units consumed in the last week

*Follow-up measures for intervention group only (n=229):*

- 1) Frequency of use of the unit-marked glasses in 3 locations: home, work, elsewhere (1=never to 10=always)
- 2) How helpful were glasses for understanding government guidelines for alcohol use? (1=not at all to 10=extremely)
- 3) How easy were glasses to use? (1=not at all to 10=extremely)
- 4) How much did the glasses make you think about your alcohol intake? (1=not at all to 10=extremely)

All 3 alcohol consumption measures were not significantly different between the intervention and control groups.

**Intervention group only:**

- Frequency of using glasses: ( $M=9.06$ ,  $SD=4.586$ )
- Helpfulness of glasses for understanding the government guidelines: ( $M=7.51$ ,  $SD=2.52$ )
- Ease of using glasses: ( $M=7.58$ ,  $SD=2.73$ )
- Glasses made participants think a lot about their alcohol intake ( $M=6.85$ ,  $SD=2.92$ )

***In-depth interviews:*****First impressions:**

- Overall positive opinions, useful for learning guidelines, clarified understanding of units
- Some approved of the design, others found it cluttered/medical/unappealing

**Influence on thinking:**

- Increased thinking about guidelines, unit information, and consumption

**Experience of using glasses**

- Some were embarrassed, reduced enjoyment of drinking
- Suggested tailored glasses for different alcohol types

**Impact on own or others' drinking:**

- Led to reduced intake for some, but effect was not lasting. Others were not concerned about health effects
- Sparked conversations with others about alcohol consumption

**Cross-Sectional Studies**

Buykx, 2015, <sup>108</sup> Australia	Cross- sectional, online survey	N=2,482  Adults from New South Wales	As part of a survey assessing knowledge and attitudes regarding cancer prevention, participants were asked to rate	<b>Support:</b> Participants were asked "To reduce the problems associated with excessive alcohol use, to what extent to	<b>Support:</b> 72.0% and 65.6% supported or strongly supported health warnings and drinking	1 author received a Monash University	Moderate (NOS)
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Coomber, 2017c, <sup>130</sup> Australia	Cross-sectional, online survey	N=1,061	First, participants were asked if they had heard of a standard drink of alcohol. They were then shown examples of the Australian standard drink logos, and asked if they had seen logos on alcohol products.  Next, participants were presented with a written definition of a standard drink (10 g of alcohol) and pictorial representations of the number of standard drinks in 7 commonly consumed alcoholic beverages, then asked questions testing their knowledge of standard drinks.  Participants were asked to what extent they supported the use of drink guideline labels.	<b>Support:</b> Participants were asked to what extent they support the use of labels that provide recommended daily drink limit guidelines for high-risk health effects (i.e., harms associated with consuming alcohol at levels higher than that stipulated in the guidelines). Responses dichotomized into "support" or "strongly support" vs "neither support nor oppose", "support" or "strongly support"	<b>Support:</b> 73% of participants supported the inclusion of information about recommended daily drink limit guidelines on alcohol products.  • Females indicated greater support than males ( $OR=2.13$ , 95% CI: 1.57, 2.88, $p<0.001$ ) • Those with tertiary or higher education indicated greater support than those with less than tertiary education ( $OR=1.53$ , 95% CI: 1.12, 2.09, $p=0.008$ ) • High-risk drinkers indicated less support than low-risk drinkers ( $OR=0.63$ , 95% CI: 0.46, 0.87, $p=0.005$ ) • Those who recognized the standard drink logo indicated greater support than those who did not ( $OR=1.73$ , 95% CI: 0.22, 2.47, $p=0.002$ )	Not reported  Strong (NOS)
Vallance, 2020, <sup>84</sup> Canada	Cross-sectional survey	N=836	<u>Intervention condition:</u> 3 rotating labels with a cancer warning, standard drink information, and	<b>Support:</b> Participants were asked the degree to which they	<b>Support:</b> 38.3% of participants agreed or strongly agreed that alcohol containers should be	Funded by Health Canada, Advancing Women's Research Success award, funds were used to support the completion of this paper. Data collection was funded by Cancer Council New South Wales



(Yukon,  
NWT)

Article from  
single  
labelling  
study  
conducted  
in Yukon/  
NWT,  
Canada

Adults of legal  
drinking age  
(19+), and at  
time of  
recruitment were  
residents of  
either  
intervention or  
comparison sites,  
consumed ≥1  
drinks in the past  
30 days, had  
purchased  
alcohol at the  
liquor store, and  
did not self-report  
being pregnant or  
breastfeeding

national drinking guidelines were  
affixed to all alcohol containers  
in 1 liquor store in the  
intervention site for a total of 5  
months. Labels were 5cm x 3cm  
in size, brightly coloured,  
included a phone number and  
website for information or help,  
and were affixed on the sides or  
backs of containers.

Comparison condition:  
Warning labels cautioning about  
drinking while pregnant or  
operating a motor vehicle and a  
general health message  
continued to be affixed to all  
alcohol containers in the 2 liquor  
stores in the comparison site.

Participants were systematically  
recruited as they exited liquor  
stores, and independently  
completed survey on a tablet  
without interviewer assistance

agree or disagree with the  
following:  
“Cans and bottles of alcoholic  
beverages should be labeled  
with low-risk drinking  
guidelines”  
Responses rated on a 5-point  
scale and dichotomized as  
0=neutral/disagree/strongly  
disagree/don't know, and  
1=agree/strongly agree.

labeled with low risk drinking  
guidelines. There were no  
significant differences in support  
between the intervention and  
comparison conditions.

- Females, those ages 45+, those with greater than high school education, and those with adequate health literacy indicated significantly greater support than their counterparts ( $p<0.05$  for all)
- Participants with annual household incomes  $>\$60,000$ , and those who consume more alcohol than the weekly guidelines recommend indicated significantly less support than their counterparts ( $p<0.05$  for both)

Substance  
Use and  
Addictions  
Program

#### Qualitative Study

Vallance, 2018, <sup>120</sup> Canada (Yukon)	Qualitative, focus groups	Total N=45  Stakeholders: N=9 Community stakeholders working in roles that intersected health and alcohol such as social work, health promotion, alcohol and drug services, and marketing and social responsibility for local liquor corporations  General public: N=36	5 focus groups were conducted. All participants viewed 2 versions of enhanced alcohol container labels on empty beer, wine, and spirits bottles. Both versions contained:  1) A health message: “To reduce your risk of serious disease, such as cancer, follow the Low-Risk Drinking Guidelines” 2) Standard drink information: “Bottle contains: 5.4 standard drinks” (with wine bottle symbol) 3) A pregnancy warning symbol 4) Low-Risk Drinking Guidelines (LRDG): “Drink no more than (2/3) standard drinks on most days, and no more than (10/15) standard drinks per week” (women/men)	<b>Perceptions:</b> Participants were asked to review labels one at a time and reflect on: 1) What they noticed about the labels 2) If the label information was clear and easy to understand 3) If the label information made them think about the health risks of drinking alcohol 4) If the label information was sufficient enough to potentially impact drinking behaviors 5) If they thought there was any relevant information missing from the label  <b>Preferences:</b> Participants were asked to choose which of the two labels was more effective for conveying a health message, standard drink information, the LRDG, and the	<b>Perceptions:</b> Enhanced labels were perceived as new, useful, important, and having potential to impact consumer behaviour. Participants discussed consumers' right to know alcohol-related risks and believed enhanced labels would allow consumers to be better informed. Both standard drink information and LRDG on alcohol container labels were perceived as important to fully understand and potentially modify behaviour. Some initial difficulty interpreting the standard drink and LRDG information resolved as participants grew familiar with the labels. Stakeholders highlighted resistance from industry, and logistical factors such as shapes of the bottles and manufacturers'	Not reported	Strong (CASP)
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Individuals ages 19–65 who consumed at least one alcoholic drink in the past 30 days

Label versions varied by LRDG format:  
Version 1: LRDG chart  
Version 2: LRDG pictogram

Participants were provided with background information about standard drinks, LRDG, and acute and chronic harms related to alcohol, then asked questions in a semi-structured interview.

pregnancy warning and explain why. Participants responded to questions about the preferred size and locations of the labels on alcohol containers

**Support:** Participants' support for labels emerged through group discussion.

labels limiting available options for label placement.

**Preferences:** Stakeholders and general public participants preferred a larger label because it was easier to read and would draw more attention. Participants felt a combination of the pictogram and the chart would be the most effective way to present the LRDG.

**Support:** Participants voiced strong support for the enhanced labels on alcohol container, no participants expressed opposition to the labels.



## Appendix II: Search Strategy

### MEDLINE

#	Searches
1	Alcohol Abstinence/ or Alcohol Drinking in College/ or Alcohol Drinking/ or exp Alcoholic Beverages/ or Alcoholic Intoxication/ or Binge Drinking/ or Drinking Behavior/ or (Ethanol/ and exp Beverages/) or Underage Drinking/ (alcopop* or "alco-pop*" or ((alcohol* or ethanol) and (beverage* or drink*)) or (alcohol and ("use" or misus* or abus* or drink* or beverage* or intak* or consum* or estimat* or attitud* or policy or policies)) or beer* or booze or "drink wise" or drinkwise or "drinking guidelines" or (drink* adj3 moderation) or liquor or liquors or "low risk drinking" or "low risk drinker*" or "high risk drinking" or "high risk drinker*" or "moderate drinking" or "moderate drinker*" or "heavy drinking" or "heavy drinker*" or "problem drinking" or "problem drinker*" or "sensible drinking" or "sensible drinker*" or spirits or "standard drink*" or wine*).kf,kw,ti. or alcohol.ti.
2	(alcopop* or "alco-pop*" or ((alcohol* or ethanol) and (beverage* or drink*)) or (alcohol and ("use" or misus* or abus* or drink* or beverage* or intak* or consum* or estimat* or attitud* or policy or policies)) or beer* or booze or "drink wise" or drinkwise or "drinking guidelines" or (drink* adj3 moderation) or liquor or liquors or "low risk drinking" or "low risk drinker*" or "high risk drinking" or "high risk drinker*" or "moderate drinking" or "moderate drinker*" or "heavy drinking" or "heavy drinker*" or "problem drinking" or "problem drinker*" or "sensible drinking" or "sensible drinker*" or spirits or "standard drink*" or wine*).ab. and ("alcohol label*" or "beverage label*" or "container label*" or "counter-market*" or countermarket* or ((cue* or "health education" or "health marketing" or (label* not "open label*") or messag* or "social marketing" or text) adj5 (bottle* or glass* or container* or packag* or "point of choice" or "point of purchas**" or "point of sale" or pour* or ((product or products) adj5 alcohol) or unit or units)) or decal or decals or disclaimer* or "drink label*" or graphic* or infographic* or labels or ((label* not "open label*") and (drink* or health)) or "labelling alcohol*" or "labelling of alcohol*" or "labelling on alcohol*" or pictogram* or pictograph* or pictorial* or "plain packag*" or sticker* or "unit label*" or warn*).ti.
3	1 or 2 or 3
4	Product Labeling/ or Product Packaging/ or Drug Packaging/ or Drug Labeling/ or Food Packaging/ or Food Labeling/ or ((Consumer Health Information/ or Cues/ or Health Education/ or Social Marketing/) and (bottle* or glass* or container* or packag* or "point of choice" or "point of purchas**" or "point of sale" or pour* or ((product or products) adj5 alcohol) or unit or units).ab,kf,kw,ti.)
5	(("alcohol label*" or "beverage label*" or "container label*" or "counter-market*" or countermarket* or ((cue* or "health education" or "health marketing" or (label* not "open label*") or messag* or "social marketing" or text) adj5 (bottle* or glass* or container* or packag* or "point of choice" or "point of purchas**" or "point of sale" or pour* or ((product or products) adj5 alcohol) or unit or units)) or decal or decals or disclaimer* or "drink label*" or graphic* or infographic* or labels or ((label* not "open label*") and (drink* or health)) or "labelling alcohol*" or "labelling of alcohol*" or "labelling on alcohol*" or pictogram* or pictograph* or pictorial* or "plain packag*" or sticker* or "unit label*" or warn*).kf,kw,ti.)
6	label*.ti. not (Isotope Labeling/ or exp Isotopes/ or Biosensing Techniques/ or exp Chemistry Techniques, Analytical/ or "open label*".ti. or ch.fs.)
7	("alcohol label*" or "beverage label*" or "container label*" or "counter-market*" or countermarket* or ((cue* or "health education" or "health marketing" or (label* not "open label*") or messag* or "social marketing" or text) adj5 (bottle* or glass* or container* or packag* or "point of choice" or "point of purchas**" or "point of sale" or pour* or ((product or products) adj5 alcohol) or unit or units)) or decal or decals or disclaimer* or "drink label*" or graphic* or infographic* or labels or ((label* not "open label*") and (drink* or health)) or "labelling alcohol*" or "labelling of alcohol*" or "labelling on alcohol*" or pictogram* or pictograph* or pictorial* or "plain packag*" or sticker* or "unit label*" or warn*).ab. /freq=2 and (alcopop* or "alco-pop*" or ((alcohol* or ethanol) and (beverage* or drink*)) or (alcohol and ("use" or misus* or abus* or drink* or beverage* or intak* or consum* or estimat* or attitud* or policy or policies)) or beer* or booze or "drink wise" or drinkwise or "drinking guidelines" or (drink* adj3 moderation) or liquor or liquors or "low risk drinking" or "low risk drinker*" or "high risk drinking" or "high risk drinker*" or "moderate drinking" or "moderate drinker*" or "heavy drinking" or "heavy drinker*" or "problem drinking" or "problem drinker*" or "sensible drinking" or "sensible drinker*" or spirits or "standard drink*" or wine*).ti.
8	sticker* or "unit label*" or warn*).ab. /freq=2 and (alcopop* or "alco-pop*" or ((alcohol* or ethanol) and (beverage* or drink*)) or (alcohol and ("use" or misus* or abus* or drink* or beverage* or intak* or consum* or estimat* or attitud* or policy or policies)) or beer* or booze or "drink wise" or drinkwise or "drinking guidelines" or (drink* adj3 moderation) or liquor or liquors or "low risk drinking" or "low risk drinker*" or "high risk drinking" or "high risk drinker*" or "moderate drinking" or "moderate drinker*" or "heavy drinking" or "heavy drinker*" or "problem drinking" or "problem drinker*" or "sensible drinking" or "sensible drinker*" or spirits or "standard drink*" or wine*).ti.



9 5 or 6 or 7 or 8

10 4 and 9

(“alcohol label\*” or “alcohol warning label\*” or “alcohol warning\*” or ((alcohol\* or “standard drink\*”) and (“beverage label\*” or “cancer risk warning\*” or “container label\*” or “drink label\*” or “health warning\*” or “unit label\*” or “warning display\*” or “warning label\*” or “warning statement\*”)) or “labelling alcoholic beverage\*” or “labelling alcoholic drink\*” or “labelling of alcoholic beverage\*” or “labelling of alcoholic drink\*” or “labelling on alcoholic beverage\*” or “labelling on alcoholic drink\*” or “standard drink\* label\*” or “warning\* on alcohol” or “warning\* on beverage\*” or “warning\* on drink\*”).mp.

12 10 or 11

13 exp Animals/ not (exp Animals/ and Humans/)

14 12 not 13

15 limit 14 to yr=“1989 -Current”

16 limit 15 to english

17 remove duplicates from 16

## Embase

#	Searches
1	*alcohol abstinence/ or *alcohol abuse/ or *alcohol consumption/ or *alcohol intoxication/ or (*alcohol/ and exp beverage/) or *binge drinking/ or *college drinking/ or *drinking behavior/ or exp *alcoholic beverage/ or *underage drinking/
2	(alcopop* or “alco-pop*” or ((alcohol* or ethanol) and (beverage* or drink*))) or (alcohol and (“use” or misus* or abus* or drink* or beverage* or intak* or consum* or estimat* or attitud* or policy or policies)) or beer* or booze or “drink wise” or drinkwise or “drinking guidelines” or (drink* adj3 moderation) or liquor or liquors or “low risk drinking” or “low risk drinker*” or “high risk drinking” or “high risk drinker*” or “moderate drinking” or “moderate drinker*” or “heavy drinking” or “heavy drinker*” or “problem drinking” or “problem drinker*” or “sensible drinking” or “sensible drinker*” or spirits or “standard drink*” or wine*).kw,ti. or alcohol.ti.
3	(alcopop* or “alco-pop*” or ((alcohol* or ethanol) and (beverage* or drink*))) or (alcohol and (“use” or misus* or abus* or drink* or beverage* or intak* or consum* or estimat* or attitud* or policy or policies)) or beer* or booze or “drink wise” or drinkwise or “drinking guidelines” or (drink* adj3 moderation) or liquor or liquors or “low risk drinking” or “low risk drinker*” or “high risk drinking” or “high risk drinker*” or “moderate drinking” or “moderate drinker*” or “heavy drinking” or “heavy drinker*” or “problem drinking” or “problem drinker*” or “sensible drinking” or “sensible drinker*” or spirits or “standard drink*” or wine*).od,ox. not embase.st.
4	(alcopop* or “alco-pop*” or ((alcohol* or ethanol) and (beverage* or drink*))) or (alcohol and (“use” or misus* or abus* or drink* or beverage* or intak* or consum* or estimat* or attitud* or policy or policies)) or beer* or booze or “drink wise” or drinkwise or “drinking guidelines” or (drink* adj3 moderation) or liquor or liquors or “low risk drinking” or “low risk drinker*” or “high risk drinking” or “high risk drinker*” or “moderate drinking” or “moderate drinker*” or “heavy drinking” or “heavy drinker*” or “problem drinking” or “problem drinker*” or “sensible drinking” or “sensible drinker*” or spirits or “standard drink*” or wine*).ab. and (“alcohol label*” or “beverage label*” or “container label*” or “counter-market*” or countermarket* or ((cue* or “health education” or “health marketing” or (label* not “open label*”)) or messag* or “social marketing” or text) adj5 (bottle* or glass* or container* or packag* or “point of choice” or “point of purchas**” or “point of sale” or pour* or ((product or products) adj5 alcohol) or unit or units)) or decal or decals or disclaimer* or “drink label*” or graphic* or infographic* or labels or ((label* not “open label*”)) and (drink* or health)) or “labelling alcohol*” or “labelling of alcohol*” or “labelling on alcohol*” or pictogram* or pictograph* or pictorial* or “plain packag*” or sticker* or “unit label*” or warn*).ti.
5	1 or 2 or 3 or 4
6	packaging/ or drug packaging/ or food packaging/ or drug labeling/ or container/ or ((consumer health information/ or health education/ or social marketing/)) and (bottle* or glass* or container* or packag* or “point



- of choice" or "point of purchas\*\*\*" or "point of sale" or pour\* or ((product or products) adj5 alcohol) or unit or units).ab,kw,od,ox,ti.)
- 7 ("alcohol label\*" or "beverage label\*" or "container label\*" or "counter-market\*" or countermarket\* or ((cue\* or "health education" or "health marketing" or (label\* not "open label\*") or messag\* or "social marketing" or text) adj5 (bottle\* or glass\* or container\* or packag\* or "point of choice" or "point of purchas\*\*\*" or "point of sale" or pour\* or ((product or products) adj5 alcohol) or unit or units)) or decal or decals or disclaimer\* or "drink label\*" or graphic\* or infographic\* or labels or ((label\* not "open label\*") and (drink\* or health)) or "labelling alcohol\*" or "labelling of alcohol\*" or "labelling on alcohol\*" or pictogram\* or pictograph\* or pictorial\* or "plain packag\*" or sticker\* or "unit label\*" or warn\*).kw,ti.)
- 8 ("alcohol label\*" or "beverage label\*" or "container label\*" or "counter-market\*" or countermarket\* or ((cue\* or "health education" or "health marketing" or (label\* not "open label\*") or messag\* or "social marketing" or text) adj5 (bottle\* or glass\* or container\* or packag\* or "point of choice" or "point of purchas\*\*\*" or "point of sale" or pour\* or ((product or products) adj5 alcohol) or unit or units)) or decal or decals or disclaimer\* or "drink label\*" or graphic\* or infographic\* or labels or ((label\* not "open label\*") and (drink\* or health)) or "labelling alcohol\*" or "labelling of alcohol\*" or "labelling on alcohol\*" or pictogram\* or pictograph\* or pictorial\* or "plain packag\*" or sticker\* or "unit label\*" or warn\*).od,ox, not embase,st.)
- 9 label\*.ti. not (isotope labeling/ or exp isotope/ or biosensor/ or exp chemical analysis/ or "open label\*".ti. or exp chemistry/)
- 10 ("alcohol label\*" or "beverage label\*" or "container label\*" or "counter-market\*" or countermarket\* or ((cue\* or "health education" or "health marketing" or (label\* not "open label\*") or messag\* or "social marketing" or text) adj5 (bottle\* or glass\* or container\* or packag\* or "point of choice" or "point of purchas\*\*\*" or "point of sale" or pour\* or ((product or products) adj5 alcohol) or unit or units)) or decal or decals or disclaimer\* or "drink label\*" or graphic\* or infographic\* or labels or ((label\* not "open label\*") and (drink\* or health)) or "labelling alcohol\*" or "labelling of alcohol\*" or "labelling on alcohol\*" or pictogram\* or pictograph\* or pictorial\* or "plain packag\*" or sticker\* or "unit label\*" or warn\*).ab. /freq=2 and (alcopop\* or "alco-pop\*" or ((alcohol\* or ethanol) and (beverage\* or drink\*)) or (alcohol and ("use" or misus\* or abus\* or drink\* or beverage\* or intak\* or consum\* or estimat\* or attitud\* or policy or policies)) or beer\* or booze or "drink wise" or drinkwise or "drinking guidelines" or (drink\* adj3 moderation) or liquor or liquors or "low risk drinking" or "low risk drinker\*" or "high risk drinking" or "high risk drinker\*" or "moderate drinking" or "moderate drinker\*" or "heavy drinking" or "heavy drinker\*" or "problem drinking" or "problem drinker\*" or "sensible drinking" or "sensible drinker\*" or spirits or "standard drink\*" or wine\*).ti.)
- 11 6 or 7 or 8 or 9 or 10
- 12 5 and 11
- 13 ("alcohol label\*" or "alcohol warning label\*" or "alcohol warning\*" or ((alcohol\* or "standard drink\*") and ("beverage label\*" or "cancer risk warning\*" or "container label\*" or "drink label\*" or "health warning\*" or "unit label\*" or "warning display\*" or "warning label\*" or "warning statement\*")) or "labelling alcoholic beverage\*" or "labelling alcoholic drink\*" or "labelling of alcoholic beverage\*" or "labelling of alcoholic drink\*" or "labelling on alcoholic beverage\*" or "labelling on alcoholic drink\*" or "standard drink\* label\*" or "warning\* on alcohol" or "warning\* on beverage\*" or "warning\* on drink\*").mp.)
- 14 12 or 13
- 15 exp animal/ not (exp animal/ and human/)
- 16 14 not 15
- 17 limit 16 to yr="1989 -Current"
- 18 limit 17 to english language
- 19 (1\* or 2\* or 3\* or 4\* or 5\* or 6\* or 7\* or 8\* or 9\*).pm.
- 20 18 not 19
- 21 remove duplicates from 20



## CINAHL

#	Searches
S1	MH "Alcohol Abuse" OR MH "Alcohol Drinking in College" OR MH "Alcohol Drinking" OR MH "Alcoholic Beverages+" OR MH "Alcoholic Intoxication" OR ((MH "Alcohols" OR MH "Ethanol") AND MH "Beverages+") OR MH "Binge Drinking" OR MH "Drinking Behavior" TI (alcohol or alcopop* OR "alco-pop*" OR ((alcohol* OR ethanol) AND (beverage* OR drink*)) OR (alcohol AND ("use" OR misus* OR abus* OR drink* OR beverage* OR intak* OR consum* OR estimat* OR attitud* OR policy OR policies)) OR beer* OR booze OR "drink wise" OR drinkwise OR "drinking guidelines" OR (drink* N3 moderation) OR liquor OR liquors OR "low risk drinking" OR "low risk drinker*" OR "high risk drinking" OR "high risk drinker*" OR "moderate drinking" OR "moderate drinker*" OR "heavy drinking" OR "heavy drinker*" OR "problem drinking" OR "problem drinker*" OR "sensible drinking" OR "sensible drinker*" OR spirits OR "standard drink*" OR wine*)
S2	SU (alcohol or alcopop* OR "alco-pop*" OR ((alcohol* OR ethanol) AND (beverage* OR drink*)) OR (alcohol AND ("use" OR misus* OR abus* OR drink* OR beverage* OR intak* OR consum* OR estimat* OR attitud* OR policy OR policies)) OR beer* OR booze OR "drink wise" OR drinkwise OR "drinking guidelines" OR (drink* N3 moderation) OR liquor OR liquors OR "low risk drinking" OR "low risk drinker*" OR "high risk drinking" OR "high risk drinker*" OR "moderate drinking" OR "moderate drinker*" OR "heavy drinking" OR "heavy drinker*" OR "problem drinking" OR "problem drinker*" OR "sensible drinking" OR "sensible drinker*" OR spirits OR "standard drink*" OR wine*) AND YC N
S3	( AB (alcohol or alcopop* OR "alco-pop*" OR ((alcohol* OR ethanol) AND (beverage* OR drink*)) OR (alcohol AND ("use" OR misus* OR abus* OR drink* OR beverage* OR intak* OR consum* OR estimat* OR attitud* OR policy OR policies)) OR beer* OR booze OR "drink wise" OR drinkwise OR "drinking guidelines" OR (drink* N3 moderation) OR liquor OR liquors OR "low risk drinking" OR "low risk drinker*" OR "high risk drinking" OR "high risk drinker*" OR "moderate drinking" OR "moderate drinker*" OR "heavy drinking" OR "heavy drinker*" OR "problem drinking" OR "problem drinker*" OR "sensible drinking" OR "sensible drinker*" OR spirits OR "standard drink*" OR wine*) AND TI ("alcohol label*" OR "beverage label*" OR "container label*" OR "counter-market*" OR countermarket* OR ((cue* OR "health education" OR "health marketing" OR label* OR messag* OR "social marketing" OR text) N5 (bottle* OR glass* OR container* OR packag* OR "point of choice" OR "point of purchas**" OR "point of sale" OR pour* OR ((product OR products) N5 alcohol) OR unit OR units)) OR decal OR decals OR disclaimer* OR "drink label*" OR graphic* OR infographic* OR labels OR (label* AND (drink* OR health)) OR "labelling alcohol*" OR "labelling of alcohol*" OR "labelling on alcohol*" OR pictogram* OR pictograph* OR pictorial* OR "plain packag*" OR sticker* OR "unit label*" OR warn* ) NOT TI "open label*" )
S4	S5 S1 OR S2 OR S3 OR S4
S6	MH "Drug Labeling" OR MH "Drug Packaging" OR MH "Food Labeling" OR MH "Food Packaging" OR MH "Product Labeling" OR MH "Product Packaging" OR ((MH "Consumer Health Information" OR MH "Cues" OR MH "Health Education" OR MH "Social Marketing" ) AND (bottle* OR glass* OR container* OR packag* OR "point of choice" OR "point of purchas**" OR "point of sale" OR pour* OR ((product OR products) N5 alcohol) OR unit OR units))
S7	( TI ("alcohol label*" OR "beverage label*" OR "container label*" OR "counter-market*" OR countermarket* OR ((cue* OR "health education" OR "health marketing" OR label* OR messag* OR "social marketing" OR text) N5 (bottle* OR glass* OR container* OR packag* OR "point of choice" OR "point of purchas**" OR "point of sale" OR pour* OR ((product OR products) N5 alcohol) OR unit OR units)) OR decal OR decals OR disclaimer* OR "drink label*" OR graphic* OR infographic* OR labels OR (label* AND (drink* OR health)) OR "labelling alcohol*" OR "labelling of alcohol*" OR "labelling on alcohol*" OR pictogram* OR pictograph* OR pictorial* OR "plain packag*" OR sticker* OR "unit label*" OR warn* ) NOT TI "open label*" )
S8	( SU ("alcohol label*" OR "beverage label*" OR "container label*" OR "counter-market*" OR countermarket* OR ((cue* OR "health education" OR "health marketing" OR label* OR messag* OR "social marketing" OR text) N5 (bottle* OR glass* OR container* OR packag* OR "point of choice" OR "point of purchas**" OR "point of sale" OR pour* OR ((product OR products) N5 alcohol) OR unit OR units)) OR decal OR decals OR disclaimer* OR "drink label*" OR graphic* OR infographic* OR labels OR (label* AND (drink* OR health)) OR "labelling alcohol*" OR "labelling of alcohol*" OR "labelling on alcohol*" OR pictogram* OR pictograph* OR pictorial* OR "plain packag*" OR sticker* OR "unit label*" OR warn* ) AND YC N ) NOT SU "open label*" )



S9	TI label* NOT (MH "Isotopes+" OR MH "Biosensing Techniques" OR MH "Chemistry, Analytical" OR TI "open label*")  ( AB ("alcohol label*" OR "beverage label*" OR "container label*" OR "counter-market*" OR countermarket* OR ((cue* OR "health education" OR "health marketing" OR label* OR messag* OR "social marketing" OR text) N5 (bottle* OR glass* OR container* OR packag* OR "point of choice" OR "point of purchas**" OR "point of sale" OR pour* OR ((product OR products) N5 alcohol) OR unit OR units)) OR decal OR decals OR disclaimer* OR "drink label*" OR graphic* OR infographic* OR labels OR (label* AND (drink* OR health)) OR "labelling alcohol*" OR "labelling of alcohol*" OR "labelling on alcohol*" OR pictogram* OR pictograph* OR pictorial* OR "plain packag*" )
S10	OR sticker* OR "unit label*" OR warn*) AND TI (alcohol or alcopop* OR "alco-pop*" OR ((alcohol* OR ethanol) AND (beverage* OR drink*)) OR (alcohol AND ("use" OR misus* OR abus* OR drink* OR beverage* OR intak* OR consum* OR estimat* OR attitud* OR policy OR policies)) OR beer* OR booze OR "drink wise" OR drinkwise OR "drinking guidelines" OR (drink* N3 moderation) OR liquor OR liquors OR "low risk drinking" OR "low risk drinker*" OR "high risk drinking" OR "high risk drinker*" OR "moderate drinking" OR "moderate drinker*" OR "heavy drinking" OR "heavy drinker*" OR "problem drinking" OR "problem drinker*" OR "sensible drinking" OR "sensible drinker*" OR spirits OR "standard drink*" OR wine*) ) NOT AB "open label*"
S11	S6 OR S7 OR S8 OR S9 OR S10
S12	S5 AND S11  "alcohol label*" OR "alcohol warning label*" OR "alcohol warning*" OR ((alcohol* OR "standard drink*") AND ("beverage label*" OR "cancer risk warning*" OR "container label*" OR "drink label*" OR "health warning*" OR "unit label*" OR "warning display*" OR "warning label*" OR "warning statement*")) OR "labelling alcoholic beverage*" OR "labelling alcoholic drink*" OR "labelling of alcoholic beverage*" OR "labelling of alcoholic drink*" OR "labelling on alcoholic beverage*" OR "labelling on alcoholic drink*" OR "standard drink* label*" OR "warning* on alcohol" OR "warning* on beverage*" OR "warning* on drink*"
S14	S12 OR S13
S15	MH "Animals+" NOT MH "Human"
S16	S14 NOT S15
S17	S16 AND DT 1989-
S18	S17 AND LA English
S19	S18 AND MX Y

## PsycINFO

#	Searches
1	Alcohol Abuse/ or Alcohol Drinking Attitudes/ or Alcohol Drinking Patterns/ or Alcohol Intoxication/ or "Alcohol Use Disorder"/ or exp Alcoholic Beverages/ or Alcoholism/ or Binge Drinking/ or Drinking Behavior/ or (Ethanol/ and (Energy Drink/ or (beverage* or drink*).ab,id,ti.)) or Social Drinking/ or Underage Drinking/  (alcohol or alcopop* or "alco-pop*" or ((alcohol* or ethanol) and (beverage* or drink*))) or (alcohol and ("use" or misus* or abus* or drink* or beverage* or intak* or consum* or estimat* or attitud* or policy or policies)) or beer* or booze or "drink wise" or drinkwise or "drinking guidelines" or (drink* adj3 moderation) or liquor or liquors or "low risk drinking" or "low risk drinker*" or "high risk drinking" or "high risk drinker*" or "moderate drinking" or "moderate drinker*" or "heavy drinking" or "heavy drinker*" or "problem drinking" or "problem drinker*" or "sensible drinking" or "sensible drinker*" or spirits or "standard drink*" or wine*).id,ti.
2	(alcohol or alcopop* or "alco-pop*" or ((alcohol* or ethanol) and (beverage* or drink*))) or (alcohol and ("use" or misus* or abus* or drink* or beverage* or intak* or consum* or estimat* or attitud* or policy or policies)) or beer* or booze or "drink wise" or drinkwise or "drinking guidelines" or (drink* adj3 moderation) or liquor or liquors or "low risk drinking" or "low risk drinker*" or "high risk drinking" or "high risk drinker*" or "moderate drinking" or "moderate drinker*" or "heavy drinking" or "heavy drinker*" or "problem drinking" or "problem drinker*" or "sensible drinking" or "sensible drinker*" or spirits or "standard drink*" or wine*).ab, and ((alcohol label* or "beverage label*" or "container label*" or "counter-market*" or countermarket* or ((cue* or "health education" or "health marketing" or (label* not "open label*")) or messag* or "social marketing" or text) adj5 (bottle* or glass* or
3	



container\* or packag\* or "point of choice" or "point of purchas\*\*" or "point of sale" or pour\* or ((product or products) adj5 alcohol) or unit or units)) or decal or decals or disclaimer\* or "drink label\*" or graphic\* or infographic\* or labels or ((label\* not "open label\*") and (drink\* or health)) or "labelling alcohol\*" or "labelling of alcohol\*" or "labelling on alcohol\*" or pictogram\* or pictograph\* or pictorial\* or "plain packag\*" or sticker\* or "unit label\*" or warn\*).ti.

4 1 or 2 or 3

Labeling/ or Product Design/ or Warning Labels/ or Warnings/ or ((Consumer Attitudes/ or Consumer Behavior/ or Consumer Education/ or Consumer Protection/ or Health Education/ or Health Information/ or Information/ or Social Marketing/) and (bottle\* or glass\* or container\* or packag\* or "point of choice" or "point of purchas\*\*" or "point of sale" or pour\* or ((product or products) adj5 alcohol) or unit or units).ab,id,ti.)

6 ("alcohol label\*" or "beverage label\*" or "container label\*" or "counter-market\*" or countermarket\* or ((cue\* or "health education" or "health marketing" or (label\* not "open label\*") or messag\* or "social marketing" or text) adj5 (bottle\* or glass\* or container\* or packag\* or "point of choice" or "point of purchas\*\*" or "point of sale" or pour\* or ((product or products) adj5 alcohol) or unit or units)) or decal or decals or disclaimer\* or "drink label\*" or graphic\* or infographic\* or labels or ((label\* not "open label\*") and (drink\* or health)) or "labelling alcohol\*" or "labelling of alcohol\*" or "labelling on alcohol\*" or pictogram\* or pictograph\* or pictorial\* or "plain packag\*" or sticker\* or "unit label\*" or warn\*).id,ti.

7 (label\* not "open label\*").ti.

8 ("alcohol label\*" or "beverage label\*" or "container label\*" or "counter-market\*" or countermarket\* or ((cue\* or "health education" or "health marketing" or (label\* not "open label\*") or messag\* or "social marketing" or text) adj5 (bottle\* or glass\* or container\* or packag\* or "point of choice" or "point of purchas\*\*" or "point of sale" or pour\* or ((product or products) adj5 alcohol) or unit or units)) or decal or decals or disclaimer\* or "drink label\*" or graphic\* or infographic\* or labels or ((label\* not "open label\*") and (drink\* or health)) or "labelling alcohol\*" or "labelling of alcohol\*" or "labelling on alcohol\*" or pictogram\* or pictograph\* or pictorial\* or "plain packag\*" or sticker\* or "unit label\*" or warn\*).ab. /freq=2 and (alcohol or alcopop\* or "alco-pop\*" or ((alcohol\* or ethanol) and (beverage\* or drink\*)) or (alcohol and ("use" or misus\* or abus\* or drink\* or beverage\* or intak\* or consum\* or estimat\* or attitud\* or policy or policies)) or beer\* or booze or "drink wise" or drinkwise or "drinking guidelines" or (drink\* adj3 moderation) or liquor or liquors or "low risk drinking" or "low risk drinker\*" or "high risk drinking" or "high risk drinker\*" or "moderate drinking" or "moderate drinker\*" or "heavy drinking" or "heavy drinker\*" or "problem drinking" or "problem drinker\*" or "sensible drinking" or "sensible drinker\*" or spirits or "standard drink\*" or wine\*).ti.

9 5 or 6 or 7 or 8

10 4 and 9

11 ("alcohol label\*" or "alcohol warning label\*" or "alcohol warning\*" or ((alcohol\* or "standard drink\*") and ("beverage label\*" or "cancer risk warning\*" or "container label\*" or "drink label\*" or "health warning\*" or "unit label\*" or "warning display\*" or "warning label\*" or "warning statement\*")) or "labelling alcoholic beverage\*" or "labelling alcoholic drink\*" or "labelling of alcoholic beverage\*" or "labelling of alcoholic drink\*" or "labelling on alcoholic beverage\*" or "labelling on alcoholic drink\*" or "standard drink\* label\*" or "warning\* on alcohol" or "warning\* on beverage\*" or "warning\* on drink\*").mp.

12 10 or 11

13 limit 12 to yr="1989 -Current"

14 limit 13 to english language

15 (1\* or 2\* or 3\* or 4\* or 5\* or 6\* or 7\* or 8\* or 9\*).pm.

16 14 not 15

17 remove duplicates from 16



## Cochrane Central Register of Controlled Trials

#	Searches
	TI ( alcohol or alcopop* OR "alco-pop*" OR ((alcohol* OR ethanol) AND (beverage* OR drink*)) OR (alcohol AND ("use" OR misus* OR abus* OR drink* OR beverage* OR intak* OR consum* OR estimat* OR attitud* OR policy OR policies)) OR beer* OR booze OR "drink wise" OR drinkwise OR "drinking guidelines" OR (drink* N3 moderation) OR liquor OR liquors OR "low risk drinking" OR "low risk drinker*" OR "high risk drinking" OR "high risk drinker*" OR "moderate drinking" OR "moderate drinker*" OR "heavy drinking" OR "heavy drinker*" OR "problem drinking" OR "problem drinker*" OR "sensible drinking" OR "sensible drinker*" OR spirits OR "standard drink*" OR wine* ) OR SU ( alcohol or alcopop* OR "alco-pop*" OR ((alcohol* OR ethanol) AND (beverage* OR drink*)) OR (alcohol AND ("use" OR misus* OR abus* OR drink* OR beverage* OR intak* OR consum* OR estimat* OR attitud* OR policy OR policies)) OR beer* OR booze OR "drink wise" OR drinkwise OR "drinking guidelines" OR (drink* N3 moderation) OR liquor OR liquors OR "low risk drinking" OR "low risk drinker*" OR "high risk drinking" OR "high risk drinker*" OR "moderate drinking" OR "moderate drinker*" OR "heavy drinking" OR "heavy drinker*" OR "problem drinking" OR "problem drinker*" OR "sensible drinking" OR "sensible drinker*" OR spirits OR "standard drink*" OR wine* ) OR KW ( alcohol or alcopop* OR "alco-pop*" OR ((alcohol* OR ethanol) AND (beverage* OR drink*)) OR (alcohol AND ("use" OR misus* OR abus* OR drink* OR beverage* OR intak* OR consum* OR estimat* OR attitud* OR policy OR policies)) OR beer* OR booze OR "drink wise" OR drinkwise OR "drinking guidelines" OR (drink* N3 moderation) OR liquor OR liquors OR "low risk drinking" OR "low risk drinker*" OR "high risk drinking" OR "high risk drinker*" OR "moderate drinking" OR "moderate drinker*" OR "heavy drinking" OR "heavy drinker*" OR "problem drinking" OR "problem drinker*" OR "sensible drinking" OR "sensible drinker*" OR spirits OR "standard drink*" OR wine* )
S1	"standard drink*" OR wine* ) OR KW ( alcohol or alcopop* OR "alco-pop*" OR ((alcohol* OR ethanol) AND (beverage* OR drink*)) OR (alcohol AND ("use" OR misus* OR abus* OR drink* OR beverage* OR intak* OR consum* OR estimat* OR attitud* OR policy OR policies)) OR beer* OR booze OR "drink wise" OR drinkwise OR "drinking guidelines" OR (drink* N3 moderation) OR liquor OR liquors OR "low risk drinking" OR "low risk drinker*" OR "high risk drinking" OR "high risk drinker*" OR "moderate drinking" OR "moderate drinker*" OR "heavy drinking" OR "heavy drinker*" OR "problem drinking" OR "problem drinker*" OR "sensible drinking" OR "sensible drinker*" OR spirits OR "standard drink*" OR wine* ) OR MW ( alcohol or alcopop* OR "alco-pop*" OR ((alcohol* OR ethanol) AND (beverage* OR drink*)) OR (alcohol AND ("use" OR misus* OR abus* OR drink* OR beverage* OR intak* OR consum* OR estimat* OR attitud* OR policy OR policies)) OR beer* OR booze OR "drink wise" OR drinkwise OR "drinking guidelines" OR (drink* N3 moderation) OR liquor OR liquors OR "low risk drinking" OR "low risk drinker*" OR "high risk drinking" OR "high risk drinker*" OR "moderate drinking" OR "moderate drinker*" OR "heavy drinking" OR "heavy drinker*" OR "problem drinking" OR "problem drinker*" OR "sensible drinking" OR "sensible drinker*" OR spirits OR "standard drink*" OR wine* )
S2	( AB (alcohol or alcopop* OR "alco-pop*" OR ((alcohol* OR ethanol) AND (beverage* OR drink*)) OR (alcohol AND ("use" OR misus* OR abus* OR drink* OR beverage* OR intak* OR consum* OR estimat* OR attitud* OR policy OR policies)) OR beer* OR booze OR "drink wise" OR drinkwise OR "drinking guidelines" OR (drink* N3 moderation) OR liquor OR liquors OR "low risk drinking" OR "low risk drinker*" OR "high risk drinking" OR "high risk drinker*" OR "moderate drinking" OR "moderate drinker*" OR "heavy drinking" OR "heavy drinker*" OR "problem drinking" OR "problem drinker*" OR "sensible drinking" OR "sensible drinker*" OR spirits OR "standard drink*" OR wine*) AND TI ("counter-market*" OR countermarket* OR ((cue* OR "health education" OR "health marketing" OR messag* OR "social marketing" OR text) N5 (bottle* OR glass* OR container* OR packag* OR "point of choice" OR "point of purchas**" OR "point of sale" OR pour* OR ((product OR products) N5 alcohol) OR unit OR units)) OR decal OR decals OR disclaimer* OR graphic* OR infographic* OR label* OR pictogram* OR pictograph* OR pictorial* OR pictorial* OR "plain packag*" OR sticker* OR warn* ) NOT TI "open label"
S3	S1 OR S2
S4	( TI ( "counter-market*" OR countermarket* OR ((cue* OR "health education" OR "health marketing" OR messag* OR "social marketing" OR text) N5 (bottle* OR glass* OR container* OR packag* OR "point of choice" OR "point of purchas**" OR "point of sale" OR pour* OR ((product OR products) N5 alcohol) OR unit OR units)) OR decal OR decals OR disclaimer* OR graphic* OR infographic* OR label* OR pictogram* OR pictograph* OR pictorial* OR "plain packag*" OR sticker* OR warn* ) OR SU ( "counter-market*" OR countermarket* OR ((cue* OR "health education" OR "health marketing" OR messag* OR "social marketing" OR text) N5 (bottle* OR glass* OR container* OR packag* OR "point of choice" OR "point of purchas**" OR "point of sale" OR pour* OR ((product OR products) N5 alcohol) OR unit OR units)) OR decal OR decals OR disclaimer* OR graphic* OR infographic* OR label* OR pictogram* OR pictograph* OR pictorial* OR "plain packag*" OR sticker* OR warn* ) OR KW ( "counter-market*" OR countermarket* OR ((cue* OR "health education" OR "health marketing" OR messag* OR "social marketing" OR text) N5 (bottle* OR glass* OR container* OR packag* OR "point of choice" OR "point of purchas**" OR "point of sale" OR pour* OR ((product OR products) N5 alcohol) OR unit OR units)) OR decal OR decals OR disclaimer* OR graphic* OR infographic* OR label* OR pictogram* OR pictograph* OR pictorial* OR "plain packag*" OR sticker* OR warn* ) OR MW ( "counter-market*" OR countermarket* OR ((cue* OR "health education" OR "health marketing" OR messag* OR "social marketing" OR text) N5 (bottle* OR glass* OR container* OR packag* OR "point of choice" OR "point of purchas**" OR "point of sale" OR pour* OR ((product OR products) N5 alcohol) OR unit OR units)) OR decal OR decals OR disclaimer* OR graphic* OR infographic* OR label* OR pictogram* OR pictograph* OR pictorial* OR "plain packag*" OR sticker* OR warn* )



products) N5 alcohol) OR unit OR units)) OR decal OR decals OR disclaimer\* OR graphic\* OR infographic\* OR label\* OR pictogram\* OR pictograph\* OR pictorial\* OR "plain packag\*" OR sticker\* OR warn\* ) NOT (TI "open label\*" OR OT "open label\*" OR SU "open label\*" OR KW "open label\*" OR MW "open label\*")

( AB ("counter-market\*" OR countermarket\* OR ((cue\* OR "health education" OR "health marketing" OR messag\* OR "social marketing" OR text) N5 (bottle\* OR glass\* OR container\* OR packag\* OR "point of choice" OR "point of purchas\*\*" OR "point of sale" OR pour\* OR ((product OR products) N5 alcohol) OR unit OR units)) OR decal OR decals OR disclaimer\* OR graphic\* OR infographic\* OR label\* OR pictogram\* OR pictograph\* OR pictorial\* OR "plain packag\*" OR sticker\* OR warn\*) AND TI ( alcohol or alcopop\* OR "alco-pop\*" OR ((alcohol\* OR ethanol)

S5 AND (beverage\* OR drink\*)) OR (alcohol AND ("use" OR misus\* OR abus\* OR drink\* OR beverage\* OR intak\* OR consum\* OR estimat\* OR attitud\* OR policy OR policies)) OR beer\* OR booze OR "drink wise" OR drinkwise OR "drinking guidelines" OR (drink\* N3 moderation) OR liquor OR liquors OR "low risk drinking" OR "low risk drinker\*" OR "high risk drinking" OR "high risk drinker\*" OR "moderate drinking" OR "moderate drinker\*" OR "heavy drinking" OR "heavy drinker\*" OR "problem drinking" OR "problem drinker\*" OR "sensible drinking" OR "sensible drinker\*" OR spirits OR "standard drink\*" OR wine\* ) NOT AB "open label\*"

S6 S4 OR S5

S7 S3 AND S6

"alcohol label\*" OR "alcohol warning label\*" OR "alcohol warning\*" OR ((alcohol\* OR "standard drink\*") AND ("beverage label\*" OR "cancer risk warning\*" OR "container label\*" OR "drink label\*" OR "health warning\*" OR "unit label\*" OR "warning display\*" OR "warning label\*" OR "warning statement\*")) OR "labelling alcoholic beverage\*" OR "labelling alcoholic drink\*" OR "labelling of alcoholic beverage\*" OR "labelling of alcoholic drink\*" OR "labelling on alcoholic beverage\*" OR "labelling on alcoholic drink\*" OR "standard drink\* label\*" OR "warning\* on alcohol" OR "warning\* on beverage\*" OR "warning\* on drink\*"

S9 S7 OR S8

PD ( 1989\* OR 1990\* OR 1991\* OR 1992\* OR 1993\* OR 1994\* OR 1995\* OR 1996\* OR 1997\* OR 1998\* OR 1999\* OR 2000\* OR 2001\* OR 2002\* OR 2003\* OR 2004\* OR 2005\* OR 2006\* OR 2007\* OR 2008\* OR 2009\* OR 2010\* OR 2011\* OR 2012\* OR 2013\* OR 2014\* OR 2015\* OR 2016\* OR 2017\* OR 2018\* S10 OR 2019\* ) OR SO ( 1989\* OR 1990\* OR 1991\* OR 1992\* OR 1993\* OR 1994\* OR 1995\* OR 1996\* OR 1997\* OR 1998\* OR 1999\* OR 2000\* OR 2001\* OR 2002\* OR 2003\* OR 2004\* OR 2005\* OR 2006\* OR 2007\* OR 2008\* OR 2009\* OR 2010\* OR 2011\* OR 2012\* OR 2013\* OR 2014\* OR 2015\* OR 2016\* OR 2017\* OR 2018\* OR 2019\* )

S11 S9 AND S10

LA (Afrikaans or Bulgarian or Chinese or Czech or Danish or Dutch or Finnish or French or German or Greek or Hebrew or Hungarian or Italian or Japanese or Korean or Multilingual or Norwegian or Polish or Portuguese or Romanian or Russian or Serbo-Croatian or Slovak or Spanish or Swedish or Thai or Turkish or Ukrainian) OR OL (Afrikaans or Bulgarian or Chinese or Czech or Danish or Dutch or Finnish or French or German or Greek or Hebrew or Hungarian or Italian or Japanese or Korean or Multilingual or Norwegian or Polish or Portuguese or Romanian or Russian or Serbo-Croatian or Slovak or Spanish or Swedish or Thai or Turkish or Ukrainian)

S13 S11 NOT S12

## Communication Abstracts

#	Searches
S1	( alcohol or alcopop* OR "alco-pop*" OR ((alcohol* OR ethanol) AND (beverage* OR drink*)) OR (alcohol AND ("use" OR misus* OR abus* OR drink* OR beverage* OR intak* OR consum* OR estimat* OR attitud* OR policy OR policies)) OR beer* OR booze OR "drink wise" OR drinkwise OR "drinking guidelines" OR (drink* N3 moderation) OR liquor OR liquors OR "low risk drinking" OR "low risk drinker*" OR "high risk drinking" OR "high risk drinker*" OR "moderate drinking" OR "moderate drinker*" OR "heavy drinking" OR "heavy drinker*" OR "problem drinking" OR "problem drinker*" OR "sensible drinking" OR "sensible drinker*" OR spirits OR "standard drink*" OR wine* ) AND ( label* OR "alcohol label*" OR "beverage label*" OR "container label*" OR "counter-market*" OR countermarket* OR ((cue* OR "health education" OR "health marketing" OR label* OR messag* OR "social marketing" OR text) N5 (bottle* OR glass* OR container* OR packag* OR "point of choice" OR "point of purchas**" OR "point of sale" OR pour* OR ((product OR products) N5 alcohol) OR unit OR units)) OR decal OR decals OR disclaimer* OR "drink



label\* OR graphic\* OR infographic\* OR labels OR (label\* AND (drink\* OR health)) OR "labelling alcohol\*" OR "labelling of alcohol\*" OR "labelling on alcohol\*" OR pictogram\* OR pictograph\* OR pictorial\* OR "plain packag\*" OR sticker\* OR "unit label\*" OR warn\* )

S2	"alcohol label*" OR "alcohol warning label*" OR "alcohol warning*" OR ((alcohol* OR "standard drink*") AND ("beverage label*" OR "cancer risk warning*" OR "container label*" OR "drink label*" OR "health warning*" OR "unit label*" OR "warning display*" OR "warning label*" OR "warning statement*")) OR "labelling alcoholic beverage*" OR "labelling alcoholic drink*" OR "labelling of alcoholic beverage*" OR "labelling of alcoholic drink*" OR "labelling on alcoholic beverage*" OR "labelling on alcoholic drink*" OR "standard drink* label*" OR "warning* on alcohol" OR "warning* on beverage*" OR "warning* on drink*")
S3	S1 OR S2
S4	S3 AND LA English
S5	S4 AND DT 1988-

## Scopus

#	Searches
#1	((TITLE (alcopop* OR "alco-pop*") OR ((alcohol* OR ethanol) AND (beverage* OR drink*))) OR (alcohol AND ("use" OR misus* OR abus* OR drink* OR beverage* OR intak* OR consum* OR estimat* OR attitud* OR policy OR policies)) OR beer* OR booze OR "drink wise" OR drinkwise OR "drinking guidelines" OR (drink* W/3 moderation) OR liquor OR liquors OR "low risk drinking" OR "low risk drinker*" OR "high risk drinking" OR "high risk drinker*" OR "moderate drinking" OR "moderate drinker*" OR "heavy drinking" OR "heavy drinker*" OR "problem drinking" OR "problem drinker*" OR "sensible drinking" OR "sensible drinker*" OR spirits OR "standard drink*" OR wine*) OR KEY (alcopop* OR "alco-pop*") OR ((alcohol* OR ethanol) AND (beverage* OR drink*)) OR (alcohol AND ("use" OR misus* OR abus* OR drink* OR beverage* OR intak* OR consum* OR estimat* OR attitud* OR policy OR policies)) OR beer* OR booze OR "drink wise" OR drinkwise OR "drinking guidelines" OR (drink* W/3 moderation) OR liquor OR liquors OR "low risk drinking" OR "low risk drinker*" OR "high risk drinking" OR "high risk drinker*" OR "moderate drinking" OR "moderate drinker*" OR "heavy drinking" OR "heavy drinker*" OR "problem drinking" OR "problem drinker*" OR "sensible drinking" OR "sensible drinker*" OR spirits OR "standard drink*" OR wine*) OR TITLE (alcohol) OR (ABS (alcopop* OR "alco-pop*") OR ((alcohol* OR ethanol) AND (beverage* OR drink*))) OR (alcohol AND ("use" OR misus* OR abus* OR drink* OR beverage* OR intak* OR consum* OR estimat* OR attitud* OR policy OR policies)) OR beer* OR booze OR "drink wise" OR drinkwise OR "drinking guidelines" OR (drink* W/3 moderation) OR liquor OR liquors OR "low risk drinking" OR "low risk drinker*" OR "high risk drinking" OR "high risk drinker*" OR "moderate drinking" OR "moderate drinker*" OR "heavy drinking" OR "heavy drinker*" OR "problem drinking" OR "problem drinker*" OR "sensible drinking" OR "sensible drinker*" OR spirits OR "standard drink*" OR wine*) AND TITLE ("alcohol label*" OR "beverage label*" OR "container label*" OR "counter-market*" OR countermarket* OR ((cue* OR "health education" OR "health marketing" OR (label* AND NOT "open label*") OR messag* OR "social marketing" OR text) W/5 (bottle* OR glass* OR container* OR packag* OR "point of choice" OR "point of purchas**" OR "point of sale" OR pour* OR ((product OR products) W/5 alcohol) OR unit OR units)) OR decal OR decals OR disclaimer* OR "drink label*" OR graphic* OR infographic* OR labels OR ((label* AND NOT "open label*") AND (drink* OR health)) OR "labelling alcohol*" OR "labelling of alcohol*" OR "labelling on alcohol*" OR pictogram* OR pictograph* OR pictorial* OR "plain packag*" OR sticker* OR "unit label*" OR warn* ) ) AND (TITLE ("alcohol label*" OR "beverage label*" OR "container label*" OR "counter-market*" OR countermarket* OR ((cue* OR "health education" OR "health marketing" OR (label* AND NOT "open label*") OR messag* OR "social marketing" OR text) W/5 (bottle* OR glass* OR container* OR packag* OR "point of choice" OR "point of purchas**" OR "point of sale" OR pour* OR ((product OR products) W/5 alcohol) OR unit OR units)) OR decal OR decals OR disclaimer* OR "drink label*" OR graphic* OR infographic* OR labels OR ((label* AND NOT "open label*") AND (drink* OR health)) OR "labelling alcohol*" OR "labelling of alcohol*" OR "labelling on alcohol*" OR pictogram* OR pictograph* OR pictorial* OR "plain packag*" OR sticker* OR "unit label*" OR warn* ) ) OR KEY ("alcohol label*" OR "beverage label*" OR "container label*" OR "counter-market*" OR countermarket* OR ((cue* OR "health education" OR "health marketing" OR (label* AND NOT "open label*") OR messag* OR "social marketing" OR text) W/5 (bottle* OR glass* OR container* OR packag* OR "point of choice" OR "point of purchas**" OR "point of sale" OR pour* OR ((product OR products) W/5 alcohol) OR unit OR units)) OR decal OR decals OR disclaimer* OR "drink label*" OR graphic* OR infographic* OR labels OR ((label* AND NOT "open label*") AND (drink* OR health)) OR "labelling alcohol*" OR "labelling of alcohol*" OR "labelling on alcohol*" OR pictogram* OR pictograph* OR pictorial* OR "plain packag*" OR sticker* OR "unit label*" OR warn* ) )



label\*" OR warn\*) OR ( TITLE (label\*) AND NOT TITLE ("open label\*") ) OR ( ABS ("alcohol label\*" OR "beverage label\*" OR "container label\*" OR "counter-market\*" OR countermarket\* OR ((cue\* OR "health education" OR "health marketing" OR (label\* AND NOT "open label\*") OR messag\* OR "social marketing" OR text) W/5 (bottle\* OR glass\* OR container\* OR packag\* OR "point of choice" OR "point of purchas\*\*" OR "point of sale" OR pour\* OR ((product OR products) W/5 alcohol) OR unit OR units)) OR decal OR decals OR disclaimer\* OR "drink label\*" OR graphic\* OR infographic\* OR labels OR ((label\* AND NOT "open label\*") AND (drink\* OR health)) OR "labelling alcohol\*" OR "labelling of alcohol\*" OR "labelling on alcohol\*" OR pictogram\* OR pictograph\* OR pictorial\* OR "plain packag\*" OR sticker\* OR "unit label\*" OR warn\*) AND TITLE ("drink wise" OR drinkwise OR ( ( (alcohol AND ("use" OR misus\* OR abus\* OR drink\* OR beverage\* OR intak\* OR consum\* OR estimat\* OR attitud\* OR policy OR policies)) ) AND NOT "alcohol use disorder\*") OR "drinking guidelines" OR (drink\* W/3 moderation) OR "low risk drinking" OR "low risk drinker\*" OR "high risk drinking" OR "high risk drinker\*" OR "moderate drinking" OR "moderate drinker\*" OR "heavy drinking" OR "heavy drinker\*" OR "problem drinking" OR "problem drinker\*" OR "sensible drinking" OR "sensible drinker\*" OR "standard drink\*") )) OR TITLE-ABS-KEY("alcohol label\*" OR "alcohol warning label\*" OR "alcohol warning\*" OR ((alcohol\* OR "standard drink\*") AND ("beverage label\*" OR "cancer risk warning\*" OR "container label\*" OR "drink label\*" OR "health warning display\*" OR "warning label\*" OR "warning statement\*")) OR "labelling alcoholic beverage\*" OR "labelling alcoholic drink\*" OR "labelling of alcoholic beverage\*" OR "labelling of alcoholic drink\*" OR "labelling on alcoholic beverage\*" OR "labelling on alcoholic drink\*" OR "standard drink\* label\*" OR "warning\* on alcohol" OR "warning\* on beverage\*" OR "warning\* on drink\*") ) AND LANGUAGE (English) AND SUBJAREA ( "SOCI" OR "BUSI" OR "MEDI" OR "ECON" OR "PSYC" OR "ARTS" OR "NURS" OR "DECI" OR "HEAL" OR "MULT" OR "Undefined" ) AND PUBYEAR AFT 1988 ) AND NOT INDEX (medline or embase)

## Google Scholar

#	Searches
1	"alcohol" OR "standard drink" OR "standard drinks" OR "alcoholic" OR alcopop OR beer OR wine OR liquor "beverage label" OR "beverage labels" OR "container label" OR "container labels" OR "drink label" OR "drink labels" OR "unit label" OR "unit labels"
2	"alcohol" OR "standard drink" OR "standard drinks" OR "alcoholic" OR alcopop OR beer OR wine OR liquor "health warning" OR "health warnings" OR "warning statement" OR "warning statements" OR "cancer risk warning" OR "cancer risk warnings"
3	"alcohol label" OR "alcohol labels" OR "alcohol warning label" OR "alcohol warning labels" OR "standard drink label" OR "standard drink labels" OR "standard drinks label" OR "standard drinks labels"
4	"alcohol" OR "standard drink" OR "standard drinks" OR "alcoholic beverage" OR "alcoholic beverages" label OR sticker OR packaging health OR cancer OR pregnancy OR "surgeon general" OR medical OR warning "-open label"
5	1 OR 2 OR 3 OR 4

## ProQuest Dissertation and Theses

#	Searches
S1	ti,su,diskw("alcohol" OR "alcoholic drink*" OR "alcoholic beverage*" OR alcopop* OR "alco-pop*" OR beer* OR booze OR "drink wise" OR drinkwise OR "drinking guidelines" OR liquor OR liquors OR "low risk drinking" OR "low risk drinker*" OR "high risk drinking" OR "high risk drinker*" OR "moderate drinking" OR "moderate drinker*" OR "heavy drinking" OR "heavy drinker*" OR "problem drinking" OR "problem drinker*" OR "sensible drinking" OR "sensible drinker*" OR "standard drink*" OR wine*) AND ti,su,diskw("counter-market*" OR countermarket* OR decal OR decals OR disclaimer* OR "drink label*" OR graphic* OR infographic* OR label* OR pictogram* OR pictograph* OR pictorial* OR "plain packag*" OR sticker* OR warn*) AND la(English)
S2	Limited by: Date: From January 01 1988 to December 31 2019  noft("alcohol label*" OR "alcohol warning label*" OR "alcohol warning*" OR ((alcohol* OR "standard drink*") AND ("beverage label*" OR "cancer risk warning*" OR "container label*" OR "drink label*" OR "health warning*" OR "unit label*" OR "warning display*" OR "warning label*" OR "warning statement*")) OR "labelling alcoholic beverage*" OR "labelling alcoholic drink*" OR "labelling of alcoholic beverage*" OR "labelling of alcoholic drink*" OR "labelling



on alcoholic beverage\* OR "labelling on alcoholic drink\*" OR "standard drink\* label\*" OR "warning\* on alcohol" OR "warning\* on beverage\*" OR "warning\* on drink\*") AND la(English)

Limited by: Date: From January 01 1988 to December 31 2019

S3 ft("alcohol label\*" OR "alcohol warning label\*" OR "alcohol warning\*" OR ((alcohol\* OR "standard drink\*") NEAR/15 ("beverage label\*" OR "cancer risk warning\*" OR "container label\*" OR "drink label\*" OR "health warning\*" OR "unit label\*" OR "warning display\*" OR "warning label\*" OR "warning statement\*")) OR "labelling alcoholic beverage\*" OR "labelling alcoholic drink\*" OR "labelling of alcoholic beverage\*" OR "labelling of alcoholic drink\*" OR "labelling on alcoholic beverage\*" OR "labelling on alcoholic drink\*" OR "standard drink\* label\*" OR "warning\* on alcohol" OR "warning\* on beverage\*" OR "warning\* on drink\*") AND su(communication OR marketing) AND la(English)

Limited by: Date: From January 01 1988 to December 31 2019

S4 ab("alcohol" OR "alcoholic drink\*" OR "alcoholic beverage\*" OR alcopop\* OR "alco-pop\*" OR beer\* OR booze OR drinking OR drinker\* OR liquor OR liquors OR "standard drink\*" OR wine\*) AND ti(decal OR decals OR disclaimer\* OR infographic\* OR label\* OR "plain package\*" OR pictogram\* OR pictograph\* OR pictorial\* OR sticker\* OR "health warning\*") AND la(English)

Limited by: Date: From January 01 1988 to December 31 2019

S5 ab(decal OR decals OR disclaimer\* OR infographic\* OR "plain package\*" OR pictogram\* OR pictograph\* OR pictorial\* OR sticker\* OR "health warning\*" OR "alcohol label\*" OR "beverage label\*" OR "container label\*" OR "drink label\*" OR labels OR "labelling alcohol\*" OR "labelling of alcohol\*" OR "labelling on alcohol\*" OR "unit label\*" OR "warning label\*") AND ti("alcohol" OR "alcoholic drink\*" OR "alcoholic beverage\*" OR alcopop\* OR "alco-pop\*" OR beer\* OR booze OR liquor OR liquors OR "standard drink\*" OR wine\* OR "drinking guidelines" OR "low risk drinking" OR "low risk drinker\*" OR "high risk drinking" OR "high risk drinker\*" OR "moderate drinking" OR "moderate drinker\*" OR "heavy drinking" OR "heavy drinker\*" OR "problem drinking" OR "problem drinker\*" OR "sensible drinking" OR "sensible drinker\*") AND la(English)

Limited by: Date: From January 01 1988 to December 31 2019

S6 S1 OR S2 OR S3 OR S4 OR S5

## Northern Light Life Sciences Conference Abstracts

#	Searches
1	(alcohol or alcopop* or "alco-pop*" or ((alcohol* or ethanol) and (beverage* or drink*))) or (alcohol and ("use" or misus* or abus* or drink* or beverage* or intak* or consum* or estimat* or attitud* or policy or policies)) or beer* or booze or "drink wise" or drinkwise or "drinking guidelines" or (drink* adj3 moderation) or liquor or liquors or "low risk drinking" or "low risk drinker*" or "high risk drinking" or "high risk drinker*" or "moderate drinking" or "moderate drinker*" or "heavy drinking" or "heavy drinker*" or "problem drinking" or "problem drinker*" or "sensible drinking" or "sensible drinker*" or spirits or "standard drink*" or wine*).ti.
2	(alcohol or alcopop* or "alco-pop*" or ((alcohol* or ethanol) and (beverage* or drink*))) or (alcohol and ("use" or misus* or abus* or drink* or beverage* or intak* or consum* or estimat* or attitud* or policy or policies)) or beer* or booze or "drink wise" or drinkwise or "drinking guidelines" or (drink* adj3 moderation) or liquor or liquors or "low risk drinking" or "low risk drinker*" or "high risk drinking" or "high risk drinker*" or "moderate drinking" or "moderate drinker*" or "heavy drinking" or "heavy drinker*" or "problem drinking" or "problem drinker*" or "sensible drinking" or "sensible drinker*" or spirits or "standard drink*" or wine*).ab. and ("alcohol label*" or "beverage label*" or "container label*" or "counter-market*" or "countermarket*" or ((cue* or "health education" or "health marketing" or (label* not "open label*") or messag* or "social marketing" or text) adj5 (bottle* or glass* or container* or packag* or "point of choice" or "point of purchas**" or "point of sale" or pour* or ((product or products) adj5 alcohol) or unit or units)) or decal or decals or disclaimer* or "drink label*" or graphic* or infographic* or labels or ((label* not "open label*") and (drink* or health)) or "labelling alcohol*" or "labelling of alcohol*" or "labelling on alcohol*" or pictogram* or pictograph* or pictorial* or "plain packag*" or sticker* or "unit label*" or warn*).ti.
3	1 or 2



- 4 ("alcohol label\*" or "beverage label\*" or "container label\*" or "counter-market\*" or countermarket\* or ((cue\* or "health education" or "health marketing" or (label\* not "open label\*") or messag\* or "social marketing" or text) adj5 (bottle\* or glass\* or container\* or packag\* or "point of choice" or "point of purchas\*-\*" or "point of sale" or pour\* or ((product or products) adj5 alcohol) or unit or units)) or decal or decals or disclaimer\* or "drink label\*" or graphic\* or infographic\* or labels or ((label\* not "open label\*") and (drink\* or health)) or "labelling alcohol\*" or "labelling of alcohol\*" or "labelling on alcohol\*" or pictogram\* or pictograph\* or pictorial\* or "plain packag\*" or sticker\* or "unit label\*" or warn\*).ti.
- 5 (label\* not "open label\*").ti.
- 6 ("alcohol label\*" or "beverage label\*" or "container label\*" or "counter-market\*" or countermarket\* or ((cue\* or "health education" or "health marketing" or (label\* not "open label\*") or messag\* or "social marketing" or text) adj5 (bottle\* or glass\* or container\* or packag\* or "point of choice" or "point of purchas\*-\*" or "point of sale" or pour\* or ((product or products) adj5 alcohol) or unit or units)) or decal or decals or disclaimer\* or "drink label\*" or graphic\* or infographic\* or labels or ((label\* not "open label\*") and (drink\* or health)) or "labelling alcohol\*" or "labelling of alcohol\*" or "labelling on alcohol\*" or pictogram\* or pictograph\* or pictorial\* or "plain packag\*" or sticker\* or "unit label\*" or warn\*).ab. and (alcohol or alcopop\* or "alco-pop\*" or ((alcohol\* or ethanol) and (beverage\* or drink\*)) or (alcohol and ("use" or misus\* or abus\* or drink\* or beverage\* or intak\* or consum\* or estimat\* or attitud\* or policy or policies)) or beer\* or booze or "drink wise" or drinkwise or "drinking guidelines" or (drink\* adj3 moderation) or liquor or liquors or "low risk drinking" or "low risk drinker\*" or "high risk drinking" or "high risk drinker\*" or "moderate drinking" or "moderate drinker\*" or "heavy drinking" or "heavy drinker\*" or "problem drinking" or "problem drinker\*" or "sensible drinking" or "sensible drinker\*" or spirits or "standard drink\*" or wine\*).ti.
- 7 4 or 5 or 6
- 8 3 and 7
- 9 ("alcohol label\*" or "alcohol warning label\*" or "alcohol warning\*" or ((alcohol\* or "standard drink\*") and ("beverage label\*" or "cancer risk warning\*" or "container label\*" or "drink label\*" or "health warning\*" or "unit label\*" or "warning display\*" or "warning label\*" or "warning statement\*")) or "labelling alcoholic beverage\*" or "labelling alcoholic drink\*" or "labelling of alcoholic beverage\*" or "labelling of alcoholic drink\*" or "labelling on alcoholic beverage\*" or "labelling on alcoholic drink\*" or "standard drink\* label\*" or "warning\* on alcohol" or "warning\* on beverage\*" or "warning\* on drink\*").mp.
- 10 8 or 9



## Search Results Overview

### December 2019: Databases Searched

Database	Date searched	Records	Duplicates removed by database	Remaining
1. MEDLINE (Ovid)	12/12/2019	688	0	688
2. Embase (Ovid)	12/12/2019	274	0	274
3. CINAHL (EBSCOhost)	12/12/2019	308	0	308
4. PsycINFO (Ovid)	12/12/2019	239	0	239
5. Cochrane Central Register of Controlled Trials (EBSCOhost)	12/12/2019	150	0	150
6. Communication Abstracts (EBSCOhost)	12/13/2019	163	0	163
7. Scopus (Elsevier)	12/12/2019	301	0	301
8. Google Scholar (Google)	12/13/2019	400	0	400
9. ProQuest Dissertation and Theses (ProQuest)	12/13/2019	208	0	208
10. Northern Light Life Sciences Conference Abstracts (Ovid)	12/13/2019	56	0	56

### December 2019: Records Totals

Records source	Records
Records identified through database searching	2787
Duplicates removed by database	0
Duplicates removed by bibliographic management software	562
Total records after duplicates removed	2225



## May 2020: Databases Searched

Database	Date searched	Records
MEDLINE (Ovid)	05/08/2020	44
Embase (Ovid)	05/08/2020	7
CINAHL (EBSCOhost)	05/09/2020	13
PsycINFO (Ovid)	05/09/2020	9
Cochrane Central Register of Controlled Trials (EBSCOhost)	05/09/2020	11
Communication Abstracts (EBSCOhost)	05/09/2020	8
Scopus (Elsevier)	05/09/2020	38
Google Scholar (Google)	05/12/2020	72
ProQuest Dissertation and Theses (ProQuest)	05/12/2020	5
Northern Light Life Sciences Conference Abstracts (Ovid)	05/12/2020	0

## May 2020: Records Totals

Records source	Records
Records identified through database searching	207
Duplicates removed by bibliographic management software	97
Total records after duplicates removed	110

## December 2020: Databases Searched

Database	Date searched	Records
MEDLINE (Ovid)	12/15/2020	32
Embase (Ovid)	12/15/2020	12
CINAHL (EBSCOhost)	12/15/2020	17
PsycINFO (Ovid)	12/15/2020	8
Cochrane Central Register of Controlled Trials (EBSCOhost)	12/16/2020	21
Communication Abstracts (EBSCOhost)	12/16/2020	10
Scopus (Elsevier)	12/16/2020	33
Google Scholar (Google)	12/16/2020	59
ProQuest Dissertation and Theses (ProQuest)	12/17/2020	4



## December 2020: Records Totals

Records source	Records
Records identified through database searching	196
Duplicates removed by bibliographic management software	87
Total records after duplicates removed	109

## Validation Search, March 2021: MEDLINE

#	Searches	Results
1	Alcohol Abstinence/ or Alcohol Drinking in College/ or Alcohol Drinking/ or exp Alcoholic Beverages/ or Alcoholic Intoxication/ or Binge Drinking/ or Drinking Behavior/ or (Ethanol/ and exp Beverages/) or Underage Drinking/	103458
2	(alcopop* or "alco-pop*" or ((alcohol* or ethanol) and (beverage* or drink*)) or (alcohol and ("use" or misus* or abus* or drink* or beverage* or intak* or consum* or estimat* or attitud* or policy or policies)) or beer* or booze or "drink wise" or drinkwise or "drinking guidelines" or (drink* adj3 moderation) or liquor or liquors or "low risk drinking" or "low risk drinker*" or "high risk drinking" or "high risk drinker*" or "moderate drinking" or "moderate drinker*" or "heavy drinking" or "heavy drinker*" or "problem drinking" or "problem drinker*" or "sensible drinking" or "sensible drinker*" or spirits or "standard drink*" or wine*).kf,kw,ti. or alcohol.ti.	119693
3	(alcopop* or "alco-pop*" or ((alcohol* or ethanol) and (beverage* or drink*)) or (alcohol and ("use" or misus* or abus* or drink* or beverage* or intak* or consum* or estimat* or attitud* or policy or policies)) or beer* or booze or "drink wise" or drinkwise or "drinking guidelines" or (drink* adj3 moderation) or liquor or liquors or "low risk drinking" or "low risk drinker*" or "high risk drinking" or "high risk drinker*" or "moderate drinking" or "moderate drinker*" or "heavy drinking" or "heavy drinker*" or "problem drinking" or "problem drinker*" or "sensible drinking" or "sensible drinker*" or spirits or "standard drink*" or wine*).ab. and ("alcohol label*" or "beverage label*" or "container label*" or "counter-market*" or countermarket* or ((cue* or "health education" or "health marketing" or (label* not "open label*") or messag* or "social marketing" or text) adj5 (bottle* or glass* or container* or packag* or "point of choice" or "point of purchas**" or "point of sale" or pour* or ((product or products) adj5 alcohol) or unit or units)) or decal or decals or disclaimer* or "drink label*" or graphic* or infographic* or labels or ((label* not "open label*") and (drink* or health)) or "labelling alcohol*" or "labelling of alcohol*" or "labelling on alcohol*" or pictogram* or pictograph* or pictorial* or "plain packag*" or sticker* or "unit label*" or warn*).ti.	192
4	1 or 2 or 3	170562
5	Product Labeling/ or Product Packaging/ or Drug Packaging/ or Drug Labeling/ or Food Packaging/ or Food Labeling/ or ((Consumer Health Information/ or Cues/ or Health Education/ or Social Marketing/) and (bottle* or glass* or container* or packag* or "point of choice" or "point of purchas**" or "point of sale" or pour* or ((product or products) adj5 alcohol) or unit or units).ab,kf,kw,ti.)	26652
6	("alcohol label*" or "beverage label*" or "container label*" or "counter-market*" or countermarket* or ((cue* or "health education" or "health marketing" or (label* not "open label*") or messag* or "social marketing" or text) adj5 (bottle* or glass* or container* or packag* or "point of choice" or "point of purchas**" or "point of sale" or pour* or ((product or products) adj5 alcohol) or unit or units)) or decal or decals or disclaimer* or "drink label*" or graphic* or infographic* or labels or ((label* not "open label*") and (drink* or health)) or "labelling alcohol*" or "labelling of alcohol*" or "labelling on alcohol*" or pictogram* or pictograph* or pictorial* or "plain packag*" or sticker* or "unit label*" or warn*).kf,kw,ti.	25846
7	label*.ti. not (Isotope Labeling/ or exp Isotopes/ or Biosensing Techniques/ or exp Chemistry Techniques, Analytical/ or "open label*".ti. or ch.fs.)	32707



8	("alcohol label*" or "beverage label*" or "container label*" or "counter-market*" or countermarket* or ((cue* or "health education" or "health marketing" or (label* not "open label*") or messag* or "social marketing" or text) adj5 (bottle* or glass* or container* or packag* or "point of choice" or "point of purchas**" or "point of sale" or pour* or ((product or products) adj5 alcohol) or unit or units)) or decal or decals or disclaimer* or "drink label*" or graphic* or infographic* or labels or ((label* not "open label*") and (drink* or health)) or "labelling alcohol*" or "labelling of alcohol*" or "labelling on alcohol*" or pictogram* or pictograph* or pictorial* or "plain packag*" or sticker* or "unit label*" or warn*).ab. /freq=2 and (alcopop* or "alco-pop*" or ((alcohol* or ethanol) and (beverage* or drink*))) or (alcohol and ("use" or misus* or abus* or drink* or beverage* or intak* or consum* or estimat* or attitud* or policy or policies)) or beer* or booze or "drink wise" or drinkwise or "drinking guidelines" or (drink* adj3 moderation) or liquor or liquors or "low risk drinking" or "low risk drinker*" or "high risk drinking" or "high risk drinker*" or "moderate drinking" or "moderate drinker*" or "heavy drinking" or "heavy drinker*" or "problem drinking" or "problem drinker*" or "sensible drinking" or "sensible drinker*" or spirits or "standard drink*" or wine*).ti.	181
9	5 or 6 or 7 or 8	77206
10	4 and 9	882
11	("alcohol label*" or "alcohol warning label*" or "alcohol warning*" or ((alcohol* or "standard drink*") and ("beverage label*" or "cancer risk warning*" or "container label*" or "drink label*" or "health warning*" or "unit label*" or "warning display*" or "warning label*" or "warning statement*")) or "labelling alcoholic beverage*" or "labelling alcoholic drink*" or "labelling of alcoholic beverage*" or "labelling of alcoholic drink*" or "labelling on alcoholic beverage*" or "labelling on alcoholic drink*" or "standard drink* label*" or "warning* on alcohol" or "warning* on beverage*" or "warning* on drink*).mp.	246
12	10 or 11	944
13	exp Animals/ not (exp Animals/ and Humans/)	4795111
14	12 not 13	889
15	limit 14 to english	841
16	remove duplicates from 15	841
17	Alcohol Abstinence/ or Alcohol Drinking in College/ or Alcohol Drinking/ or exp Alcoholic Beverages/ or Alcoholic Intoxication/ or Binge Drinking/ or Drinking Behavior/ or (Ethanol/ and exp Beverages/) or Underage Drinking/	103458
18	(alcopop* or "alco-pop*" or ((alcohol* or ethanol) and (beverage* or drink*))) or (alcohol and ("use" or misus* or abus* or drink* or beverage* or intak* or consum* or estimat* or attitud* or policy or policies)) or beer* or booze or "drink wise" or drinkwise or "drinking guidelines" or (drink* adj3 moderation) or liquor or liquors or "low risk drinking" or "low risk drinker*" or "high risk drinking" or "high risk drinker*" or "moderate drinking" or "moderate drinker*" or "heavy drinking" or "heavy drinker*" or "problem drinking" or "problem drinker*" or "sensible drinking" or "sensible drinker*" or spirits or "standard drink*" or wine*).kf,kw,ti, or alcohol.ti.	119693
19	(alcopop* or "alco-pop*" or ((alcohol* or ethanol) and (beverage* or drink*))) or (alcohol and ("use" or misus* or abus* or drink* or beverage* or intak* or consum* or estimat* or attitud* or policy or policies)) or beer* or booze or "drink wise" or drinkwise or "drinking guidelines" or (drink* adj3 moderation) or liquor or liquors or "low risk drinking" or "low risk drinker*" or "high risk drinking" or "high risk drinker*" or "moderate drinking" or "moderate drinker*" or "heavy drinking" or "heavy drinker*" or "problem drinking" or "problem drinker*" or "sensible drinking" or "sensible drinker*" or spirits or "standard drink*" or wine*).ab. and ("alcohol label*" or "beverage label*" or "container label*" or "counter-market*" or countermarket* or ((cue* or "health education" or "health marketing" or (label* not "open label*") or messag* or "social marketing" or text) adj5 (bottle* or glass* or container* or packag* or "point of choice" or "point of purchas**" or "point of sale" or pour* or ((product or products) adj5 alcohol) or unit or units)) or decal or decals or disclaimer* or "drink label*" or graphic* or infographic* or labels or ((label* not "open label*") and (drink* or health)) or "labelling alcohol*" or "labelling of alcohol*" or "labelling on alcohol*" or pictogram* or pictograph* or pictorial* or "plain packag*" or sticker* or "unit label*" or warn*).ti.	192
20	17 or 18 or 19	170562
21	Product Labeling/ or Product Packaging/ or Drug Packaging/ or Drug Labeling/ or Food Packaging/ or Food Labeling/ or ((Consumer Health Information/ or Cues/ or Health Education/ or Social Marketing/) and (bottle* or glass* or container* or packag* or "point of choice" or "point of purchas**" or "point of sale" or pour* or ((product or products) adj5 alcohol) or unit or units).ab,kf,kw,ti.)	26652



22	(Recommended Dietary Allowances/ or Dietary Sucrose/ or Dietary Fats/ or Dietary Carbohydrates/ or Dietary Sugars/ or Energy Intake/ or Nutritional Requirements/ or Serving Size/) and label*.ab,kf,kw,ti.	2726
23	("alcohol label*" or "beverage label*" or "container label*" or "counter-market*" or countermarket* or ((cue* or "health education" or "health marketing" or (label* not "open label*") or messag* or "social marketing" or text) adj5 (bottle* or glass* or container* or packag* or "point of choice" or "point of purchas**" or "point of sale" or pour* or ((product or products) adj5 alcohol) or unit or units)) or decal or decals or disclaimer* or "drink label*" or graphic* or infographic* or labels or ((label* not "open label*") and (drink* or health)) or "labelling alcohol*" or "labelling of alcohol*" or "labelling on alcohol*" or pictogram* or pictograph* or pictorial* or "plain packag*" or sticker* or "unit label*" or warn* or "nutritional information" or "nutrient information" or ((calori* or energy or nutrition or nutritional or nutrient or fat or fats or sugar or sugars or sucrose or carb or carbs or carbohydrate* or "healthy choice*") and label*) or ((calorie* or caloric or calorific) adj3 information) or "nutrition information" or "guideline daily amount" or "recommended daily amount" or "recommended dietary allowance*" or "nutrient reference value*" or "nutrient daily value*").kf,kw,ti.	28557
24	label*.ti. not (Isotope Labeling/ or exp Isotopes/ or Biosensing Techniques/ or exp Chemistry Techniques, Analytical/ or "open label*".ti. or ch.fs.)	32707
25	("alcohol label*" or "beverage label*" or "container label*" or "counter-market*" or countermarket* or ((cue* or "health education" or "health marketing" or (label* not "open label*") or messag* or "social marketing" or text) adj5 (bottle* or glass* or container* or packag* or "point of choice" or "point of purchas**" or "point of sale" or pour* or ((product or products) adj5 alcohol) or unit or units)) or decal or decals or disclaimer* or "drink label*" or graphic* or infographic* or labels or ((label* not "open label*") and (drink* or health)) or "labelling alcohol*" or "labelling of alcohol*" or "labelling on alcohol*" or pictogram* or pictograph* or pictorial* or "plain packag*" or sticker* or "unit label*" or warn* or "nutritional information" or "nutrient information" or ((calori* or energy or nutrition or nutritional or nutrient or fat or fats or sugar or sugars or sucrose or carb or carbs or carbohydrate* or "healthy choice*") and label*) or ((calorie* or caloric or calorific) adj3 information) or "nutrition information" or "guideline daily amount" or "recommended daily amount" or "recommended dietary allowance*" or "nutrient reference value*" or "nutrient daily value*").ab. /freq=2 and (alcopop* or "alco-pop*" or ((alcohol* or ethanol) and (beverage* or drink*)) or (alcohol and ("use" or misus* or abus* or drink* or beverage* or intak* or consum* or estimat* or attitud* or policy or policies)) or beer* or booze or "drink wise" or drinkwise or "drinking guidelines" or (drink* adj3 moderation) or liquor or liquors or "low risk drinking" or "low risk drinker*" or "high risk drinking" or "high risk drinker*" or "moderate drinking" or "moderate drinker*" or "heavy drinking" or "heavy drinker*" or "problem drinking" or "problem drinker*" or "sensible drinking" or "sensible drinker*" or spirits or "standard drink*" or wine*).ti.	192
26	21 or 22 or 23 or 24 or 25	80801
27	20 and 26	914
28	("alcohol label*" or "alcohol warning label*" or "alcohol warning**" or ((alcohol* or "standard drink*") and ("beverage label*" or "cancer risk warning*" or "container label*" or "drink label*" or "health warning*" or "unit label*" or "warning display*" or "warning label*" or "warning statement*")) or "labelling alcoholic beverage*" or "labelling alcoholic drink*" or "labelling of alcoholic beverage*" or "labelling of alcoholic drink*" or "labelling on alcoholic beverage*" or "labelling on alcoholic drink*" or "standard drink* label*" or "warning* on alcohol" or "warning* on beverage*" or "warning* on drink*").mp.	246
29	27 or 28	976
30	exp Animals/ not (exp Animals/ and Humans/)	4795111
31	29 not 30	915
32	limit 31 to english	867
33	remove duplicates from 32	866
34	33 not 16	25



## Appendix III: Quality Appraisal

Table 5: Quality Appraisal Of Experimental and Quasi-experimental Studies (EPHPP)

Author, Year	A) Selection bias	B) Study design	C) Confounders	D) Blinding	E) Data collection methods	F) Withdrawals and dropouts	Final rating
Al-hamdani, 2015	Weak	Strong	Weak	Moderate	Strong	Moderate	Weak
Al-hamdani, 2017	Weak	Strong	Strong	Moderate	Strong	Weak	Weak
Annunziata, 2019	Moderate	Strong	Moderate	Moderate	Weak	Weak	Weak
Armitage, 2016	Weak	Strong	Strong	Moderate	Strong	Moderate	Moderate
Blackwell, 2018	Moderate	Strong	Weak	Moderate	Weak	Moderate	Weak
Brunk, 2020	Moderate	Weak	Weak	Moderate	Strong	Weak	Weak
Bui, 2008	Moderate	Strong	Weak	Moderate	Moderate	Weak	Weak
Clarke, 2021	Weak	Strong	Strong	Moderate	Weak	Moderate	Weak
de Wilde, 2016	Weak	Strong	Weak	Moderate	Weak	Moderate	Weak
Escandon-Barbosa, 2019	Moderate	Weak	Weak	Moderate	Weak	Weak	Weak
Gold, 2021	Moderate	Strong	Strong	Strong	Weak	Not applicable	Moderate
Hall, 2019	Moderate	Strong	Weak	Moderate	Weak	Weak	Weak
Hobin, 2018	Moderate	Strong	Strong	Moderate	Weak	Moderate	Moderate
Hobin, 2020a	Weak	Strong	Weak	Moderate	Weak	Weak	Weak
Hobin, 2020b	Weak	Moderate	Strong	Moderate	Strong	Weak	Weak
Hobin, 2020c	Weak	Strong	Strong	Moderate	Weak	Moderate	Weak
Jorgenson, 2018a	Moderate	Strong	Strong	Moderate	Weak	Moderate	Moderate
Jorgenson, 2018b	Moderate	Strong	Moderate	Moderate	Weak	Weak	Weak
Kersbergen, 2017	Weak	Strong	Strong	Moderate	Strong	Moderate	Moderate
Martinez, 2015	Moderate	Strong	Weak	Moderate	Weak	Moderate	Weak
Maynard, 2018	Moderate	Strong	Strong	Strong	Moderate	Weak	Moderate
Monk, 2017	Moderate	Strong	Strong	Moderate	Weak	Moderate	Moderate
Osiowy, 2015	Weak	Strong	Strong	Moderate	Weak	Strong	Weak
Pabst, 2021	Moderate	Weak	Weak	Moderate	Weak	Not Applicable	Weak
Pechey, 2020	Moderate	Strong	Weak	Moderate	Moderate	Weak	Weak



Pettigrew, 2016	Moderate	Moderate	Weak	Moderate	Weak	Weak	Weak
Pham, 2018	Moderate	Strong	Weak	Moderate	Weak	Moderate	Weak
Schoueri-Mychasiw, 2020a	Weak	Moderate	Strong	Moderate	Strong	Weak	Weak
Schoueri-Mychasiw, 2020b	Weak	Moderate	Strong	Weak	Weak	Weak	Weak
Sillero-Rejan, 2018	Moderate	Strong	Weak	Strong	Weak	Weak	Weak
Sillero-Rejan, 2019	Moderate	Strong	Weak	Moderate	Weak	Moderate	Weak
Stafford, 2017	Weak	Strong	Weak	Moderate	Strong	Moderate	Weak
Vecchio, 2018	Weak	Weak	Weak	Moderate	Strong	Weak	Weak
Weerasinghe, 2020	Weak	Moderate	Strong	Moderate	Strong	Weak	Weak
Wigg, 2016	Weak	Strong	Strong	Moderate	Moderate	Moderate	Moderate

Table 6: Quality Appraisal of Cross-sectional and Interrupted Time-series Studies (NOS)

Author, Year	Representativeness	Sample size	Non-respondents	Risk Factor	Controls for one factor	Controls for additional factor	Assessment of outcome	Statistical test	Score	Final rating
Annunziata, 2017	0	0	0	1	0	0	1	0	2	Weak
Annunziata, 2016a	1	0	0	1	1	1	1	1	6	Moderate
Annunziata, 2016b	1	0	0	1	1	1	1	1	6	Moderate
Annunziata, 2016c	1	0	0	1	1	1	1	1	6	Moderate
Bhawra, 2018	1	0	0	1	1	1	1	1	6	Moderate
Buykx, 2015	0	0	0	1	1	1	1	1	5	Moderate
Coomber, 2017a	0	1	0	1	1	1	1	1	6	Moderate
Coomber, 2017c	1	1	0	1	1	1	1	1	7	Strong
Critchlow, 2019	1	1	0	1	0	0	1	1	5	Moderate
Dekker, 2020	1	0	0	0	1	1	1	1	5	Moderate
Kongats, 2020	1	1	0	1	1	0	1	1	6	Moderate



Maharaj, 2018	0	1	1	2	1	0	1	1	7	Moderate
Miller, 2016	0	0	0	1	1	1	1	1	5	Moderate
Rosseim, 2020	0	1	0	1	1	0	1	1	5	Moderate
Winstock, 2020	0	1	0	1	0	0	1	1	4	Weak
Vallance, 2020	1	0	0	1	1	1	1	1	6	Moderate
Zhao, 2020	1	1	0	0	1	1	1	1	6	Moderate

**Table 7: Quality Appraisal of Mixed Methods Studies (MMAT)**

Author, Year	Qualitative	Quantitative (RCT)	Quantitative (non-randomized)	Quantitative (descriptive)	Mixed methods	Final rating
Clarke 2020	5 of 5 (Yes to 1.1, 1.2, 1.3, 1.4, 1.5)	3 of 5 (yes to 2.2, 2.3, 2.5)	N/A	N/A	3 of 5 (Yes to 5.1, 5.3, 5.5)	Moderate
deVisser, 2017	4 of 5 (Yes to 1.1, 1.2, 1.4, 1.5)	N/A	4 of 5 (Yes to 3.2, 3.3, 3.4 and 3.5)	N/A	4 of 5 (Yes to 5.1, 5.2, 5.3, 5.4)	Moderate
Li, 2017	5 of 5 (Yes to 1.1, 1.2, 1.3, 1.4, 1.5)	N/A	N/A	4 of 5 (Yes to 4.1, 4.2, 4.3, 4.5)	5 of 5 (Yes to 5.1, 5.2, 5.3, 5.4, 5.5)	Strong
Roderique-Davies, 2020	5 of 5 (Yes to 1.1, 1.2, 1.3, 1.4, 1.5)	N/A	N/A	2 of 5 (Yes to 4.3, 4.5)	2 of 5 (Yes to 5.1, 5.3)	Moderate
Thomson, 2012	3 of 5 (Yes to 1.1, 1.2, 1.3)	N/A	N/A	3 of 5 (Yes to 4.1, 4.3, 4.5)	5 of 5 (Yes to 5.1, 5.2, 5.3, 5.4, 5.5)	Moderate

**Table 8: Quality Appraisal of Qualitative Studies (CASP)**

Author, Year	1: Clear aims	2: Qualitative approach is appropriate	3: Research design	4: Recruitment	5: Data collection	6: Researcher participant relationship	7: Ethical considerations	8: Data analysis	9: Statement of findings	10: Value of research	Score	Final rating
Coomber, 2018	1	1	1	1	1	0	1	1	1	1	9	Strong
Coomber, 2017b	1	1	1	1	1	0	1	1	1	1	9	Strong
Dossou, 2017	1	1	1	0	1	0	0	0	1	1	6	Moderate
Pabst, 2019	1	1	1	1	1	0	1	1	1	0	8	Strong
Vallance, 2018	1	1	1	1	1	0	1	1	1	1	9	Strong



## Appendix IV: Images of Alcohol Container Nutrition Labels

Annunziata, 2016c<sup>73</sup>

Two of 36 manipulated wine container labels:

- i) No nutrition information, a health message and logo, drink limit guidelines, alcohol by volume, and lower price
- ii) Calories per glass icon; no health message, drink limit guidelines, alcohol by volume, and higher price



Reprinted from Annunziata, A., Pomarici, E., Vecchio, R., & Mariani, A. (2016c). Nutritional information and health warnings on wine labels: Exploring consumer interest and preferences. *Appetite*, 106, 58–69. With permission from Elsevier.



Bui, 2008<sup>65</sup>

- i) Control condition back container label: Mandatory United States government warning statements
- ii) Manipulated condition back container label: Mandatory government warning statements; a nutrition facts label with calorie, carbohydrate, fat, protein, alcohol per serving; serving size; servings per container; and standard drinks per serving



Control condition: Light Beer

Manipulated condition: Wine

Reprinted from Bui, M., Burton, S., Howlett, E., & Kozup, J. (2008). What am I drinking? The effects of serving facts information on alcohol beverage containers. *Journal of Consumer Affairs*, 42(1), 81–99. Copyright 2008 by the American Council on Consumer Interests.



## Pabst, 2019<sup>78</sup>

Label conditions viewed by focus group participants:

- i) No nutrition information
- ii) Detailed nutrition facts label containing calorie, alcohol, fat, carbohydrate, protein and salt content per 100mL
- iii) Detailed nutrition facts label per 100mL plus a condensed ingredients list
- iv) Detailed nutrition facts label per 100mL plus an extensive ingredients list

Version 1	Version 2																																				
<p>Rheingau • 2016 Riesling</p> <p>This fresh and fruity Riesling classic comes from the Geisenheim vineyards Mäuerchen and Fuchsberg. The wine is typical for the region and has a harmonious sweetness and acidity. The fragrance is elegant, with fine peach aromas, floral nuances and ripe apple fruit. The subtle residual sweetness makes the fruit appear much juicier and more intense on the palate.</p> <p>German quality wine Estate bottled A.P.Nr. 5512 22 14 Contains sulphites</p> <p>Winery of Geisenheim University GER – 65366 Geisenheim</p> <p>0.75 l                    12.5 % vol</p>	<p>Rheingau • 2016 Riesling</p> <table border="1"><thead><tr><th>Average nutritional values</th><th>per 100 ml</th></tr></thead><tbody><tr><td>Caloric value (kJ/kcal)</td><td>317/ 76</td></tr><tr><td>Ethyl alcohol</td><td>10.0 g</td></tr><tr><td>Fat</td><td>&lt;0.1 g</td></tr><tr><td>    hereof saturated fatty acids</td><td>0.0 g</td></tr><tr><td>Carbohydrates</td><td>1.0 g</td></tr><tr><td>    hereof sugar</td><td>1.0 g</td></tr><tr><td>Protein</td><td>&lt;0.1 g</td></tr><tr><td>Salt</td><td>&lt;0.1 g</td></tr></tbody></table> <p>German quality wine Estate bottled A.P.Nr. 5512 22 14 Contains sulphites</p> <p>Winery of Geisenheim University GER – 65366 Geisenheim</p> <p>0.75 l                    12.5 % vol</p>	Average nutritional values	per 100 ml	Caloric value (kJ/kcal)	317/ 76	Ethyl alcohol	10.0 g	Fat	<0.1 g	hereof saturated fatty acids	0.0 g	Carbohydrates	1.0 g	hereof sugar	1.0 g	Protein	<0.1 g	Salt	<0.1 g																		
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Average nutritional values	per 100 ml																																				
Caloric value (kJ/kcal)	317/ 76																																				
Ethyl alcohol	10.0 g																																				
Fat	<0.1 g																																				
hereof saturated fatty acids	0.0 g																																				
Carbohydrates	1.0 g																																				
hereof sugar	1.0 g																																				
Protein	<0.1 g																																				
Salt	<0.1 g																																				

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## Pabst, 2021<sup>69</sup>

Three of nine manipulated nutrition and ingredients label conditions:

- i) No nutrition information, a condensed ingredients list
- ii) Calorie content per 100mL, no ingredients list
- iii) Nutrition facts label per 100mL, an extensive ingredients list

<b>LANGHORNE CREEK</b> CABERNET SAUVIGNON	<b>BAROSSA VALLEY</b> CABERNET SAUVIGNON	<b>BAROSSA VALLEY</b> BARBERA
 A dark and oaky wine, with a lovely texture and taste of blackberry and capsicum	 A dark and oaky wine, with a lovely texture and taste of blackberry and capsicum   Great match with braised lamb, steaks, and blue cheese	
PRODUCED BY BEYOND WINES 23 THE ROAD LANGHORNE CREEK, SA 5255	Average nutritional values per 100 ml  Energy value (kJ/kcal) 356/85	PRODUCED BY KAPUNDA WINES 64 KRONDORF RD. KAPUNDA, SA 5373
\$16.99	\$16.99	\$16.99
Ingredients: grapes; Acidity regulator: L-tartaric acid; Preservative: sulphites; Stabilizer: tannins	Contains Sulphites	Ingredients: grapes; Acidity regulators: L-tartaric acid, malic acid; Antioxidant: ascorbic acid; Preservative: sulphites; Stabilizers: citric acid, gum arabic, metatarsitic acid; tannins
WINE OF AUSTRALIA LOT 11218	WINE OF AUSTRALIA LOT 22618	WINE OF AUSTRALIA LOT 22618
6 71860 01362 4 750ml 14% ALC/VOL	6 71860 01362 4 750ml 14% ALC/VOL	6 71860 01362 4 750ml 14% ALC/VOL

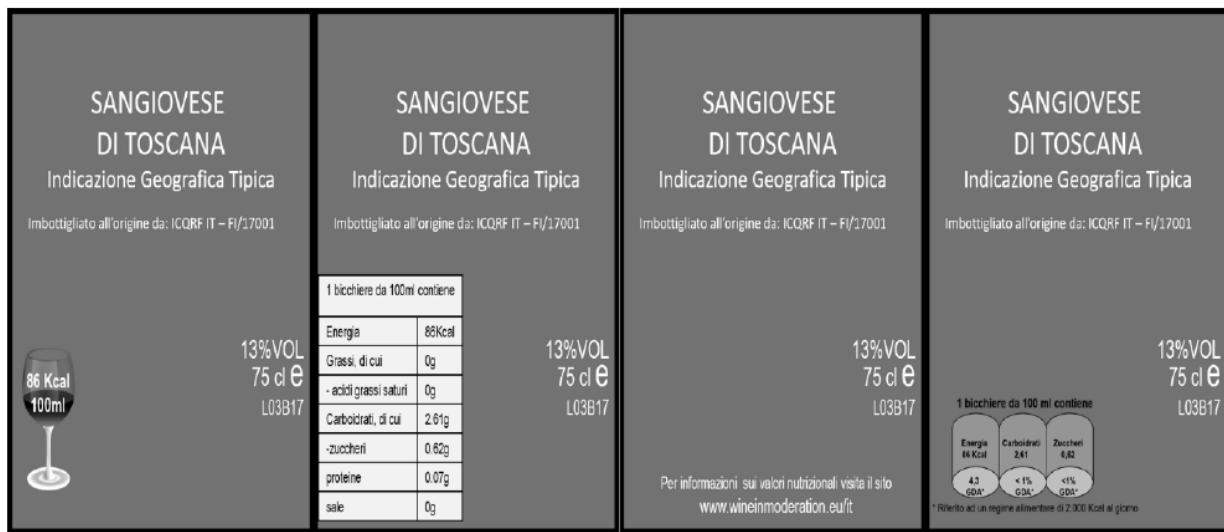
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## Vecchio, 2018<sup>70</sup>

Four nutrition label conditions presented to experimental auction participants:

- i) Calorie content per 100mL
- ii) Nutrition facts label per 100mL with calorie, fat, carbohydrates, sugar, protein and salt content
- iii) Website URL for detailed product and nutrition information
- iv) Calorie, carbohydrate, and sugar content per 100mL of wine presented as a % guideline daily amount icon



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